R-7

Vostok Kaluga Museum
Credit: © Mark Wade

Russian intercontinental ballistic missile and launch vehicle series. The world's first ICBM and first orbital launch vehicle. The original 8K71 version was never actually put into military service, being succeeded by the R-7A 8K74.

The world's first ICBM became the most often used and most reliable launch vehicle in history. The original core+four strap-on booster missile had a small third stage added to produce the Vostok launch vehicle, with a payload of 5 metric tons. Addition of a larger third stage produced the Voskhod/Soyuz vehicle, with a payload over 6 metric tons. Using this with a fourth stage, the resulting Molniya booster placed communications satellites and early lunar and planetary probes in higher energy trajectories. By the year 2000 over 1,628 had been launched with an unmatched success rate of 97.5% for production models. Improved models providing commercial launch services for international customers entered service in the new millennium, and a new launch pad at Kourou was to be inaugurated in 2009. It appeared that the R-7 could easily still be in service 70 years after its first launch.

AKA: 8K71;Sapwood;SS-6 Mod 1. *Status*: Retired 1961. *First Launch*: 1957-05-15. *Last Launch*: 1960-06-04. *Number*: 26 . *Payload*: 5,370 kg (11,830 lb). *Thrust*: 3,904.00 kN (877,654 lbf). *Gross mass*: 279,100 kg (615,300 lb). *Height*: 33.50 m (109.90 ft). *Diameter*: 2.95 m (9.67 ft). *Apogee*: 1,000 km (600 mi).

Development of the R-7 began under research project N-3 "Development requirements for a liquid rocket with a range of 5,000 to 10,000 km and a warhead of 1 to 10 metric tons". The research project was authorized in a decree of 4 December 1950. The study was headed by Korolev's NII-88 but involved a wide range of other Soviet research institutes:

- OKB-456 - Glushko - Engines
- NII-885 - Ryazanskiy, Pilyugin - Guidance
- NII-3 - Shebanin / GSKB Spetsmash - Launch facility
- KB-11 - Nuclear warhead
- NII-4 - Sokolov - Launch pad development
- TSIAM - Svishchev
- TsAGI - Dorognitsin, Struminskiy - aerodynamics
- NII-6 - Sukhikh
- NII-125 - Zhukov
- NII-137 - Kostrov
- NII-504 - Karpov
- NII-10 - Kuznetsov - gyro platform
- NII-49 - Charin
- Mathematics Institute - Steklov and Keldysh

The research program tackled a range of difficult problems to achieve a rocket with the following new technologies:

- Engines of 200 to 300 metric tons thrust, burning Lox/Kerosene propellant in place of the Lox/Alcohol used in rockets derived from German work, with a vacuum specific impulse of 325 seconds
- Nuclear payload reduction to the 3 to 5 metric ton range
- Autonomous inertial and radio guidance systems
- Heat shield and re-entry vehicle development to enable the warhead to survive re-entry into the atmosphere at 6 to 7 km/sec
- Parametric studies to determine the optimum rocket configuration

Following completion of this basic research, work was focused in the successor project N-1, "Theoretical experimental research for a two stage ballistic rocket with a range of 7,000 to 8,000 km". Work on the N-1 was authorized by a decree of 13 February 1953. The objective was to create a draft project for a two stage ICBM with a range of 8,000 km, a fission warhead mass of 3,000 kg, and a gross lift-off mass of 170 metric tons.

Work was well underway when the requirements were suddenly altered on 3 October 1953. Tests at Semipalatinsk had demonstrated the possibility of building a thermonuclear warhead of vastly greater power. However the total warhead mass would have to be increased to 5,500 kg, with the net mass of only the nuclear device itself being 3,000 kg. The rocket designed to that point would have a range of only 5,500 km with such a warhead. A meeting was called of the Chief Designers in January 1954 to discuss how to handle the problem. Several weight saving measures were used. The single engines per module were replaced by small diameter engines of reduced length; the propellant tanks were laid out to minimize mass; a unique launch pad design was accepted that suspended

the rocket above the flame pit and shielded it from cross winds, which allowed a lighter structure.

Another technical challenge were the small vernier rockets used to pitch the rocket. These had to have a high specific impulse, gimbal 45 degrees, and deliver a thrust of 2.5 metric tons. Glushko could not deliver an engine with these characteristics, so Melnikov of OKB-1 was assigned the task of designing the engines in-house. The engine that resulted met the requirements and was the technological basis for later rocket engines developed within OKB-1 (the Lox/Kerosene upper stage engines for the Molniya, N1, and Proton boosters).

By February 1954 the stage was reached where a final design was possible. A government declaration of 20 May 1954 authorized development of the two stage R-7 / 8K71 intercontinental ballistic missile. This was followed by a decree of 28 June 1954 'On plans N/R for space research'. Implementation came via a Ministry of Defence decree of 6 July 1954 calling on all industry organizations to work together and assigning the project the highest national priority. The draft project, using much material generated for the T-1 project, was completed in July 1954.

The vehicle in the draft project used the 'packet' layout with a hammerhead core stage surrounded by four shorter booster stages. At ignition, the four booster stages ignited. If full thrust was achieved, the core was then ignited and the booster rose on the thrust of all five stages. The rocket could boost the 5500 kg warhead to 7.9 km/s and 8,000 km range, with a maximum miss distance of plus or minus 10 km. The warhead was the German 'sharp point': a 16 degree cone, 7.27 m long, mounted atop a cylindrical interstage section. The rocket had a gross lift-off mass of 280 metric tons, and an empty mass of 27 metric tons. The first stage burned out at 2,170 m/s and the second stage at 6,385 m/s. Thrust at lift-off was 403.4 metric tons. The R-7 incorporated ingenious solutions in ground handling of the large rocket. The rocket would be assembled horizontally, rolled out to the pad, then raised to the vertical position and quickly fuelled.

The expert commission deemed the decree requirements to be fulfilled and recommended construction of the rocket with minor changes in the development plan. The government authorized the construction phase in a decree of 20 November 1954. Korolev froze the design on 11 March 1955 and drawing release and parts fabrication began.

Meanwhile work was underway to provide the infrastructure needed for the test program. The Soviet Union was so vast that it was possible to test a missile with intercontinental range within its borders. A warhead impact area on the Kamchatka peninsula was selected, and in August 1955 at unit was formed at the village of Klyuchan in the Ust-Kamchatka region. Although eventually operated by the strategic rocket forces, his base was originally founded in 1913 to support the Kamchatka Fleet. To track incoming warheads, station NIP-6 was built at Ylizora in addition to NIP-7 at Klyuchan.

By 20 March 1956 a decree set forth the impending three stage development test plan:

- Two lots of prototype rockets for stand tests and one lot for flight tests
- Following completion of the prototype test series, incorporate necessary changes

into next lot of rockets
- Final lot of rockets representing production configuration flight tested to verify changes

It turned out that the biggest problem was development of the vernier rockets for the first stage. Glushko was uncooperative and special test stands had to be build to test the integrated propulsion system.

In the first half of 1956 work began in earnest at 36 factories with the objective of making the first test flight by the end of the year. The first article completed was a full scale mock-up consisting of the core and one booster stage. Two Block A and B stages were delivered for stand tests, but incomplete factory test equipment held up the start. At that point it seemed impossible that a flight would be made within the year.

By the second half of 1956 solutions had been found to the outstanding problems. Serial production of rockets had begun. The Progress Aviation Factory in Samara, V Ya Litvinov manager, had been selected to fabricate detailed parts but final assembly of the prototype rockets was carried out at Factory 88 in Kaliningrad. Over time the factory at Samara would be organised as the Third Filial of OKB-1 and take over first production, and then engineering, of future R-7 derivatives. In 1974 it became the TsKB, a separate entity.

R-7 systems were developed in the following research program:

- The radio guidance system was flight tested on R-5R modifications of the R-5 IRBM. Launches on 31 May and 15 June 1956 proved the system.
- The R-7's propellant utilization system, velocity integrator, stabilization system, Tral telemetry system, and Fakel control system were tested in two phases of 5 flights each of the M5RD modification of the R-5. Five Phase 1 flights took place from 16 February to 23 March 1956, followed by five Phase 2 flights from 20 July to 18 August 1956.
- The unique Tyulpan launch concept - suspension of the rocket from its 'shoulders' over the flame pit - was tested at a huge mock-up, 19 m in diameter, at the LMZ Leningrad Metal Foundry Factory. The rig also allowed hydraulics test of a mock-up booster with water in the tanks (protected by an anti-corrosion agent). The increasingly elaborated mock-up allowed the interface between the suspension arms and the rocket to be worked out in detail. Simulated launches allowed the separation of the vehicles and the umbilicals to be worked out, as well as the zero-shock launch concept (there were no hold-down clamps - once thrust built up, the rocket rose, and the suspension arms rotate away on counter-weights). LMZ also used the mock-up to develop ground handling, horizontal assembly, and installation protocols for the launch vehicle. The methods worked out in that summer remained in continuous use until well into the 21st Century.
- Rocket engine stand test were conducted at Filial 2 of NII-88 from July 1956 to March 1957. These included determining the best arrangement of engines and their components to minimize thermal and vibration effects. Also conducted were liquid oxygen / liquid nitrogen loading, control systems and vernier tests.
- Five test stand firings using three complete booster stages, were conducted on 15

August, 1 September, 24 September, 11 October, and 3 December 1956
- Three test stand firing using two core stages were conducted on 27 December 1956 and 10 and 26 January 1957.
- Two test stand firing were conducted using the complete rocket with four booster stages and the core stage. Ground test article s/n 2S was fired on 20 February 1957 and flight article s/n 4SL was fired on 30 March 1957.
- Ground test article s/n 5N was delivered to Baikonur in December 1956 for facilities verification tests, including ground handling, transport, assembly, erection, and propellant loading.
- The first flight article M1-5 was delivered to Baikonur in March 1957. The launch commission met on 10 April and certain questions were raised regarding the flight readiness due to test stand and ground test adequacy. Once these were resolved M1-5 was cleared for flight, and the first launch took place on 15 May 1957.

Test flights of the first lot of 12 prototype missiles was completed on January 30, 1958. By that time the Soviet Union had used the R-7 to demonstrate the first full-range ICBM and orbit the first two artificial satellites of the earth. Two further lots of missiles were test flown through December 1959. These demonstrated a flight configuration capable of carrying a nuclear warhead. But the 8K71 version of the missile was never actually put into service. The R-7, combined with upper stages, continued as the mainstay of the Russian space program into the 21st Century.

Maximum range: 8,000 km (4,900 mi). *Number Standard Warheads:* 1. *Warhead yield:* 3,000 KT. *CEP:* 3.39 km (2.10 mi). *Boost Propulsion:* Liquid rocket, Lox/Kerosene. *Cruise engine:* RD-108. *Initial Operational Capability:* 1959.

Stage Data - R-7

- Stage 0. 4 x R-7 8K71-0. *Gross Mass*: 43,100 kg (95,000 lb). *Empty Mass*: 3,500 kg (7,700 lb). *Thrust (vac)*: 970.000 kN (218,060 lbf). *Isp*: 306 sec. *Burn time*: 120 sec. *Isp(sl)*: 250 sec. *Diameter*: 2.68 m (8.79 ft). *Span*: 2.68 m (8.79 ft). *Length*: 19.00 m (62.00 ft). *Propellants*: **Lox/Kerosene**. *No Engines*: 1. *Engine*: **RD-107-8D74**. *Status*: Out of Production.

- Stage 1. 1 x R-7 8K71-1. *Gross Mass*: 95,300 kg (210,100 lb). *Empty Mass*: 7,500 kg (16,500 lb). *Thrust (vac)*: 912.000 kN (205,025 lbf). *Isp*: 308 sec. *Burn time*: 330 sec. *Isp(sl)*: 241 sec. *Diameter*: 2.99 m (9.80 ft). *Span*: 2.99 m (9.80 ft). *Length*: 28.00 m (91.00 ft). *Propellants*: **Lox/Kerosene**. *No Engines*: 1. *Engine*: **RD-108-8D75**. *Status*: Out of Production.

***More at*: R-7.**

Subtopics

T-1 Original conceptual design for ICBM. Final design was R-7 due to unachievability of mass ratio for this single stage design. Data from chart

at Russian Space Agency HQ.

R-7A Russian intercontinental ballistic missile. The R-7A was an improved version of the R-7 first ICBM, and the one actually deployed to pads in Baikonur and Plesetsk. The missile saw service from 1960 to 1968. Four pads at Plesetsk, and one reserve pad at Baikonur, were operational at the peak of deployment in 1962. These were the Soviet Union's only strategic missile deterrent during the Cuban Missile Crisis.

Vostok-L 8K72 Russian orbital launch vehicle. R-7 ICBM with single-engine upper stage used for early Soviet unmanned lunar shots.

Molniya 8K78 Russian orbital launch vehicle. Four stage derivative of the R-7 ICBM developed on a crash-program basis in 1960 for Soviet lunar and planetary deep space probe missions. The third stage found later use in the Voskhod and Soyuz launchers. By the 1970's mature versions of the launch vehicle were used almost entirely for launch of Molniya communications satellites and Oko missile early warning spacecraft into elliptical, 12-hour earth orbits.

Molniya 8K78L Russian orbital launch vehicle. The Molniya 8K78L was designed by Korolev's design bureau for launching a manned spacecraft on a flyby of the Moon and return to earth. To achieve this it would have used LOx/LH2 engines in the third and fourth stages. Preliminary design was completed on 8 July 1962, but such technology was years away in the Soviet Union and the project was not pursued further.

Molniya 8K78/E6 Russian orbital launch vehicle. Molniya adaptation for launch of E-6 lunar probes.

Sputnik 11A59 Russian orbital launch vehicle. Two stage version of Vostok 11A57. Used for flight test of prototype Chelomei ASAT after cancellation of UR-200 booster and before availability of Tsyklon.

Soyuz 11K55 Russian orbital launch vehicle. Version of the Soyuz launcher envisioned for the cancelled Soyuz B translunar rocket stage.

Soyuz 11K56 Russian orbital launch vehicle. Version of the Soyuz launcher envisioned for the cancelled Soyuz V tanker spacecraft.

Molniya 8K78M Russian orbital launch vehicle. Improved Molniya, in variants with Blocks ML, 2BL, or SO-L third stages according to payload.

Soyuz 11A510 Russian orbital launch vehicle. Version of R-7 launch vehicle with Vostok second stage and unknown third stage used only twice to launch prototype RORSATs. These satellites were originally to have been launched on the cancelled UR-200 launcher, and operational satellites used Tsyklon-2 launchers.

Soyuz 11A514 Russian orbital launch vehicle. Version of Soyuz launcher with increased payload, designed to launch Soyuz R military reconnaissance satellite. Cancelled along with the Soyuz R project in 1966. Unknown differences to standard Soyuz to reach payload requirement of circa 6700 kg to 65 degree orbit.

Molniya-M Blok-VL Russian orbital launch vehicle variant.

Soyuz 11A511M Russian orbital launch vehicle. Development of the Soyuz-M began in 1967 to launch the 6.6 metric ton Soyuz 7K-VI manned military spacecraft into a 65-degree inclination earth orbit. The spacecraft was cancelled, but development continued, and eight Soyuz-M's were built and used to launch Zenit-4MT reconnaissance satellites in 1971-1976. It has been said that these missions flew elements of the 11A511U modifications (such as the 11D511/11D512 variants of the RD-107/8 engines).

Soyuz-U Russian standardized man-rated orbital launch vehicle derived from the original R-7 ICBM of 1957. It has been launched in greater numbers than any orbital launch vehicle in history. Not coincidentally, it has been the most reliable as well. After over 40 years service in Russia, ESA built a new launch pad at Kourou which will keep it in service from three launch sites in three countries well into the mid-21st Century.

Soyuz-U-PVB Russian orbital launch vehicle. Version of Soyuz-U with safety modifications to prevent and resist fires in all stages and the upper stage avionics compartment. These were incorporated as a result of the 18 March 1980 disaster at Plesetsk, when the launch vehicle exploded, killing 18 and putting the pad out of commission for three years.

Molniya 8K78M-PVB Russian orbital launch vehicle. Version of Molniya 8K78M with safety modifications to prevent and resist fires in all

stages and the upper stage avionics compartment. These were incorporated as a result of the 18 March 1980 disaster at Plesetsk, when the launch vehicle exploded, killing 18 and putting the pad out of commission for three years.

Yamal launch vehicle Version of the Soyuz proposed with an Ariane 4 or Russian LOx/LH2 upper stage.

Soyuz-U Ikar Russian orbital launch vehicle variant.

Soyuz 11A511U / Ikar Russian orbital launch vehicle. Standard Soyuz universal booster with the Ikar upper stage, derived from the propulsion system for the Kozlov Yantar series of spy satellites.

Soyuz-U Fregat Russian orbital launch vehicle variant.

Soyuz 11A511U / Fregat Russian orbital launch vehicle. Standard Soyuz universal booster with the Fregat upper stage, derived from the propulsion system for Lavochkin interplanetary probes.

Soyuz-FG Uprated Soyuz booster designed for high performance Russian government missions and delivery of Soyuz and Progress spacecraft to the International Space Station. Upgraded engines, modern avionics, reduced non-Russian content. Unknown differences to Soyuz ST.

Soyuz-FG Fregat Russian orbital launch vehicle variant.

Soyuz-2-1A Alternate designation for [Soyuz-ST-B].

Soyuz-ST-B Uprated Soyuz booster designed for commercial customers. Upgraded engines, modern digital avionics, reduced non-Russian content. Can be used with either Ikar or Fregat upper stages. The 'FG' was the military version.

Onega Russian orbital launch vehicle. Launch vehicle proposed for the 'Kliper' manned spaceplane in 2004. The 'Onega' was a hitherto-unrevealed massive improvement of the reliable Soyuz. It would deliver double the payload to a space station orbit, and could be available by 2010 if funding was made available.

Soyuz-2-1A Fregat Russian orbital launch vehicle variant.

Soyuz-2-1B Russian orbital launch vehicle. Incorporates digital flight control system from Soyuz-2-1A with new RD-0124 upper stage engine.

Soyuz-2-1B Fregat Russian orbital launch vehicle variant.

Soyuz ST / Fregat ST Uprated Soyuz booster designed for commercial customers. Upgraded engines, modern avionics, reduced non-Russian content. Uses Fregat upper stage.

Soyuz-2-1A Fregat-M Russian orbital launch vehicle variant.

Soyuz-2-1B Fregat-M Russian orbital launch vehicle variant.

Soyuz-ST-A Russian orbital launch vehicle. Version of Soyuz-2-1A for launch from the European equatorial launch site at Kourou. Includes some European avionics and electrical systems, adjustments to communications equipment, and certification for the humid tropical climate.

Soyuz-2-1V A major derivative lightweight of the Soyuz, abandoning the four side-mounted conical strapon boosters that were the R-7 family's trademark since the ICBM and Sputnik launches in 1957. The core stage's lower section has been slightly enlarged in iameter and a new propulsion system used - the main engine is the NK-33A based on the NK-33 first developed (but never used) for the N-1 moon rocket in the 1970s. (An Americanized version of the NK-33, the Aerojet AJ-26, is the main engine for Orbital's new Antares rocket). The Soyuz-2-1V second stage is the same Blok-I stage as the existing Soyuz-2-1B, with an RD-0124 engine. An optional Volga third stage is a low-thrust orbit positioning bus derived from the Yantar satellite propulsion system.

Soyuz-2-1V Volga Russian orbital launch vehicle variant.

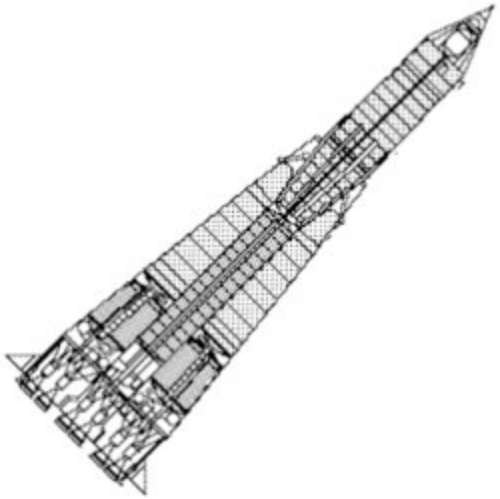
Soyuz-STA Fregat-M Russian orbital launch vehicle variant.

Soyuz-2-1A Volga Russian orbital launch vehicle variant.

Soyuz-5 Russian orbital launch vehicle proposed by the Kozlov bureau in 2015. A new lower stage using Lox/Methane propellants would be the basis of a family of launch vehicles.

Family: ICBM, orbital launch vehicle. *Country*: Russia. *Engines*: S1.35800, RD-107-8D74, RD-108-8D75. *Spacecraft*: Aist, Bars, Bion-M, BLITS, Chibis-M, DX 1, Ekspress-1000, ELiTeBus, Kanopus, MKA-FKI, NGB, Persona, Prima, Proteus, Relek, SKRL, SkySat, SSTL-900, Sterkh, Sumbandila , Tatyana, TET, Toronto GNB, UGATUSAT , Pleiades, VKA Myasishchev M-48, Sputnik 1, Sputnik 2, Sputnik 3, Raketoplan, Luna E-1, PKA, Sever, Luna E-1A, Luna E-3, VKA-23 Design 1, VKA-23 Design 2, Vostok, Mars 1M, Venera 1VA, Zenit-2 satellite, Oscar, Soyuz A, Soyuz B, Soyuz V, Vostok-Zh, L1-1962, Mars 2MV-1, Mars 2MV-2, Mars 2MV-4, Mars 2MV-3, Soyuz P, Soyuz R, Luna E-6, L2-1963, Polyot, Venera 3MV-1A, Zenit-4, Elektron-A, Elektron-B, Venera 3MV-1, Molniya-1, Meteor, Voskhod, Mars 3MV-4A, Soyuz 7K-TK, Soyuz PPK, Soyuz VI, Venera 3MV-4, Venera 3MV-3, US-A, Luna E-6S, Soyuz 7K-OK Tether, Luna E-6LF, Soyuz 7K-OK, Luna E-6M, Luna E-6LS, Venera 1V (V-67), Soyuz OB-VI, Nauka, Zenit-2M satellite, Zenit-4M, Yantar-1, Yantar-2, Venera 2V (V-69), Aelita satellite, Meteor M 11F614, Soyuz Kontakt, Zenit-4MK, Yantar-3KF, Venera 3V (V-70), LK, Tselina-D, Yantar-1KF, Soyuz 7KT-OK, Molniya-2, Zenit-4MT, Venera 3V (V-72), SRET, Energia satellite, Prognoz, Soyuz 7K-T, Oko, Bion, Soyuz 7K-TM, Yantar-2K, Soyuz 7K-T/A9, Meteor-Priroda, Soyuz 7K-S, Molniya-3, Meteor-2, Zenit-4MKT, Molniya-1T, Soyuz 7K-MF6, Zenit-6U, Yantar-6K, Yantar-6KS, Zenit-4MKM, Progress, Soyuz T, Magion, Astrofizika, Yantar-4K1, KRT-10, Resurs F1-17F41, Resurs-OE, Yantar-2K-M, Yantar-1KFT, Iskra, IK-B-1300, Astrozond, Glonass, Yantar-4KS1, Efir, Zenit-8, Foton, Resurs-O1, Soyuz TM, Resurs F1-14F40, Resurs F2, IRS, Resurs F1-14F43, Pion, Orlets-1, Progress M, Gamma, Mak, Znamya, Obzor, Resurs-Spektr, GFZ-1, MicroSat-100, Prognoz-M, Radarsat, Skipper, AMOS, MuSat, Inspector, PS Model, Mirka, YES, Star bus, Resurs F1M, Globalstar, MiniSat-400, Yamal, Progress M1, IRDT, Cluster 2, Progress M-SO, ISS Pirs, Kolibri, SPOT-5A-5B, Soyuz TMA, Mars Express, Cubesat, Myriade, Kliper, Nanosputnik, Venus Express, Metop, Meridian, Corot, Galileo Navsat, SSTL-150, Meteor-M, Gaia. *Launch Sites*: Baikonur, Baikonur LC1, Plesetsk, Baikonur LC31. *Stages*: Fregat, R-7 8K71-0, R-7 8K71-1. *Agency*: Korolev bureau. *Bibliography*: 100, 101, 102, 103, 104, 106, 113, 116, 118, 121, 138, 150, 16, 17, 173, 174, 175, 177, 178, 179, 2, 21, 23, 26, 32, 33, 4, 42, 51, 6, 60, 64, 65, 69, 78, 85, 89, 9, 93, 99, 11663.

Photo Gallery

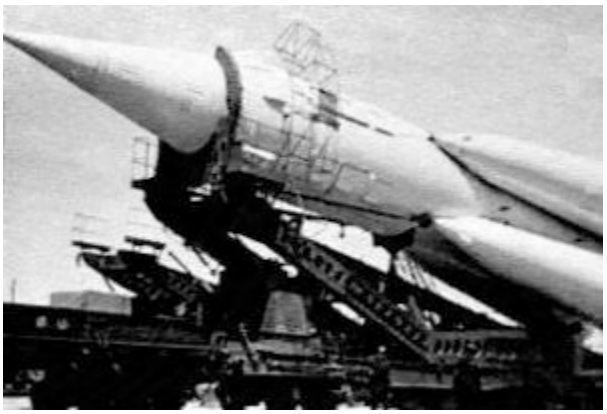


R-7 Sputnik

R-7 aft end
Credit: © Mark Wade

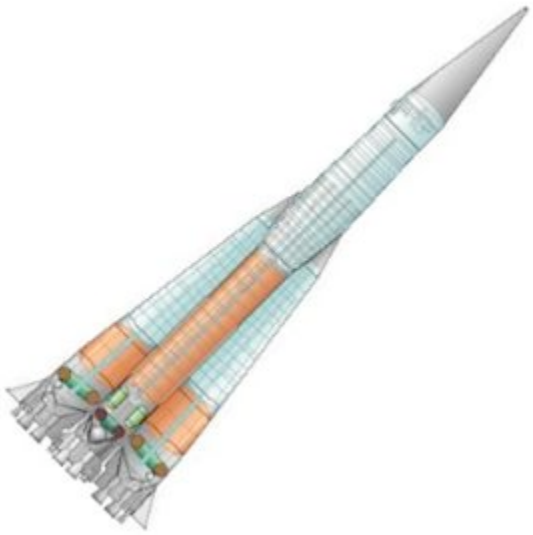
Korolev/Kurchatov
Architects of the Soviet nuclear deterrent.
Credit: RKK Energia

R-7 ICBM in assembly
R-7 ICBM in assembly hall
Credit: RKK Energia



R-7 raised
R-7 raised to launch position
Credit: RKK Energia

R-7
Credit: © Mark Wade



R-7
Credit: © Mark Wade

R-7 test console
Credit: © Mark Wade

Sputnik LV
Credit: © Mark Wade

1951 October 4 - . *Launch Vehicle*: R-7.

- **Russian satellite predicted.** - . *Nation*: USA. M. K. Tikhonravov in New York Times said U.S.S.R. science made feasible space flight and creation of artificial earth satellite; reported U.S.S.R. rocket advance equaled or exceeded West..

1954 May 30 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **Go-ahead for R-7 ICBM by designers council** - . *Nation*: Russia. Council of Chief designers approval to proceed with development of R-7..

1954 June 28 - . *Launch Vehicle*: R-7.

- **R-7 development plans.** - . *Nation*: Russia. Council of Soviet Ministers (SM) Decree 'On NIP Plan for Special Product--course of work on the R-7 ICBM' was issued..

1954 November 20 - . *Launch Vehicle*: R-7.

- **R-7 draft project approved.** - . *Nation*: Russia. Council of Soviet Ministers (SM) Decree 'On approval of the R-7 draft project' was issued..

1955 January 12 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **Tyuratam selected for ICBM test range.** - . *Nation*: Russia.

Council of Ministers selects Tyuratam for ICBM test site. The first 30 construction workers arrive at Tyuratam. The town founded at the rail staion is called Zarya (Dawn). The name will be changed to Leninsk in January 1958, but Zarya will remain the call sign of Soviet ground control.

1955 April - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **Housing/road constructions starts at Tyuratam** - . *Nation*: Russia.

1955 June 19 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **First surveyors arrive at Tyuratam.** - . *Nation*: Russia.

1955 August - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **LC 1 launch pad excavation starts** - . *Nation*: Russia.

1956 February 27 - . *Launch Vehicle*: R-7.

- **Soviet Leadership tours Korolev's design bureau** - . *Nation*: Russia. *Related Persons*: Bulganin, Khrushchev, Korolev, Ustinov.

  Khrushchev, Molotov, Bulganin, and other leaders are given a tour of Korolev's OKB-1 in Kaliningrad. They are shown the R-1, R-2 and R-5 missiles as well as a mock-up of the R-7 and are awed. Ustinov reports that only five warheads would be needed to destroy Britain, and seven to nine for France. The need for the R-12 was discussed - the longer range was essential so that the missiles could be based farther from NATO's borders (the experience of the German invasion and quick destruction of forward-based units and equipment was on everyone's minds).

1956 March 20 - . *Launch Vehicle*: R-7.

- **R-7 flight test authorised.** - . *Nation*: Russia. Decree 'On means to ensure testing or the R-7' was issued..

1956 April 4 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **First concrete poured at pad A at Tyuratam** - . *Nation*: Russia.

1956 June - . *Launch Vehicle*: R-7.

- **Zenit preliminary design complete** - . *Nation*: Russia. *Class*: Technology. *Type*: Navigation technology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit satellite. Design was original concept of Zenit reconnaisance spacecraft. The effort would later

be included in the Vostok program under the name of Zenit..

1956 June - . *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72.

- **First studies by Korolev OKB of manned spacecraft** - . *Nation*: Russia. *Related Persons*: Feoktistov, Korolev. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft*: Vostok. First studies by Korolev and Feoktistov of manned spacecraft. The first stage would be suborbital ballistic flights (like the US Mercury-Redstone flights) from Kapustin Yar using IRBM's. First flights not planned until 1964 - 1967..

1956 July - . *Launch Vehicle*: R-7.

- **OKB-1 completed draft project for the first earth satellite** - . *Nation*: Russia. *Spacecraft*: Sputnik 3.

  Tikhonravov's unit of OKB-1 completed the preliminary design of the ISZ satellite (launched as Sputnik 3). The Fourth Scientific Research Institute of the Ministry of Defence had meanwhile completed a draft project for the KIK ground control system. Tikhonravov's 1.4 tonne ISZ satellite was to have been launched by the new R-7 ICBM as the Soviet Union's first satellite, but the R-7 was ready before the satellite, so it was preceded by Sputnik 1 and Sputnik 2. The ISZ was a miniature physics laboratory, but was launched with a known faulty recorder, limiting data to that received when the spacecraft was over Soviet tracking stations. As a result, the Van Allen radiation belts were discovered by the United States rather than Russia.

1956 August - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **First ground equipment installed at Tyuratam** - . *Nation*: Russia.

1956 August 31 - . *Launch Vehicle*: R-7.

- **State Commission formed to oversee R-7 flight test.** - . *Nation*: Russia. Central Committee of the Communist Party and Council of Soviet Ministers Decree 'On creation of the State Commission for the R-7' was issued..

1956 September 3 - . *Launch Vehicle*: R-7.

- **Soviet space and ballistic missile tracking network established.** - . *Nation*: Russia. *Spacecraft*: Sputnik 3.

  Decree 1241-632 'on creation or the Command Measurement Complex' was issued. The decree marked the beginning of development of the KIK satellite tracking system. This network was put together using a combination of PVO (Air Defence) and ICBM tracking systems. Trajectory information was fed into the KIK Centre for

orbital calculations. The Centre was staffed by 680 officers and 151 civilian scientists of the Soviet Army in four sections.

1956 September 30 - . *Launch Vehicle*: R-7.

- **Sputnik 3 draft project approved.** - . *Nation*: Russia. *Spacecraft*: Sputnik 3.

  Decree 'On approval of the draft project for Object D' was issued. The decree gave the go-ahead for Tikhonravov's 1.4 tonne ISZ physics satellite to be launched by the new R-7 ICBM during the International Geophysical Year . The ISZ, a miniature physics laboratory,.was to have been the first artificial satellite of the earth. In the event, it was preceded by Sputniks 1 and 2.

1957 January 11 - . *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **First Soviet ICBM base at Plesetsk is authorised.** - . *Nation*: Russia. Decree 61-39ss 'On creation of launch complex Angara at NIIP-53' was issued..

1957 January 11 - . *Launch Vehicle*: R-7.

- **Flight test program for R-7 approved.** - . *Nation*: Russia. Decree 'On approval of flight-testing program for the R-7 ICBM' was issued..

1957 February 15 - . *Launch Vehicle*: R-7.

- **Decision to build Sputnik 1 due to delays in Sputnik 3 design.** - . *Nation*: Russia. *Spacecraft*: Sputnik 1. Council of Soviet Ministers (SM) Decree 171-83ss 'On Measures to Carry Out During the International Geophysical Year.--Launch of simple satellites in mid-1957' was issued..

1957 March 4 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **Checkout of first R-7 starts** - . *Nation*: Russia.

1957 May 5 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **1st R-7 rolled out to pad** - . *Nation*: Russia.

1957 May 15 - . 16:01 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7. *FAILURE*: Failure of Block D strap on, which tore away from the core 98 seconds after liftoff. The booster crashed 400 km from the pad. A fuel leak in the pump outlet led to a fire in the engine compartment from the time of liftoff.. *Failed Stage*: 0.

- **M1-5 (I-1) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 100 km (60 mi). R-7 test flight. (M1-5 (I-1)).

1957 June 11 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **R-7 launch attempt** - . *Nation*: Russia. After third attempt in three days to launch R-7 8K71 M1-6, the rocket is pulled from the pad. It is found that a nitrogen scavenging valve was installed backwards..

1957 July 2 - . *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Tikhonravov defined the development tasks for the Zenit reconnaissance satellite.** - . *Nation*: Russia. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit satellite.

  These included development of a three stage version of R-7, development of satellite guidance and control systems of the precision required for photography from orbit, satellite control equipment, ELINT sensors, guidance systems, film cassette return systems, and tracking systems for recovery of the re-entry vehicle with the film cassette.

1957 July 12 - . 12:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7. *FAILURE*: Failure of the control system due to a short circuit of the battery. Rapid roll developed, resulting in all four strap-on boosters flying away from the core at 33 seconds in the flight.. *Failed Stage*: G.

- **M1-7 (I-2) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 20 km (12 mi). R-7 test flight. (M1-7 (I-2)).

1957 August 21 - . 12:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **M1-9 (I-3) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). First successful ICBM flight. Problems with the curing of the nose cone material, known before launch, led to the dummy warhead disintegrating over the Kamchatka Peninsula..

1957 August 26 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *Launch Vehicle*: R-7.

- **R-7 ICBM announced publicly.** - . *Nation*: Russia. Soviet Union announces successful launch of a "super longdistance intercontinental multistage ballistic rocket ...a few days ago," according to Tass Soviet News Agency..

1957 September 7 - . 11:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC1. *Launch Vehicle*: R-7.

- **M1-10 (I-4) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). Second successful ICBM flight..

1957 October 4 - . 19:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Sputnik 8K71PS.

- **Sputnik 1** - . *Payload*: PS. *Mass*: 84 kg (185 lb). *Nation*: Russia. *Agency*: MVS. *Class*: Technology. *Type*: Navigation technology satellite. *Spacecraft*: Sputnik 1. *Decay Date*: 1958-01-03 . *USAF Sat Cat*: 2 . *COSPAR*: 1957-Alpha-2. *Apogee*: 945 km (587 mi). *Perigee*: 227 km (141 mi). *Inclination*: 65.0000 deg. *Period*: 96.10 min.

  First artificial satellite; transmitted signals for 21 days. Launching of first ever artificial satellite of the Earth; physical study of the atmosphere; remained in orbit until January 4, 1958. This event began the space race by galvanizing interest and action on the part of the American public to support an active role in space research, technology, and exploration.

1957 November 3 - . 02:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Sputnik 8K71PS.

- **Sputnik 2** - . *Payload*: PS-2. *Mass*: 508 kg (1,119 lb). *Nation*: Russia. *Agency*: MVS. *Class*: Biology. *Type*: Biology satellite. *Spacecraft*: Sputnik 2. *Decay Date*: 1958-04-14 . *USAF Sat Cat*: 3 . *COSPAR*: 1957-Beta-1. *Apogee*: 1,660 km (1,030 mi). *Perigee*: 212 km (131 mi). *Inclination*: 65.3000 deg. *Period*: 103.70 min.

  Carried dog Laika. Study of the physical processes and conditions of life in outer space. After the surprise public impact of Sputnik 1, the satellite and launch teams were called back from vacation and in one month assembled the satellite (using equipment already developed for dog sounding rocket flights). After the launch, Soviet space officials said that the spacecraft would not return and that the dog had enough food and oxygen to live for up to 10 days. Only 45 years later was it revealed that Laika overheated, panicked and died within 5 to 7 hours of launch. What turned out to be the first space crypt remained in orbit a total of 162 days, then burned up in the atmosphere on April 14, 1958.

1958 During the Year - . *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72.

- **Work begun on Vostok spacecraft and third stage** - . *Nation*: Russia. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft*: Vostok.

1958 January 29 - . 21:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7. *FAILURE*: The missile exploded a few seconds after liftoff.. *Failed Stage*: 0.

- **M1-12 (I-5) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). Last test of the original R-7 8K71 test series. Suborbital launch test..

1958 March 20 - . *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72.

- **Soviet lunar probes authorised.** - . *Nation*: Russia. *Program*: Luna. *Spacecraft*: Luna E-1. Decree 'On work on automated lunar probes and three-stage launch vehicles for them' was issued..

1958 March 29 - . 14:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **M1-6A (I-6) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). R-7 test flight. (M1-6A (I-6)).

1958 April - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk. *Launch Vehicle*: R-7.

- **Plesetsk construction begins.** - . *Nation*: Russia. Construction work begins on Angara (R-7) base at Plesetsk..

1958 April 4 - . 15:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **B1-11 (I-7) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). R-7 test flight. (B1-11 (I-7)).

1958 April 27 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Sputnik 8A91. *FAILURE*: Launch vehicle disintegrated 88 seconds after liftoff.. *Failed Stage*: 0.

- **Sputnik failure** - . *Payload*: D-1 s/n 1. *Mass*: 1,327 kg (2,925 lb). *Nation*: Russia. *Agency*: MVS. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Sputnik 3. *Decay Date*: 1958-04-01 .

1958 May 15 - . 07:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Sputnik 8A91.

- **Sputnik 3** - . *Payload*: D-1 s/n 2. *Mass*: 1,327 kg (2,925 lb). *Nation*: Russia. *Agency*: MVS. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Sputnik 3. *Decay Date*: 1960-04-06 . *USAF Sat Cat*: 8 . *COSPAR*: 1958-Delta-2. *Apogee*: 1,864 km (1,158 mi). *Perigee*: 217 km (134 mi). *Inclination*: 65.2000 deg. *Period*: 106.00 min. Variety of scientific data. Research in the upper atmosphere and outer space.

1958 May 24 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1.

Launch Vehicle: R-7. *FAILURE*: Failure.

- **B1-3 (II-1) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). R-7 test flight. (B1-3 (II-1)).

1958 July 2 - . *Launch Vehicle*: R-7.

- **R-14 IRBM, R-7A ICBM, and Raketoplan development authorised.** - . *Nation*: Russia. *Spacecraft*: Raketoplan. Central Committee of the Communist Party and Council of Soviet Ministers Decree 726-346 'On start of work on the R-14 missile, on creation of the R-7A ICBM, and on creation of the winged-ballistic rocket at OKB-52' was issued..

1958 July 10 - . 07:42 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7. *FAILURE*: Failure.

- **B1-14 (II-5)/Blok E test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 0 km (0 mi).

1958 August 18 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72.

- **Luna launch delayed.** - . *Nation*: Russia. *Class*: Technology. *Type*: Navigation technology satellite.

  Planned August launch rescheduled after failure of American lunar probe on August 17. Inability to complete final tests of the new engines and malfunctions during pre-launch preparations indicated a lot of work had to be done on the new launch vehicle before the first launch could be attempted.

1958 September 2 - . *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72.

- **Launch of Soviet Luna probes authorised.** - . *Nation*: Russia. *Program*: Luna. *Spacecraft*: Luna E-1. Decree 'On launch of automated lunar probes November' was issued..

1958 September 23 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72. *FAILURE*: Launcher disintegrated 93 seconds after launch due to longitudinal resonance of strap-ons.. *Failed Stage*: 0.

- **Luna failure - booster disintegrated at T+92 seconds** - . *Payload*: E-1 s/n 1. *Mass*: 361 kg (795 lb). *Nation*: Russia. *Related Persons*: Glushko, Korolev. *Agency*: MVS. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-1. This was the start of an acrimonious debated between Glushko and Korolev design bureaux over the fault and fix for the problem..

1958 October 11 - . 08:42 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72. *FAILURE*: Launcher disintegrated 104 seconds after launch due to longitudinal resonance of strap-ons.. *Failed Stage*: 0.

- **Luna failure - booster disintegrated at T+104 seconds** - . *Payload*: E-1 s/n 2. *Mass*: 361 kg (795 lb). *Nation*: Russia. *Agency*: MVS. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-1.

1958 December 4 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72. *FAILURE*: Core engines shut off at 245 seconds into the flight. Cause was a loss of lubrication to the hydrogen peroxide pump.. *Failed Stage*: 1.

- **Luna failure - booster core shut down at T+245 seconds** - . *Payload*: E-1 s/n 3. *Mass*: 361 kg (795 lb). *Nation*: Russia. *Agency*: MVS. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-1.

1958 December 24 - . 14:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **III-1** - . *Nation*: Kazakhstan. *Agency*: MVS. *Apogee*: 200 km (120 mi).

1959 January 2 - . 16:41 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72. *FAILURE*: Failure of the launch vehicle control system.. *Failed Stage*: G.

- **Luna 1** - . *Payload*: E-1 s/n 4. *Mass*: 361 kg (795 lb). *Nation*: Russia. *Agency*: MVS. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-1. *USAF Sat Cat*: 112 . *COSPAR*: 1959-Mu-1.

  Lunar probe; passed within 5,995 km of moon but did not hit it as planned due to a failure of the launch vehicle control system. Went into solar orbit. First manmade object to attain of escape velocity. Also known as *Mechta* ("Dream"), popularly called *Lunik I*. Because of its high velocity and its announced package of various metallic emblems with the Soviet coat of arms, it was concluded that Luna 1 was intended to impact the Moon. After reaching escape velocity, Luna 1 separated from its 1472 kg third stage. The third stage, 5.2 m long and 2.4 m in diameter, travelled along with Luna 1. On 3 January, at a distance of 113,000 km from Earth, a large (1 kg) cloud of sodium gas was released by the spacecraft. This glowing orange trail of gas, visible over the Indian Ocean with the brightness of a sixth-magnitude star, allowed astronomers to track the spacecraft. It also served as an experiment on the behavior of gas in outer space. Luna 1 passed within 5,995 km of the Moon's surface on 4 January after 34 hours of flight. It went into orbit around the Sun, between the orbits of Earth and Mars. The measurements obtained during this mission provided new data on the Earth's radiation belt and outer space, including the discovery that the Moon had no magnetic field and that a solar wind, a strong flow of ionized plasma

emmanating from the Sun, streamed through interplanetary space.

1959 March 14 - . *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A flight test plan approved.** - . *Nation*: Russia. Central Committee of the Communist Party and Council of Soviet Ministers Decree 'On Work on the R-7 Product and Flight-Design Testing of the R-7A Product-- testing of the R-7 and R-7A ICBMs' was issued..

1959 March 17 - . 01:46 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **GCh No. 13 (III-2) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). First test flight serial production model..

1959 March 25 - . 05:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **GCh No. 15 (III-3) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). R-7 development test flight. (GCh No. 15 (III-3)).

1959 March 30 - . 22:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7. *FAILURE*: Failure.

- **GCh No. IZ-20 (III) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,000 km (600 mi).

1959 April 1 - . *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A ICBM production approved.** - . *Nation*: Russia. Central Committee of the Communist Party and Council of Soviet Ministers Decree 'On production of the R-7A missile at Plant No. 1001 at Krasnoyarsk-26 and establishment of a branch' was issued..

1959 May 9 - . 18:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7. *FAILURE*: Failure.

- **GCh No. 17 (III) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,000 km (600 mi). R-7 development test flight. (GCh No. 17 (III)).

1959 May 30 - . 21:42 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7. *FAILURE*: Failure.

- **GCh No. IZ-22 (III) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,000 km (600 mi). Landed far from aim point..

1959 June 9 - . 20:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7. *FAILURE*: Failure.

- **GCh No. IZ-23 (III) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,000 km (600 mi). Landed far from aim point..

1959 June 18 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72. *FAILURE*: Inertial system failed at 153 seconds after launch. Vehicle destroyed by range safety.. *Failed Stage*: G.

- **Luna failure - inertial system failed at T+153 seconds** - . *Payload*: E-1A s/n 5. *Mass*: 387 kg (853 lb). *Nation*: Russia. *Agency*: MVS. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft Bus*: Luna E-1. *Spacecraft*: Luna E-1A.

1959 July 15 - . *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Samara Filial 1 takes over design responsibility for R-7 and its derivatives.** - . *Nation*: Russia. Decree 'On formation of the Design Department of OKB-1 at the Progress Plant in Kuibyshev' was issued..

1959 July 18 - . 18:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **GCh No. IZ-24 (III) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). R-7 development test flight. (GCh No. IZ-24 (III)).

1959 July 30 - . 04:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **GCh (III) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). First successful flight of series production model..

1959 August 13 - . 23:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **GCh No. IZ-25 (III) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi).

1959 September 12 - . 06:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72.

- **Luna 2** - . *Payload*: E-1A s/n 6. *Mass*: 387 kg (853 lb). *Nation*: Russia. *Agency*: MVS. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft Bus*: Luna E-1. *Spacecraft*: Luna E-1A. *Decay Date*: 1959-09-13 . *USAF Sat Cat*: 114 . *COSPAR*:

1959-Xi-1.

First probe to impact lunar surface. Delivered a pennant to the surface of the Moon and conducted research during flight to the Moon. Impacted Moon 13 Sep 1959 at 22:02:04 UT, Latitude 29.10 N, Longitude 0.00 - Palus Putredinis, east of Mare Serenitatis near the Aristides, Archimedes, and Autolycus craters. After launch and attainment of escape velocity, Luna 2 separated from its third stage, which travelled along with it towards the Moon. On 13 September the spacecraft released a bright orange cloud of sodium gas which aided in spacecraft tracking and acted as an experiment on the behavior of gas in space. On 14 September, after 33.5 hours of flight, radio signals from Luna 2 abruptly ceased, indicating it had impacted on the Moon. Some 30 minutes after Luna 2, the third stage of its rocket also impacted the Moon. The mission confirmed that the Moon had no appreciable magnetic field, and found no evidence of radiation belts at the Moon.

1959 September 18 - . 16:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **Phase 3 test flight** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). R-7 development test flight..

1959 October 4 - . 00:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72.

- **Luna 3** - . *Payload*: E-2A s/n 1. *Mass*: 279 kg (615 lb). *Nation*: Russia. *Agency*: MVS. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-3. *Decay Date*: 1960-04-20 . *USAF Sat Cat*: 21 . *COSPAR*: 1959-Theta-1. *Apogee*: 499,998 km (310,683 mi). *Perigee*: 500 km (310 mi). *Inclination*: 55.0000 deg. *Period*: 21,563.20 min.

  Luna 3 was the third spacecraft successfully launched to the Moon and the first to return images of the lunar far side. It was launched on a figure-eight trajectory which brought it over the Moon (closest approach to the Moon was 6200 km) and around the far side, which was sunlit at the time. It was stabilized while in optical view of the far side of the Moon. On October 7, 1959, the television system obtained a series of 29 photographs over 40 minutes, covering 70% of the surface, that were developed on-board the spacecraft. The photographs were scanned and 17 were radio transmitted to ground stations in facsimile form on October 18, 1959, as the spacecraft, in a barycentric orbit, returned near the Earth. The photographs were to be retransmitted at another point close to Earth but were not received. The spacecraft returned very indistinct pictures, but, through computer enhancement, a tentative atlas of the lunar farside was produced. These first views of the lunar far side showed mountainous terrain, very different from the near side, and two dark regions which were named Mare Moscovrae (Sea of Moscow) and Mare Desiderii (Sea of Dreams).

1959 October 22 - . 17:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **Phase 3 test flight** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi).

1959 October 25 - . 17:32 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **Phase 3 test flight** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi).

1959 October 31 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk. *Launch Vehicle*: R-7.

- **First R-7 missiles go on alert at Plesetsk.** - . *Nation*: Russia.

1959 November 1 - . 21:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **Phase 3 test flight** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). Flight over full missile design range..

1959 November 20 - . 21:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **Phase 3 test flight** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). Flight over full missile design range..

1959 November 27 - . 01:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **GCh No. IZ-33 (III) test** - . *Nation*: Russia. *Agency*: MVS. *Apogee*: 1,350 km (830 mi). Sixteenth and last launch of the third production batch..

1959 December - . *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Flight test series of production R-7A ICBM begins** - . *Nation*: Russia. These tests proved the design of the missile actually deployed to pads in Baikonur and Plesetsk..

1959 December 23 - . 19:05 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A I-1 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi). Failure in first test of R-7A ICBM. Despite this failed launch, Cold War pressures meant that the R-7A conditionally entered service on 31 December 1959..

1960 January 15 - . *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya 8K78 design begins** - . *Nation*: Russia. *Related Persons*: Korolev. Korolev signed the order for development of a four stage rocket based on the R-7..

1960 January 20 - . *Launch Vehicle*: R-7.

- **R-7 accepted into military service.** - . *Nation*: Russia. Decree 'On adoption of the R-7 ICBM into armaments' was issued..

1960 January 20 - . 16:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A I-2/Dummy L test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,000 km (600 mi). Suborbital aerodynamic test flight with R-7A 8K74 lower stages, dummy upper stages..

1960 January 24 - . 16:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A. *FAILURE*: Failure.

- **R-7A I-3 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 20 km (12 mi).

1960 January 31 - . 16:17 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A I-4/Dummy L test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,000 km (600 mi). Suborbital aerodynamic test flight with R-7A 8K74 lower stages, dummy upper stages..

1960 March 17 - . 23:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A I-4 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1960 March 24 - . 02:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A I-5 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1960 April 15 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72. *FAILURE*: The third stage RO-5 engine either did not reach full thrust or shut down early.. *Failed Stage*: 3.

- **Luna failure - third stage insufficient delta V** - . *Payload*: E-3 s/n 1. *Mass*: 279

kg (615 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-3. *Decay Date*: 1960-04-15 . *COSPAR*: F600415A. Reached an altitude of 200,000 km before plunging back to earth..

1960 April 16 - . 16:07 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok-L 8K72. *FAILURE*: Strap-on B reached only 75 percent of thrust at ignition. Four tenths of a second after liftoff it broke away from the core.. *Failed Stage*: 2.

- **Luna failure at lift-off** - . *Payload*: E-3 s/n 2. *Mass*: 279 kg (615 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-3. *Decay Date*: 1960-04-16 . This dramatic failure resulted in a loss of thrust, and the lateral strap-on units separated and flew over the tracking stations and living areas. The core continued on its trajectory..

1960 May 10 - . *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya 8K78 draft project completed** - . *Nation*: Russia. The original design was intended for launch of unmanned probes toward Mars, but it had universal uses..

1960 May 15 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72.

- **Korabl-Sputnik 1** - . *Payload*: Vostok 1KP. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft*: Vostok. *Duration*: 1,979.00 days. *Decay Date*: 1962-09-05 . *USAF Sat Cat*: 34 . *COSPAR*: 1960-Epsilon-1. *Apogee*: 514 km (319 mi). *Perigee*: 284 km (176 mi). *Inclination*: 65.0000 deg. *Period*: 92.50 min.

  The Soviet Union launched a Vostok 1KP prototype manned spacecraft (without heat shield; not recoverable) into near-earth orbit. Called *Sputnik IV* by the Western press. On May 19, at 15:52 Moscow time, the spacecraft was commanded to retrofire. However the guidance system had oriented the spacecraft incorrectly and the TDU engine instead put the spacecraft into a higher orbit. Soviet scientists said that conditions in the cabin, which had separated from the remainder of the spacecraft, were normal.
  Officially: Development and checking of the main systems of the space ship satellite, which ensure its safe flight and control in flight, return to Earth and conditions needed for a man in flight.

1960 June 4 - . *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya launch vehicle and initial Vostok flights approved.** - . *Nation*: Russia. *Spacecraft*: Vostok. Central Committee and Council of Soviet Ministers

Decree 587-238 'On the Realisation of the Plan to Master Cosmic Space in 1960 and the First Half of 1961 -creation of a four-stage launcher for interplanetary missions and schedule for the Korabl-Sputniks'.

1960 June 4 - . 15:49 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Vehicle*: R-7.

- **UBP (Readiness) operational test launch** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi). R-7 readiness verification test..

1960 July - . *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Flight test series of production R-7A ICBM completed** - . *Nation*: Russia. 15 launches were in the flight test series, with 14 successes. These rockets were completed at Aviation Factory Number 1, 'Progress', in Kuibyshev (Samara)..

1960 July 5 - . 15:56 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A I-6 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1960 July 7 - . 15:27 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A I-7 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1960 July 28 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72. *FAILURE*: At ignition one of the combustion chambers in strap on Block B or G burned through. The strap on separated from the core at 17 seconds into the flight and the launch vehicle exploded at 28.5 seconds.. *Failed Stage*: 0.

- **Korabl-Sputnik** - . *Payload*: Vostok 1K s/n 1. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft*: Vostok. *Decay Date*: 1960-07-23 . First attempted flight of the Vostok 1K manned spacecraft prototype. Dogs Chaika and Lisichka perished in the explosion of the rocket..

1960 August 19 - . 08:44 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72.

- **Korabl-Sputnik 2** - . *Payload*: Vostok 1K s/n 2. *Mass*: 1,440 kg (3,170 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft*: Vostok. *Duration*: 1.09 days. *Decay Date*: 1960-08-20 . *USAF Sat Cat*: 55 . *COSPAR*: 1960-Lambda-1. *Apogee*: 340 km (210 mi). *Perigee*: 281 km (174 mi). *Inclination*: 64.6000 deg. *Period*: 90.70 min.

The Soviet Union launched its second unmanned test of the Vostok spacecraft, the *Korabl Sputnik II*, or *Sputnik V*. The spacecraft carried two dogs, Strelka and Belka, in addition to a gray rabbit, rats, mice, flies, plants, fungi, microscopic water plants, and seeds. Electrodes attached to the dogs and linked with the spacecraft communications system, which included a television camera, enabled Soviet scientists to check the animals' hearts, blood pressure, breathing, and actions during the trip. After the spacecraft reentered and landed safely the next day, the animals and biological specimens were reported to be in good condition.
Officially: Development of systems ensuring man's life functions and safety in flight and his return to Earth.

1960 September 12 - . *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A accepted for military service.** - . *Nation*: Russia. Decree 'On adoption of the R-7A into armaments' was issued..

1960 October 10 - . 14:27 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: At T+300.9 sec, the launcher went out of control and the destruct command was given at T+324.2 sec - the engine of Stage 3 cut off after 13.32 s of burning.. *Failed Stage*: U.

- **Mars probe 1M s/n 1 failure.** - . *Payload*: 1M s/n 1. *Mass*: 640 kg (1,410 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Mars. *Class*: Mars. *Type*: Mars probe. *Spacecraft Bus*: 1MV. *Spacecraft*: Mars 1M. *Decay Date*: 1960-10-10 .

  This was the Soviet Union's first attempt at a planetary probe. Mars probe intended to photograph Mars on a flyby trajectory. The possible cause lay in resonance vibrations of upper stages during Stage 2 burning, which led to break of contact in the command potentiometer of the gyrohorizon. As a result a pitch control malfunctioned and the launcher began to veer off the desired ascent profile. On exceeding 7 degrees of veering in pitch, the control system failed. The upper stage with the payload reached an altitude of 120 km before burning up on re-entry into the atmosphere above East Siberia.

1960 October 14 - . 13:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: At T+290 sec Stage 3's engine 8D715K failed to ignite because a LOX leak froze kerosene in the fuel inlet to the pump on the launch pad due to a faulty LOX valve seal.. *Failed Stage*: U.

- **Mars probe 1M s/n 2 failure.** - . *Payload*: 1M s/n 2. *Mass*: 640 kg (1,410 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Mars. *Class*: Mars. *Type*: Mars probe. *Spacecraft Bus*: 1MV. *Spacecraft*: Mars 1M. *Decay Date*: 1960-10-14 . Mars probe intended to photograph Mars on a flyby trajectory. This was the Soviet Union's second attempt at a planetary probe. The upper stages and payload broke up on re-entry into the atmosphere..

1960 December 1 - . 07:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72.

- **Korabl-Sputnik 3** - . *Payload*: Vostok 1K s/n 3. *Mass*: 4,563 kg (10,059 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft*: Vostok. *Duration*: 0.99 days. *Decay Date*: 1960-12-02 . *USAF Sat Cat*: 65 . *COSPAR*: 1960-Rho-1. *Apogee*: 269 km (167 mi). *Perigee*: 123 km (76 mi). *Inclination*: 65.0000 deg. *Period*: 88.40 min.

  The Soviet Union launched its third spaceship satellite, *Korabl Sputnik III*, or *Sputnik VI*. The spacecraft, similar to those launched on May 15 and August 19, carried the dogs Pcheka and Mushka in addition to other animals, insects, and plants. Deorbited December 2, 1960 7:15 GMT. Burned up on reentry due to steep entry angle (retrofire engine did not shut off on schedule and burned to fuel depletion).
  Officially: Medical and biological research under space flight conditions.
  Officially: Medical and biological research under space flight conditions.

1960 December 22 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K. *FAILURE*: The third stage engine RO-7 failed just after ignition, 425 seconds in to flight.. *Failed Stage*: 3.

- **Korabl-Sputnik** - . *Payload*: Vostok 1K s/n 4. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft*: Vostok. *Decay Date*: 1960-12-20 .

  Unable to reach orbital velocity, the Vostok prototype separated while the third stage was still firing. While the ejection seat failed to operate, the capsule did make a hard landing in severe winter conditons in Siberia. It was recovered after some time, and the dogs Kometa and Shutka were alive. As a result of this flight the ejection seat was developed with a heat shield designed to protect the pilot in the event of a launch vehicle failure up to shut down of the first stage. *Additional Details*: here....

1961 January 14 - . 01:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A II-1 operational test launch** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi). Some sources say first launch from LC31 was not until 27 February..

1961 January 18 - . *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Venera preparations** - . *Nation*: Russia. *Spacecraft Bus*: 2MV. *Spacecraft*: Mars 2MV-2.

The VVS contingent arrives at Tyuratam at 23:45 aboard an Il-14 for the Venera launch. Chertok is in charge of launch preparations. Due to various radio system problems, there can be no launch until 26 January. The death of Nedelin and the others still hangs over the cosmodrome.

1961 February 1 - . *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Venera rolled out to pad** - . *Nation*: Russia. *Spacecraft Bus*: 2MV. *Spacecraft*: Mars 2MV-2. The booster is 5 to 7 m taller than the Vostok. One gyroscope has to be replaced on the pad. Fuelling begins at 23:30. At 02:00 the launch is scrubbed due to continuing gyro problems. Next attempt is set for 4 February..

1961 February 4 - . 01:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: At T+531 sec, the fourth vernier chamber of Stage 3's 8D715K engine exploded because the LOX cut-off valve had not closed as scheduled and LOX flowed into the hot chamber.. *Failed Stage*: U.

- **Sputnik 7** - . *Payload*: 2MV-2 s/n 1. *Mass*: 6,483 kg (14,292 lb). *Nation*: Russia. *Related Persons*: Glushko, Korolev. *Agency*: RVSN. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 1MV. *Spacecraft*: Venera 1VA. *Decay Date*: 1961-02-26 . *USAF Sat Cat*: 71 . *COSPAR*: 1961-Beta-1. *Apogee*: 318 km (197 mi). *Perigee*: 212 km (131 mi). *Inclination*: 64.9000 deg. *Period*: 89.80 min.

  The escape stage entered parking orbit but the main engine cut off just 0.8 s after ignition due to cavitation in the oxidiser pump and pump failure.. The payload attached together with escape stage remained in Earth orbit.

  The booster launched into a beautiful clear sky, and it could be followed by the naked eye for four minutes after launch. The third stage reached earth parking orbit, but the fourth stage didn't ignite. It was at first believed a radio antenna did not deploy from the interior of the stage, and it did not receive the ignition commands. Therefore the Soviet Union has successfully orbited a record eight-tonne 'Big Zero' into orbit. The State Commission meets two hours after the launch, and argues whether to make the launch public or not, and how to announce it. Glushko proposes the following language for a public announcement: 'with the objective of developing larger spacecraft, a payload was successfully orbited which provided on the first revolution the necessary telemetry'. Korolev and the others want to minimize any statement, to prevent speculation that it was a reconnaissance satellite or a failed manned launch. Kamanin's conclusion - the rocket didn't reach Venus, but it did demonstrated a new rocket that could deliver an 8 tonne thermonuclear warhead anywhere on the planet. The commission heads back to Moscow.

1961 February 12 - . 00:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Venera 1** - . *Payload*: 1VA s/n 2, Venera 1 (Sputnik 8, AMS). *Mass*: 644 kg (1,419

lb). *Nation*: Russia. *Related Persons*: Korolev. *Agency*: RVSN. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 1MV. *Spacecraft*: Venera 1VA. *USAF Sat Cat*: 80 . *COSPAR*: 1961-Gamma-1.

Venera 1 was the first spacecraft to fly by Venus. The 6424 kg assembly was launched first into a 229 x 282 km parking orbit, then boosted toward Venus by the restartable Molniya upper stage. On 19 February, 7 days after launch, at a distance of about two million km from Earth, contact with the spacecraft was lost. On May 19 and 20, 1961, Venera 1 passed within 100,000 km of Venus and entered a heliocentric orbit. This failure resulted in only the following objectives being met: checking of methods of setting space objects on an interplanetary course; checking of extra-long-range communications with and control of the space station; more accurate calculation of the dimension of the solar system; a number of physical investigations in space. *Additional Details*: here....

1961 February 13 - . 04:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A II-2 operational test launch** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi). Some sources say first launch from LC31 was not until 27 February..

1961 February 27 - . 00:52 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Operational missile test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1961 March 7 - . *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **R-7 Failure Commission** - . *Nation*: Russia. *Related Persons*: Bogomolov, Glushko, Keldysh, Korolev, Kosberg, Sokolov. *Program*: Vostok. *Flight*: Vostok 1. *Spacecraft*: Vostok.

  Keldysh, Korolev, Sokolov, Glushko, Bogomolov hear testimony from Kosberg on the causes of the RO-7 engine failure on the 22 December 1960 launch, that resulted in the suborbital flight of the Vostok capsule with a landing in Tura. The causes are not completely understood, but the bottom line is that a fuel line must have leaked. Further testimony is offered on the booster trajectory, landing time at various points along the trajectory, tracking station readiness, communications lessons, and recovery efforts. The communications are clearly unreliable. The radius of the HF radio is 5000 km, and 1500 km for UHF. TsP Moscow and PU Tyuratam, plus Novosibirsk, Kolpachev, Khabarovsk, and Yelizov (Kamchatka) all have HF and UHF transceivers. But due to practical reception problems, only UHF communications were available at Tyuratam, Kolpachev, and Yelizov, and only HF at Novosibirsk and Khabarovsk. It is recommended that each IP tracking station should have a Chief

Communications Officer, a cosmonaut to act as capsule communicator, a physician, and a representative from the Ministry of Communications to assure action on problems.

1961 March 9 - . 06:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Korabl-Sputnik 4** - . *Payload*: Vostok 3KA s/n 1. *Mass*: 4,700 kg (10,300 lb). *Nation*: Russia. *Related Persons*: Mozzhorin, Yazdovskiy. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Vostok 1. *Spacecraft*: Vostok. *Duration*: 0.0700 days. *Decay Date*: 1961-03-09 . *USAF Sat Cat*: 91 . *COSPAR*: 1961-Theta-1. *Apogee*: 239 km (148 mi). *Perigee*: 173 km (107 mi). *Inclination*: 64.9000 deg. *Period*: 88.60 min.

  Carried dog Chernushka, mannequin Ivan Ivanovich, and other biological specimens. Ivanovich was ejected from the capsule and recovered by parachute, and Chernsuhka was successfully recovered with the capsule on March 9, 1961 8:10 GMT. Officially: Development of the design of the space ship satellite and of the systems on board, which ensure necessary conditions for man's flight. *Additional Details*: here....

1961 March 22 - . *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Flight preparations** - . *Nation*: Russia. *Related Persons*: Barmin, Gagarin, Keldysh, Korolev, Nelyubov, Titov. *Program*: Vostok. *Flight*: Vostok 1.

  Between 10:00 and 12:00 Chief Designer of Launch Facilities Barmin meets with the cosmonauts. He reviews the launch mechanism. The rocket is suspended at the 'shoulders' of the strap-ons, on four swivelled supports. After the rocket has lifted 49 mm, it is free from these, and counterweights weighing dozens of tonnes will swing them back and away from the rising booster. At 12:00 Kamanin meets with Keldysh and Korolev. They agree with his position that the flight be announced as soon as the cosmonaut is safely in orbit.

1961 March 25 - . 05:54 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Korabl-Sputnik 5** - . *Payload*: Vostok 3KA s/n 2. *Mass*: 4,695 kg (10,350 lb). *Nation*: Russia. *Related Persons*: Bykovsky, Gagarin, Goreglyad, Kamanin, Karpov, Keldysh, Kirillov, Korolev, Nelyubov, Nikolayev, Popovich, Titov, Voskresenskiy, Yazdovskiy. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Vostok 1. *Spacecraft*: Vostok. *Duration*: 0.0600 days. *Decay Date*: 1961-03-25 . *USAF Sat Cat*: 95 . *COSPAR*: 1961-Iota-1. *Apogee*: 175 km (108 mi). *Perigee*: 175 km (108 mi). *Inclination*: 64.9000 deg. *Period*: 88.00 min.

  Carried dog Zvezdochka and mannequin Ivan Ivanovich. Ivanovich was again ejected

from the capsule and recovered by parachute, and Zvezdochka was successfully recovered with the capsule on March 25, 1961 7:40 GMT.
Officially: Development of the design of the space ship satellite and of the systems on board, designed to ensure man's life functions during flight in outer space and return to Earth. *Additional Details*: here....

1961 April 12 - . 06:07 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Vostok 1** - . *Call Sign*: Kedr (Cedar). *Crew*: Gagarin. *Backup Crew*: Nelyubov, Titov. *Payload*: Vostok 3KA s/n 3. *Mass*: 4,725 kg (10,416 lb). *Nation*: Russia. *Related Persons*: Gagarin, Karpov, Keldysh, Korolev, Moskalenko, Nelyubov, Rudnev, Titov. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Vostok 1. *Spacecraft*: Vostok. *Duration*: 0.0750 days. *Decay Date*: 1961-04-12 . *USAF Sat Cat*: 103 . *COSPAR*: 1961-Mu-1. *Apogee*: 315 km (195 mi). *Perigee*: 169 km (105 mi). *Inclination*: 65.0000 deg. *Period*: 89.30 min.

  First manned spaceflight, one orbit of the earth. Three press releases were prepared, one for success, two for failures. It was only known ten minutes after burnout, 25 minutes after launch, if a stable orbit had been achieved.

  The payload included life-support equipment and radio and television to relay information on the condition of the pilot. The flight was automated; Gagarin's controls were locked to prevent him from taking control of the ship. The combination to unlock the controls was available in a sealed envelope in case it became necessary to take control in an emergency. After retrofire, the service module remained attached to the Sharik reentry sphere by a wire bundle. The joined craft went through wild gyrations at the beginning of re-entry, before the wires burned through. The Sharik, as it was designed to do, then naturally reached aerodynamic equilibrium with the heat shield positioned correctly.

  Gagarin ejected after re-entry and descended under his own parachute, as was planned. However for many years the Soviet Union denied this, because the flight would not have been recognized for various FAI world records unless the pilot had accompanied his craft to a landing. Recovered April 12, 1961 8:05 GMT. Landed Southwest of Engels Smelovka, Saratov. *Additional Details*: here....

1961 April 14 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: R-7A. *FAILURE*: Failure..

- **R-7A II-3 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 0 km (0 mi). Failure occurred only two days after Yuri Gagarin's flight..

1961 June 15 - . 05:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A II-4 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1961 July 4 - . 04:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A II-5 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1961 July 4 - . 20:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A II-6 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi). Two launches from one launch complex in the same day..

1961 August 6 - . 06:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Vostok 2** - . *Call Sign*: Oryel (Eagle). *Crew*: Titov. *Backup Crew*: Nelyubov, Nikolayev. *Payload*: Vostok 3KA s/n 4. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Related Persons*: Nelyubov, Nikolayev, Titov. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Vostok 2. *Spacecraft*: Vostok. *Duration*: 1.00 days. *Decay Date*: 1961-08-07 . *USAF Sat Cat*: 168 . *COSPAR*: 1961-Tau-1. *Apogee*: 221 km (137 mi). *Perigee*: 172 km (106 mi). *Inclination*: 64.8000 deg. *Period*: 88.40 min.

  Second manned orbital flight. The Soviet Union successfully launched *Vostok II* into orbit with Gherman S. Titov as pilot. The spacecraft carried life-support equipment, radio and television for monitoring the condition of the cosmonaut, tape recorder, telemetry system, biological experiments, and automatic and manual control equipment. Flight objectives: Investigation of the effects on the human organism of a prolonged flight in orbit and subsequent return to the surface of the Earth; investigation of man's ability to work during a prolonged period of weightlessness. Titov took manual control of spacecraft but suffered from space sickness. He was equipped with a professional quality Konvas movie camera, with which ten minutes of film of the earth were taken through the porthole. Both television and film images were taken of the interior of the spacecraft. Like Gagarin, Titov experienced problems with separation of the service module after retrofire. Titov was never to fly again, after being assigned to the Spiral spaceplane, which turned out to be a dead-end project. A biography of him by Martin Caidin ('I Am Eagle') made him somewhat more accessible than Gagarin to the West.

1961 September 21 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31?. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **R-7A II-7 test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi). R-7A readiness verification test..

1961 November 29 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31?. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Operational test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1961 December 11 - . 09:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K. *FAILURE*: RO-7 engine of block E upper stage cutoff prematurely. Spacecraft liquidated by self destruct system APO in 407th second of flight. Debris landed 100 km north of Vilyuisk.. *Failed Stage*: 2.

- **Zenit-2 11F61 s/n 1** - . *Payload*: Zenit-2 11F61 s/n 1. *Mass*: 4,610 kg (10,160 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Decay Date*: 1961-12-11 .

  First attempted launch of Zenit photo-reconnaisance satellite. According to Kamanin, there was a problem with the third stage, and the capsule landed between Novosibirsk and Yakutsk, but could not be located. There was no information on the nature of the problem. Korolev stayed at Tyuratam, preparing for the next launch attempt.

1962 During the Year - . *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Vostok-Zh studies** - . *Nation*: Russia. *Program*: Lunar L1. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Vostok. *Spacecraft*: Vostok-Zh.

  Vostok-Zh studies conducted for multiple dockings of rocket blocks and payloads in orbit for circumlunar missions, using Vostok rocket. Vostok-Zh spacecraft used to for manual dockings only. Manned reentry vehicle from circumlunar distance is Sever/Soyuz design. Korolev's reaction to Chelomei's exclusive assignment by Khrushchev to circumlunar mission.

1962 January 18 - . *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Korolev requests new Vostoks** - . *Nation*: Russia. *Related Persons*: Korolev. *Program*: Vostok. *Spacecraft*: Vostok, Vostok-Zh, Zenit-4.

  Korolev has issued a letter requested eight new Vostok 3A spacecraft to be built in 1962-1963. He recommends that they should be finished as the 1100 to 1300 kg heavier 'Vostok-2', to be boosted by the 11A57 rocket, developed originally for the Zenit-4 spy satellite. These Vostok-2's will be used for docking experiments, to form EO Experimental Orbital stations, and to develop spacecraft systems for flight to the moon. The VVS fully supports these plans. One of the docking spacecraft will be piloted, the other unpiloted.

1962 April 26 - . 10:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Cosmos 4** - . *Payload*: Zenit-2 11F61 s/n 2. *Mass*: 4,610 kg (10,160 lb). *Nation*: Russia. *Related Persons*: Nikolayev, Popovich. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Flight*: Vostok 3, Vostok 4. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 3.00 days. *Decay Date*: 1962-04-29 . *USAF Sat Cat*: 287 . *COSPAR*: 1962-Xi-1. *Apogee*: 317 km (196 mi). *Perigee*: 285 km (177 mi). *Inclination*: 65.0000 deg. *Period*: 90.50 min.

  Area survey photo reconnaissance satellite. Program partially completed. Failure of primary spacecraft orientation system. It was to spend four days in space, to be followed by another mission during 5-10 May. This meant that Vostok 3/4 could not be launched before 20-30 May. The cosmonaut prime crew returned from their in-suit parachute training at Fedosiya.

1962 June 1 - . 09:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92. *FAILURE*: Shutdown of Block B strap-on engine stage 1.8 seconds after liftoff. The booster crashed 300 m from the pad. Pad damaged.. *Failed Stage*: 0.

- **Zenit-2 11F61 s/n 3** - . *Payload*: Zenit-2 11F61 s/n 3. *Mass*: 4,610 kg (10,160 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Decay Date*: 1962-06-01 .

  Area survey photo reconnaissance satellite. Third attempted launch of Zenit photo-reconnaissance satellite. It blew up 300 m from the pad, and did enough damage to put the launch complex out of operation for a month. Therefore the Vostok 3/4 launches could not take place until the end of July at the earliest.

1962 July 2 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Operational test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1962 July 8 - . *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78L.

- **Molniya 8K78L preliminary design completed** - . *Nation*: Russia. *Related Persons*: Korolev.

  The Molniya 8K78L was designed by Korolev's design bureau for launching a manned spacecraft on a flyby of the Moon and return to earth. To achieve this it would have used Lox/LH2 engines in the third and fourth stages. Such technology was years away in the Soviet Union and the project was not pursued further.

1962 July 28 - . 09:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 7** - . *Payload*: Zenit-2 11F61 s/n 4. *Mass*: 4,610 kg (10,160 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 4.00 days. *Decay Date*: 1962-08-01 . *USAF Sat Cat*: 346 . *COSPAR*: 1962-A-Iota-1. *Apogee*: 356 km (221 mi). *Perigee*: 197 km (122 mi). *Inclination*: 64.9000 deg. *Period*: 90.00 min. Area survey photo reconnaissance satellite. Also performed radiation measurements..

1962 August 11 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Vostok 3** - . *Call Sign*: Sokol (Falcon). *Crew*: Nikolayev. *Backup Crew*: Bykovsky, Volynov. *Payload*: Vostok 3KA s/n 5. *Mass*: 4,722 kg (10,410 lb). *Nation*: Russia. *Related Persons*: Barmin, Bykovsky, Gagarin, Khrushchev, Kirillov, Kozlov, Frol, Nikolayev, Popovich, Smirnov, Ustinov, Volynov. *Agency*: RVSN. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Vostok 3. *Spacecraft*: Vostok. *Duration*: 3.93 days. *Decay Date*: 1962-08-15 . *USAF Sat Cat*: 363 . *COSPAR*: 1962-A-Mu-1. *Apogee*: 218 km (135 mi). *Perigee*: 166 km (103 mi). *Inclination*: 65.0000 deg. *Period*: 88.30 min.

  Joint flight with Vostok 4. The first such flight, where Vostok capsules were launched one day apart, coming within a few kilometers of each other at the orbital insertion of the second spacecraft. The flight was supposed to occur in March, but following various delays, one of the two Vostok pads was damaged in the explosion of the booster of the third Zenit-2 reconnsat in May. Repairs were not completed until August. Vostok 3 studied man's ability to function under conditions of weightlessness; conducted scientific observations; furthered improvement of space ship systems, communications, guidance and landing. Immediately at orbital insertion of Vostok 4, the spacecraft were less than 5 km apart. Popovich made radio contact with Cosmonaut Nikolayev. Nikolayev reported shortly thereafter that he had sighted Vostok 4. Since the Vostok had no maneuvering capability, they could not rendezvous or dock, and quickly drifted apart. The launches did allow Korolev to offer something new and different, and gave the launch and ground control crews practice in launching and handling more than one manned spacecraft at a time. The cosmonaut took colour motion pictures of the earth and the cabin interior. *Additional Details*: here....

1962 August 12 - . 08:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Vostok 4** - . *Call Sign*: Berkut (Golden Eagle). *Crew*: Popovich. *Backup Crew*: Komarov, Volynov. *Payload*: Vostok 3KA s/n 6. *Mass*: 4,728 kg (10,423 lb). *Nation*: Russia. *Related Persons*: Komarov, Nikolayev, Popovich, Volynov. *Agency*: RVSN.

Program: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Vostok 4. *Spacecraft*: Vostok. *Duration*: 2.96 days. *Decay Date*: 1962-08-15 . *USAF Sat Cat*: 365 . *COSPAR*: 1962-A-Nu-1. *Apogee*: 211 km (131 mi). *Perigee*: 159 km (98 mi). *Inclination*: 65.0000 deg. *Period*: 88.20 min.

Joint flight with Vostok 3. Acquisition of experimental data on the possibility of establishing a direct link between two space ships; coordination of astronauts' operations; study of the effects of identical spaceflight conditions on the human organism. The launch of Popovich proceeds exactly on schedule, the spacecraft launching with 0.5 seconds of the planned time, entering orbit just a few kilometers away from Nikolayev in Vostok 3. Popovich had problems with his life support system, resulting in the cabin temperature dropping to 10 degrees Centigrade and the humidity to 35%. The cosmonaut still managed to conduct experiments, including taking colour motion pictures of the terminator between night and day and the cabin interior.

Despite the conditions, Popovich felt able to go for the full four days scheduled. But before the mission, Popovich had been briefed to tell ground control that he was 'observing thunderstorms' if he felt the motion sickness that had plagued Titov and needed to return on the next opportunity. Unfortunately he actually did report seeing thunderstorms over the Gulf of Mexico, and ground control took this as a request for an early return. He was ordered down a day early, landing within a few mintutes of Nikolayev. Only on the ground was it discovered that he was willing to go the full duration, and that ground control had thought he had given the code.

1962 August 25 - . 02:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: At T+60 min 50 sec one of the four solid motors of the escape stage's BOZ unit did not fire. The resulting asymmetric torque caused the stage to lose correct attitude and three seconds after ignition of the main engine S1.5400A1 it began to tumble.. *Failed Stage*: U.

- **Sputnik 19** - . *Payload*: 2MV-1 s/n 1. *Mass*: 890 kg (1,960 lb). *Nation*: Russia. *Related Persons*: Kuznetsova, Ponomaryova, Solovyova, Tereshkova, Yerkina. *Agency*: RVSN. *Program*: Venera, Vostok. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Mars 2MV-1. *Decay Date*: 1962-08-28 . *USAF Sat Cat*: 371 . *COSPAR*: 1962-A-Pi-1. *Apogee*: 252 km (156 mi). *Perigee*: 173 km (107 mi). *Inclination*: 64.9000 deg. *Period*: 88.70 min.

  Attempt to launch a probe towards Mars. The launch went well, but the fourth stage motor burnt for only 45s of the planned 240s. The stage remained in Earth orbit. However Kamanin notes that it was good that the launch of the basic vehicle was a success - it gave the visiting female cosmonauts confidence in the rocket they will have to ride.

1962 September 1 - . 02:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: At T+ 61 min 30 sec the

fuel valve did not open.; the ignition command was blocked from going to the main engine of Stage 4.. *Failed Stage*: U.

- **Sputnik 20** - . *Payload*: 2MV-1 s/n 2. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Mars 2MV-1. *Decay Date*: 1962-09-06 . *USAF Sat Cat*: 381 . *COSPAR*: 1962-A-Tau-1. *Apogee*: 246 km (152 mi). *Perigee*: 185 km (114 mi). *Inclination*: 64.7000 deg. *Period*: 88.80 min.

1962 September 12 - . 00:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: At T+531 sec, the fourth vernier chamber of Stage 3's 8D715K engine exploded because the LOX cut-off valve had not closed as scheduled and LOX flowed into the hot chamber.. *Failed Stage*: U.

- **Sputnik 21** - . *Payload*: 2MV-2 s/n 1. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Mars 2MV-2. *Decay Date*: 1962-09-14 . *USAF Sat Cat*: 389 . *COSPAR*: 1962-A-Phi-1. *Apogee*: 218 km (135 mi). *Perigee*: 179 km (111 mi). *Inclination*: 64.9000 deg. *Period*: 88.40 min. The escape stage entered parking orbit but the main engine cut off just 0.8 s after ignition due to cavitation in the oxidiser pump and pump failure..

1962 September 27 - . 09:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 9** - . *Payload*: Zenit-2 11F61 s/n 7. *Mass*: 4,700 kg (10,300 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 4.00 days. *Decay Date*: 1962-10-01 . *USAF Sat Cat*: 422 . *COSPAR*: 1962-A-Omega-1. *Apogee*: 981 km (609 mi). *Perigee*: 829 km (515 mi). *Inclination*: 67.6000 deg. *Period*: 103.10 min. Area survey photo reconnaissance satellite. Also performed radiation measurements..

1962 October 17 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 10** - . *Payload*: Zenit-2 11F61 s/n 5. *Mass*: 4,700 kg (10,300 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 4.00 days. *Decay Date*: 1962-10-21 . *USAF Sat Cat*: 437 . *COSPAR*: 1962-B-Zeta-1. *Apogee*: 376 km (233 mi). *Perigee*: 178 km (110 mi). *Inclination*: 64.9000 deg. *Period*: 90.00 min. Area survey photo reconnaissance satellite. Also performed radiation measurements..

1962 October 24 - . 17:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: 16 seconds after ignition of Stage 4, Block L's S1.5400A1 engine exploded. A lubricant leak resulted in the jamming of a shaft in the turbopump gearbox and break up of the turbine.. *Failed Stage*: U.

- **Sputnik 22** - . *Payload*: 2MV-4 s/n 3. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Mars. *Class*: Mars. *Type*: Mars probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Mars 2MV-4. *Decay Date*: 1962-10-29 . *USAF Sat Cat*: 443 . *COSPAR*: 1962-B-Iota-1. *Apogee*: 260 km (160 mi). *Perigee*: 202 km (125 mi). *Inclination*: 65.1000 deg. *Period*: 89.10 min.

  Mars probe intended to photograph Mars on a flyby trajectory. The spacecraft broke into many pieces, some of which apparently remained in Earth orbit for a few days. This occurred during the Cuban missile crisis and was picked up by U.S. military radar installations, who originally feared it might by the start of a Soviet nuclear attack.

1962 November 1 - . 16:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Mars 1** - . *Payload*: 2MV-4 s/n 4 / Sputnik 23. *Mass*: 894 kg (1,970 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Mars. *Class*: Mars. *Type*: Mars probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Mars 2MV-4. *USAF Sat Cat*: 450 . *COSPAR*: 1962-B-Nu-3.

  Mars probe intended to photograph Mars on a flyby trajectory. Launched from Sputnik 23 in a 157 x 238 km, 65 degree parking orbit. Sixty-one radio transmissions were held in which a large amount of data was collected. On March 21, 1963, when the spacecraft was at a distance of 106 million km communications ceased, possibly due to a malfunction in the spacecraft orientation system. Mars 1 closest approach to Mars occurred on June 19, 1963 at a distance of approximately 193,000 km, after which the spacecraft entered a heliocentric orbit. Announced mission: Prolonged exploration of outer space during flight to the planet Mars; establishment of inter-planetary radio communications; photgraphing of the planet Mars and subsquent radio-transmission to Earth of the photographs of the surface of Mars thus obtained.

1962 November 4 - . 15:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: After T+260 sec, a malfunction of the pressurization system of the central sustainer led to cavitation in the oxidizer pipeline and LOX pump, followed at T+292s by the fuel pump.. *Failed Stage*: 1.

- **Sputnik 24** - . *Payload*: 2MV-3 s/n 1. *Mass*: 890 kg (1,960 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Mars. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Mars 2MV-3. *Decay Date*: 1962-11-05 . *USAF Sat Cat*: 451 . *COSPAR*: 1962-B-Xi-1. *Apogee*: 170 km (100 mi). *Perigee*: 170 km (100 mi). *Inclination*: 64.8000 deg. *Period*: 87.90 min.

  Mars probe intended to make a soft landing on Mars. Although the escape stage and

payload reached orbit, the strong third stage vibrations shook a fuse loose from its mount in the main nozzle of the escape stage Block L's engine. The engine could not be ignited and remained in Earth orbit. It decayed about two months after insertion.

1962 December 22 - . 09:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 12** - . *Payload*: Zenit-2 11F61 s/n 6. *Mass*: 4,700 kg (10,300 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1962-12-30 . *USAF Sat Cat*: 517 . *COSPAR*: 1962-B-Omega-1. *Apogee*: 385 km (239 mi). *Perigee*: 202 km (125 mi). *Inclination*: 64.8000 deg. *Period*: 90.40 min. Area survey photo reconnaissance satellite. Also performed radiation measurements..

1963 January 4 - . 08:49 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: The escape stage's BOZ unit failed to operate due to failure of a DC transformer of the power system. The stage with payload remained in Earth orbit.. *Failed Stage*: U.

- **Sputnik 25** - . *Payload*: E-6 s/n 1. *Mass*: 1,422 kg (3,134 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1963-01-05 . *USAF Sat Cat*: 522 . *COSPAR*: 1963-001B. *Apogee*: 189 km (117 mi). *Perigee*: 165 km (102 mi). *Inclination*: 64.6000 deg. *Period*: 88.00 min.

1963 February 1 - . *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 'leaves drafting boards'** - . *Nation*: Russia. *Program*: Lunar L1. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz A. Soyuz 'leaves drafting boards'..

1963 February 3 - . 09:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: Upper stage gyro platform failure.. *Failed Stage*: G.

- **E-6 s/n 2 failure.** - . *Payload*: E-6 s/n 2. *Mass*: 1,422 kg (3,134 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1963-02-03 . Apparent causes were instabilities in the torque sensor circuit and the pitch-free floating gyro device. The upper stages and payload broke up on re-entry into the atmosphere over the Pacific..

1963 March 7 - . *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Korolev approves draft plan for 'Soyuz Complex'** - . *Nation*: Russia. *Related*

Persons: Chelomei, Korolev. *Program*: Lunar L1. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft*: Soyuz 7K-OK, Soyuz A, Soyuz B, Soyuz V.

Final design approval for Soyuz A spacecraft for earth orbit and circumlunar flight using orbital rendezvous, docking, and refuelling technques. Except for change of orbital module from cylindrical to spherical design, and changes to rendezvous radar tower arrangement, this design was essentially identical to the Soyuz 7K-OK that flew three years later. *Additional Details*: here....

1963 March 21 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 13** - . *Payload*: Zenit-2 11F61 s/n 9. *Mass*: 4,700 kg (10,300 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1963-03-29 . *USAF Sat Cat*: 554 . *COSPAR*: 1963-006A. *Apogee*: 303 km (188 mi). *Perigee*: 214 km (132 mi). *Inclination*: 65.2000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite. Also performed radiation measurements..

1963 April 2 - . 08:16 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Luna 4** - . *Payload*: E-6 s/n 3. *Mass*: 1,422 kg (3,134 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1963-04-03 . *USAF Sat Cat*: 563 . *COSPAR*: 1963-008A. *Apogee*: 182 km (113 mi). *Perigee*: 167 km (103 mi). *Inclination*: 64.7000 deg. *Period*: 87.98 min.

  Luna 4 was the second attempted Soviet unmanned lunar soft lander probe. The spacecraft, rather than being sent on a straight trajectory toward the Moon, was placed first in an earth parking orbit. The rocket stage then reignited and put the spaccecraft on a translunar trajectory. Failure of Luna 4 to make a required midcourse correction resulted in it missing the Moon by 8336.2 km on April 6, at 4:26 a.m. Moscow time. It thereafter entered a barycentric Earth orbit. The Soviet news agency, Tass, reported that data had been received from the spacecraft throughout its flight and that radio communication would continue for a few more days.

1963 April 22 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31?. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Combat training launch** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1963 April 22 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1.

LV Family: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 15** - . *Payload*: Zenit-2 11F61 s/n 8. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 5.00 days. *Decay Date*: 1963-04-27 . *USAF Sat Cat*: 569 . *COSPAR*: 1963-011A. *Apogee*: 336 km (208 mi). *Perigee*: 194 km (120 mi). *Inclination*: 65.0000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite. Also carried weather, radiation experiments..

1963 April 28 - . 08:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 16** - . *Payload*: Zenit-2 11F61 s/n 10. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 10.00 days. *Decay Date*: 1963-05-08 . *USAF Sat Cat*: 571 . *COSPAR*: 1963-012A. *Apogee*: 379 km (235 mi). *Perigee*: 201 km (124 mi). *Inclination*: 64.7000 deg. *Period*: 90.30 min. Program partially completed. Part of the information lost due to failure of engine block stabilization system. Area survey photo reconnaissance satellite. Also performed radiation measurements..

1963 May 18 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31?. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Combat training launch** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1963 May 24 - . 10:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 18** - . *Payload*: Zenit-2 11F61 s/n 11. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 9.00 days. *Decay Date*: 1963-06-02 . *USAF Sat Cat*: 586 . *COSPAR*: 1963-018A. *Apogee*: 269 km (167 mi). *Perigee*: 212 km (131 mi). *Inclination*: 64.6000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite. Also performed radiation measurements..

1963 June 14 - . 11:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Vostok 5** - . *Call Sign*: Yastreb (Hawk). *Crew*: Bykovsky. *Backup Crew*: Leonov, Volynov. *Payload*: Vostok 3KA s/n 7. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Related Persons*: Bykovsky, Leonov, Volynov. *Program*: Vostok. *Class*: Manned.

Type: Manned spacecraft. *Flight*: Vostok 5. *Spacecraft*: Vostok. *Duration*: 4.96 days. *Decay Date*: 1963-06-19 . *USAF Sat Cat*: 591 . *COSPAR*: 1963-020A. *Apogee*: 131 km (81 mi). *Perigee*: 130 km (80 mi). *Inclination*: 64.9000 deg. *Period*: 87.10 min.

Joint flight with Vostok 6. The Soviet Union launched *Vostok 5*, piloted by Lt. Col. Valery F. Bykovsky. Two days later Lt. Valentina V. Tereshkova, the first spacewoman, followed in *Vostok 6*. On its first orbit, *Vostok 6* came within about five km of *Vostok 5*, the closest distance achieved during the flight, and established radio contact. Both cosmonauts landed safely on June 19. The space spectacular featured television coverage of Bykovsky that was viewed in the West as well as in Russia. Unlike earlier missions, only a black and white film camera was carried. Photometric measurements of the earth's horizon were made.

Mission objectives were officially: further study of the effect of various space-flight factors in the human organism; extensive medico-biological experiments under conditions of prolonged flight; further elaboration and improvement of spaceship systems.

Vostok 5 was originally planned to go for a record eight days. The launch was delayed repeatedly due to high solar activity and technical problems. Finally the spacecraft ended up in a lower than planned orbit. Combined with increased atmospheric activity due to solar levels, Vostok 5 quickly decayed temperatures in the service module reached very high levels.

Bykovsky also experienced an unspecified problem with his waste management system (a spill?) which made conditions in the cabin 'very uncomfortable'. He was finally ordered to return after only five days in space.

To top it all off, once again the Vostok service module failed to separate cleanly from the reentry sphere. Wild gyrations ensued until the heat of reentry burned through the non-separating retraining strap.

1963 June 16 - . 09:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Vostok 6** - . *Call Sign*: Chayka (Seagull). *Crew*: Tereshkova. *Backup Crew*: Ponomaryova, Solovyova. *Payload*: Vostok 3KA s/n 8. *Mass*: 4,713 kg (10,390 lb). *Nation*: Russia. *Related Persons*: Korolev, Ponomaryova, Solovyova, Tereshkova. *Program*: Vostok. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Vostok 6. *Spacecraft*: Vostok. *Duration*: 2.95 days. *Decay Date*: 1963-06-19 . *USAF Sat Cat*: 595 . *COSPAR*: 1963-023A. *Apogee*: 166 km (103 mi). *Perigee*: 165 km (102 mi). *Inclination*: 64.9000 deg. *Period*: 87.80 min.

  Joint flight with Vostok 5. First woman in space, and the only Russian woman to go into space until Svetlana Savitskaya 19 years later. On its first orbit, *Vostok 6* came within about five km of *Vostok 5*, the closest distance achieved during the flight, and established radio contact. Flight objectives included: Comparative analysis of the

effect of various space-flight factors on the male and female organisms; medico-biological research; further elaboration and improvement of spaceship systems under conditions of joint flight. It was Korolev's idea just after Gagarin's flight to put a woman into space as yet another novelty. Khrushchev made the final crew selection. Korolev was unhappy with Tereshkova's performance in orbit and she was not permitted to take manual control of the spacecraft as had been planned.

1963 July 10 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92. *FAILURE*: Shutdown of Block B strap-on engine stage 1.9 seconds after liftoff. Pad damaged.. *Failed Stage*: 0.

- **Zenit-2 11F61 s/n 12** - . *Payload*: Zenit-2 11F61 s/n 12. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Decay Date*: 1963-07-10 . Area survey photo reconnaissance satellite..

1963 October 14 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31?. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Combat training launch** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1963 October 18 - . 09:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 20** - . *Payload*: Zenit-2 11F61 s/n 13. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1963-10-26 . *USAF Sat Cat*: 673 . *COSPAR*: 1963-040A. *Apogee*: 296 km (183 mi). *Perigee*: 201 km (124 mi). *Inclination*: 64.8000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite..

1963 November 1 - . 08:56 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Sputnik 11A59.

- **Polet 1; Polyot 1** - . *Payload*: I-2B s/n 1. *Mass*: 1,400 kg (3,000 lb). *Nation*: Russia. *Related Persons*: Chelomei. *Agency*: Korolev bureau. *Class*: Military. *Type*: Anti-satellite system. *Spacecraft Bus*: Kosmoplan. *Spacecraft*: Polyot. *Decay Date*: 1982-10-16 . *USAF Sat Cat*: 683 . *COSPAR*: 1963-043A. *Apogee*: 1,420 km (880 mi). *Perigee*: 331 km (205 mi). *Inclination*: 58.9000 deg. *Period*: 102.40 min.

  ASAT interceptor control and propulsion test. Launched by Korolev R-7 because Chelomei's own UR-200 was not yet available. Purpose - elaboration of system providing for the extensive manoeuvring of space apparatuses. Flight was considered a great success. Micro-engine fired 350 times and main stabilizing engine fired 300

times. Orbit given is final orbit after manoeuvres.

1963 November 11 - . 06:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: During unpowered coast in parking orbit the escape stage Block L lost stable attitude. Engine ignition occurred in an incorrect direction.. *Failed Stage*: U.

- **Cosmos 21** - . *Payload*: 3MV-1A s/n 1. *Mass*: 890 kg (1,960 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Mars. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3MV-1A. *Decay Date*: 1963-11-14 . *USAF Sat Cat*: 687 . *COSPAR*: 1963-044A. *Apogee*: 231 km (143 mi). *Perigee*: 192 km (119 mi). *Inclination*: 64.8000 deg. *Period*: 88.70 min. The stage with payload remained in Earth orbit as Cosmos-51 and burnt up on re-entry..

1963 November 16 - . 10:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 22** - . *Payload*: Zenit-4 no. 1. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 6.00 days. *Decay Date*: 1963-11-22 . *USAF Sat Cat*: 689 . *COSPAR*: 1963-045A. *Apogee*: 376 km (233 mi). *Perigee*: 193 km (119 mi). *Inclination*: 64.9000 deg. *Period*: 90.20 min. High resolution photo reconnaissance satellite; returned film capsule.

1963 November 28 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92. *FAILURE*: Failure of block E upper stage. Spacecraft liquidated by APO destruct system.. *Failed Stage*: 2.

- **Zenit-2 11F61 s/n 14** - . *Payload*: Zenit-2 11F61 s/n 14. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Decay Date*: 1963-11-28 . Area survey photo reconnaissance satellite..

1963 December 19 - . 09:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 24** - . *Payload*: Zenit-2 11F61 s/n 15. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 9.00 days. *Decay Date*: 1963-12-28 . *USAF Sat Cat*: 712 . *COSPAR*: 1963-052A. *Apogee*: 391 km (242 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 90.50 min. Area survey photo reconnaissance satellite..

1964 Duing the year - . *Launch Vehicle*: R-7.

- **Development of Soyuz-R and Soyuz-P begun.** - . *Nation*: Russia. *Related Persons*: Kozlov. *Program*: Almaz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft*: Soyuz 7K-TK, Soyuz P, Soyuz PPK, Soyuz R.

  KB Kozlov began active development of the military applied versions of the Soyuz. A new version of the R-7 launch vehicle, the 11A514, was put into development to support launch of the Soyuz-P, now designated the 7K-PPK (pilotiruemovo korablya-perekhvatchika, manned interceptor spacecraft). The Soyuz-R would include the small orbital station 11F71 with photo-reconnaissance and ELINT equipment. To dock with the 11F71 station Kuibishev developed the transport spacecraft 11F72 7K-TK. This version of the Soyuz was equipped with rendezvous, docking, and transition equipment, including an airlock, that allowed the two cosmonauts to enter the station without using EVA. The launch vehicle for the 7K-TK would be the 11A511, known today as the Soyuz.

1964 January 30 - . 09:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Elektron 1** - . *Payload*: 2D s/n 1. *Mass*: 329 kg (725 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Elektron. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Elektron-A. *USAF Sat Cat*: 746 . *COSPAR*: 1964-006A. *Apogee*: 6,439 km (4,001 mi). *Perigee*: 413 km (256 mi). *Inclination*: 60.9000 deg. *Period*: 161.00 min.

  Studied inner Van Allen belt. Electron I and II launched by a single carrier rocket. Electron I: simultaneous study of the Earth's inner and outer radiation belts, cosmic rays and upper atmosphere. Electron II: simultaneous study of the Earth's inner and outer radiation belts, cosmic rays and outer space.

- **Elektron 2** - . *Payload*: 2D s/n 2. *Mass*: 444 kg (978 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Elektron. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Elektron-B. *Decay Date*: 1997-04-22 . *USAF Sat Cat*: 748 . *COSPAR*: 1964-006B. *Apogee*: 62,811 km (39,028 mi). *Perigee*: 5,611 km (3,486 mi). *Inclination*: 60.2000 deg. *Period*: 1,356.40 min.

  Studied outer Van Allen belt. Electron I and II launched by a single carrier rocket. Electron I: simultaneous study of the Earth's inner and outer radiation belts, cosmic rays and upper atmosphere. Electron II: simultaneous study of the Earth's inner and outer radiation belts, cosmic rays and outer space.

1964 February 19 - . 05:47 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: Second stage failure.. *Failed Stage*: 2.

- **3MV-1A** - . *Payload*: 3MV-1A s/n 2. *Mass*: 890 kg (1,960 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Mars. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*:

3MV. *Spacecraft*: Venera 3MV-1A. *Decay Date*: 1964-02-19 .

- **3MV-1 No. 2 SA** - . *Mass*: 890 kg (1,960 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Mars. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3MV-1.

1964 March 1 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Venus launch delayed.** - . *Payload*: 3MV-1. *Nation*: Russia. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3MV-1. *Decay Date*: 1964-03-01 . The launch was delayed due to malfunctions during prelaunch service..

1964 March 10 - . *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Zenit-2 spy satellite accepted into mlitary service** - . *Nation*: Russia. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. Defence Ministry of the USSR decree 0045 'On adopting the Zenit-2 satellite launched on the 8A92 into armaments' was issued..

1964 March 21 - . 08:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: Failure. *Failed Stage*: U.

- **Luna failure** - . *Payload*: E-6 s/n 4. *Mass*: 1,422 kg (3,134 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1964-03-21 . The upper stages burnt on re-entry into the atmosphere..

1964 March 27 - . 03:24 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: During unpowered coast in parking orbit the escape stage Block L lost stable attitude due to a loss of the power circuit of the pneumatic valves of the attitude control and stabilization system.. *Failed Stage*: U.

- **Cosmos 27** - . *Payload*: 3MV-1 s/n 3. *Mass*: 890 kg (1,960 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3MV-1. *Decay Date*: 1964-03-29 . *USAF Sat Cat*: 772 . *COSPAR*: 1964-014A. *Apogee*: 209 km (129 mi). *Perigee*: 197 km (122 mi). *Inclination*: 64.8000 deg. *Period*: 88.50 min. The stage with payload remained in Earth orbit as Cosmos-27..

1964 April 2 - . 02:42 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Zond 1** - . *Payload*: 3MV-1 s/n 4. *Mass*: 890 kg (1,960 lb). *Nation*: Russia. *Agency*:

Korolev bureau. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3MV-1. *USAF Sat Cat*: 785 . *COSPAR*: 1964-016D. Failed Venus probe. Solar Orbit (Heliocentric). Elaboration of a long range space system and conduct of scientific research..

1964 April 4 - . 09:36 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 28** - . *Payload*: Zenit-2 11F61 s/n 16. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1964-04-12 . *USAF Sat Cat*: 779 . *COSPAR*: 1964-017A. *Apogee*: 373 km (231 mi). *Perigee*: 213 km (132 mi). *Inclination*: 65.0000 deg. *Period*: 90.40 min. Area survey photo reconnaissance satellite..

1964 April 12 - . 09:21 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Sputnik 11A59.

- **Polet 2; Polyot 2** - . *Payload*: I-2B s/n 2. *Mass*: 1,400 kg (3,000 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Military. *Type*: Anti-satellite system. *Spacecraft Bus*: Kosmoplan. *Spacecraft*: Polyot. *Decay Date*: 1966-06-08 . *USAF Sat Cat*: 783 . *COSPAR*: 1964-019A. *Apogee*: 479 km (297 mi). *Perigee*: 303 km (188 mi). *Inclination*: 58.1000 deg. *Period*: 92.30 min. ASAT interceptor control and propulsion test. Elaboration of systems providing for the extensive manouevring of space apparatuses..

1964 April 20 - . 08:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: Power failure caused upper stage shutdown at T+340 seconds.. *Failed Stage*: U.

- **Luna failure** - . *Payload*: E-6 s/n 5. *Mass*: 1,422 kg (3,134 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1964-04-20 . The upper stages broke up on re-entry into the atmosphere...

1964 April 25 - . 10:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 29** - . *Payload*: Zenit-2 11F61 s/n 19. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 7.00 days. *Decay Date*: 1964-05-02 . *USAF Sat Cat*: 791 . *COSPAR*: 1964-021A. *Apogee*: 292 km (181 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite..

1964 May 18 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 30** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1964-05-26 . *USAF Sat Cat*: 797 . *COSPAR*: 1964-023A. *Apogee*: 366 km (227 mi). *Perigee*: 206 km (128 mi). *Inclination*: 64.9000 deg. *Period*: 90.30 min. High resolution photo reconnaissance satellite; returned film capsule.

1964 June 3 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31?. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Test?** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1964 June 4 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: At T+104 sec the tank draining of core Block A failed due to jamming of the servo-motored throttle and break down of the motor's circuit The launcher was destroyed on impact downrange from the pad.. *Failed Stage*: 0.

- **Molniya-1 s/n 2 Failure** - . *Payload*: Molniya-1 s/n 2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. Unsuccessful first attempt to launch Molniya communications satellite..

1964 June 10 - . 10:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 32** - . *Payload*: Zenit-2 11F61 s/n 18. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1964-06-18 . *USAF Sat Cat*: 807 . *COSPAR*: 1964-029A. *Apogee*: 322 km (200 mi). *Perigee*: 205 km (127 mi). *Inclination*: 51.3000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite..

1964 June 23 - . 10:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 33** - . *Payload*: Zenit-2 11F61 s/n 20. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1964-07-01 . *USAF Sat Cat*: 816 . *COSPAR*: 1964-033A. *Apogee*: 279 km (173 mi). *Perigee*: 205 km (127 mi). *Inclination*: 64.9000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite..

1964 July 1 - . 11:16 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 34** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1964-07-09 . *USAF Sat Cat*: 822 . *COSPAR*: 1964-034A. *Apogee*: 342 km (212 mi). *Perigee*: 201 km (124 mi). *Inclination*: 64.9000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule.

1964 July 10 - . 21:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8K72K.

- **Elektron 3** - . *Payload*: 2D s/n 3. *Mass*: 350 kg (770 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Elektron. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Elektron-A. *USAF Sat Cat*: 829 . *COSPAR*: 1964-038A. *Apogee*: 6,302 km (3,915 mi). *Perigee*: 408 km (253 mi). *Inclination*: 60.9000 deg. *Period*: 159.30 min. Studied inner Van Allen belt. Electron 3 and 4 launched by a single carrier rocket. Simultaneous study of the inner and outer radiation belts of the earth, cosmic rays and the upper atmosphere. .

- **Elektron 4** - . *Payload*: 2D s/n 4. *Mass*: 444 kg (978 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Elektron. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Elektron-B. *Decay Date*: 1983-10-12 . *USAF Sat Cat*: 830 . *COSPAR*: 1964-038B. *Apogee*: 66,269 km (41,177 mi). *Perigee*: 447 km (277 mi). *Inclination*: 60.8000 deg. *Period*: 1,313.80 min. Studied outer Van Allen belt. Electron 3 and 4 launched by a single carrier rocket. Simultaneous study of the inner and outer radiation belts of the earth, cosmic rays and the upper atmosphere. .

1964 July 15 - . 11:31 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 35** - . *Payload*: Zenit-2 11F61 s/n 21. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1964-07-23 . *USAF Sat Cat*: 833 . *COSPAR*: 1964-039A. *Apogee*: 258 km (160 mi). *Perigee*: 218 km (135 mi). *Inclination*: 51.3000 deg. *Period*: 89.20 min. Area survey photo reconnaissance satellite..

1964 July 27 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31?. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Test?** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1964 August 14 - . 09:36 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 37** - . *Payload*: Zenit-2 11F61 s/n 22. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1964-08-22 . *USAF Sat Cat*: 848 . *COSPAR*: 1964-044A. *Apogee*: 240 km (140 mi). *Perigee*: 208 km (129 mi). *Inclination*: 64.9000 deg. *Period*: 88.90 min. Area survey photo reconnaissance satellite. Program partially completed. Break in the film fof the SA-10 camera..

1964 August 22 - . 07:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Cosmos 41** - . *Payload*: Molniya-1. *Mass*: 1,500 kg (3,300 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 2004-04-09 . *USAF Sat Cat*: 869 . *COSPAR*: 1964-049D. *Apogee*: 39,169 km (24,338 mi). *Perigee*: 1,023 km (635 mi). *Inclination*: 68.4000 deg. *Period*: 714.50 min.

  Successful launch of first Soviet communications satellite. This is the second Molniya launch attempt. (the first was a launch failure). The failure of the antennae to deploy means the spacecraft can only be tested in a limited manner and cannot be used for the planned relay of television.

1964 August 28 - . 16:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 44** - . *Payload*: Meteor no. 1. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *USAF Sat Cat*: 876 . *COSPAR*: 1964-053A. *Apogee*: 778 km (483 mi). *Perigee*: 599 km (372 mi). *Inclination*: 65.1000 deg. *Period*: 98.50 min. Investigation of the upper atmosphere and outer space. .

1964 September 9 - . *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Voskhod preparations** - . *Nation*: Russia. *Related Persons*: Korolev, Krylov, Rudenko. *Program*: Voskhod. *Flight*: Voskhod 1. *Spacecraft*: Voskhod, Zenit-4.

  Kamanin arrives at the cosmodrome, only to find the launch of the manned Voskhod delayed to October. The launch of a Zenit-4 spy satellite, that uses the same launch vehicle as planned for Voskhod, has aborted on the pad after the Block A strap-on failed to ignite. This is the first block A failure in over 100 R-7 launches. That evening Kamanin views a launch of an R-36 heavy ICBM. Marshall Krylov reveals it will have a range of 14,000 km with a CEP of under 1 km with a 40 megaton warhead - one missile is sufficient to wipe out a city like New York. Rudenko believes that the

victor in any nuclear war will be the one who pushes the button first. Krylov disagrees, saying that if the Americans would launch an attack on Soviet missile forces, the Soviet Union would launch its missiles on a counter-strike before the American missiles arrive - total and senseless destruction. Rudenko believes that Rudenko is more correct, since in the real-world responses will not conform to theoretical possibilities of instant reaction.

Later the state commission meets to consider the launch of the first Voskhod. The unpleasantness at the landing trials in the Crimea reveal only the inadequacy of the design of the test capsules, and do not reflect the flight system, says Korolev. He certifies the reliability of the Voskhod for flight. The commission decides to set the launch of the next Zenit-4 reconnaissance satellite for 14 September; that of the Voskhod with mannequins on 18-20 September; the definitive landing system trial at Fedosiya on 23 September; and if that is successful, launch of a manned Voskhod by the end of September.

1964 September 13 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 45** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Related Persons*: Korolev. *Agency*: Korolev bureau. *Program*: Voskhod. *Class*: Surveillance. *Type*: Military surveillance satellite. *Flight*: Voskhod 1. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 5.00 days. *Decay Date*: 1964-09-18 . *USAF Sat Cat*: 880 . *COSPAR*: 1964-055A. *Apogee*: 311 km (193 mi). *Perigee*: 203 km (126 mi). *Inclination*: 64.9000 deg. *Period*: 89.60 min.

  High resolution photo reconnaissance satellite; returned film capsule; also carried weather experiments. The Zenit-4 launches a day ahead of schedule. The booster rocket performs perfectly as Korolev and Kamanin watch from the veranda of the IP-1 tracking station. This confirms readiness of the same launch vehicle for the Voskhod launch.

1964 September 24 - . 12:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 46** - . *Payload*: Zenit-2 11F61 s/n 23. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1964-10-02 . *USAF Sat Cat*: 885 . *COSPAR*: 1964-059A. *Apogee*: 264 km (164 mi). *Perigee*: 211 km (131 mi). *Inclination*: 51.3000 deg. *Period*: 89.20 min. Area survey photo reconnaissance satellite. Demonstration launch witnessed by Khrushchev..

1964 October 6 - . 07:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 47** - . *Payload*: Voskhod 3KV s/n 2. *Mass*: 5,320 kg (11,720 lb). *Nation*: Russia. *Related Persons*: Kirillov, Korolev, Rudenko, Tyulin. *Agency*: Korolev bureau. *Program*: Voskhod. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Voskhod 1. *Spacecraft Bus*: Vostok. *Spacecraft*: Voskhod. *Duration*: 1.01 days. *Decay Date*: 1964-10-07 . *USAF Sat Cat*: 891 . *COSPAR*: 1964-062A. *Apogee*: 383 km (237 mi). *Perigee*: 174 km (108 mi). *Inclination*: 64.6000 deg. *Period*: 90.10 min.

  Unmanned test of Voskhod spacecraft. At 07:00 the State Commission meets at Area 2. All Chief Designers, Commanders, and Section report that all is ready for flight. The commission gives the order to proceed with the launch. Weather at the pad is 7 balls, 8-10 m/s wind with gusts to 15 m/s, temperature 9 to 12 deg C. Weather in the recovery zones is reported as winds up to 15 m/s. Weather in the recovery zone is not clear, but that is not considered an impediment, and in fact Kamanin would like to see how the landing system functions in bad conditions. Kamanin visits the pad at T-30 seconds; at T-20 seconds, the veranda at IP-1 has over 50 viewers of the launch, including 15 cosmonaut candidates and the 7 Voskhod cosmonauts. Kamanin is relegated to the IP-1 veranda this time, with Rudenko, Kirillov, and Tyulin the bunker adjacent to the pad. Korolev stays with the booster until T-5 minutes, then enters the bunker. The booster ignites precisely at 10:00; the strap-ons burn out and are jettisoned at T+120 seconds; the core burns out and the final stage ignites at T+290 seconds; and at T+523 seconds spacecraft 3KV number 2 is placed in orbit as the final stage shuts down. The spacecraft separates and all systems look normal.

  Recovered October 7, 1964 7:28 GMT. Officially: Investigation of the upper atmosphere and outer space.

1964 October 7 - . *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 47 returns to earth.** - . *Nation*: Russia. *Program*: Voskhod. *Flight*: Voskhod 1. *Spacecraft Bus*: Vostok. *Spacecraft*: Voskhod.

  At 7 am the Cosmos 47 landing commission convenes. Kamanin has had only three hours sleep. The spacecraft is to conduct retrofire on its 17th orbit of the earth and land in Kustan, where winds are 15-17 m/s. The capsule made a good landing, with the parachute-rocket soft landing system working perfectly - the spacecraft had zero velocity on impact with the ground. The spacecraft penetrated 90 mm into the ground. The strong winds caught the parachute after landing and dragged it 160 m, but if a crew had been aboard they could have quickly commanded separation of the parachute. All systems of the booster and spacecraft worked perfectly, except that the third stage engines' thrust fell by 10% for three seconds, but the engine controller detected the shortfall and made up the velocity.

1964 October 8 - . *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 47 capsule returned to Baikonur.** - . *Nation*: Russia. *Related Persons*: Kosberg. *Program*: Voskhod. *Flight*: Voskhod 1. *Spacecraft Bus*: Vostok. *Spacecraft*:

Voskhod.

The capsule arrived aboard an An-12 at 11:30. All systems performed well. It is reported that one of Kosberg's third stage engines developed an out-of-control high frequency oscillation in a stand test, and exploded. The State Commission decides to delay the manned Voskhod launch 3 or 4 days while the safety of the engines on the booster are verified. A special commission is sent to Voronezh to assess the situation. Kosberg's engines have flown 60 times, and been tested on the stand 400 times, without this problem having occurred before. In the evening seven reporters arrive from the Soviet press and begin their work leading up to the manned launch.

1964 October 12 - . 07:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Voskhod 1** - . *Call Sign*: Rubin (Ruby). *Crew*: Feoktistov, Komarov, Yegorov. *Backup Crew*: Katys, Lazarev, Volynov. *Payload*: Voskhod 3KV s/n 3. *Mass*: 5,320 kg (11,720 lb). *Nation*: Russia. *Related Persons*: Feoktistov, Gagarin, Katys, Komarov, Korolev, Lazarev, Rudenko, Tyulin, Volynov, Yegorov. *Program*: Voskhod. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Voskhod 1. *Spacecraft Bus*: Vostok. *Spacecraft*: Voskhod. *Duration*: 1.01 days. *Decay Date*: 1964-10-13 . *USAF Sat Cat*: 904 . *COSPAR*: 1964-065A. *Apogee*: 336 km (208 mi). *Perigee*: 178 km (110 mi). *Inclination*: 64.7000 deg. *Period*: 89.60 min.

  The U.S.S.R. launched the world's first multi-manned spacecraft, *Voskhod I*, the first to carry a scientist and a physician into space. The crew were Col. Vladimir Komarov, pilot; Konstantin Feoktistov, scientist; and Boris Yegorov, physician. Potentially dangerous modification of Vostok to upstage American Gemini flights; no spacesuits, ejection seats, or escape tower. One concession was backup solid retrorocket package mounted on nose of spacecraft. Seats mounted perpendicular to Vostok ejection seat position, so crew had to crane their necks to read instruments, still mounted in their original orientation. Tested the new multi-seat space ship; investigated the in-flight work potential and co-operation of a group of cosmonauts consisting of specialists in different branches of science and technology; conducted scientific physico-technical and medico-biological research. The mission featured television pictures of the crew from space.

  Coming before the two-man Gemini flights, Voskhod 1 had a significant worldwide impact. In the United States, the "space race" was again running under the green flag. NASA Administrator James E. Webb, commenting on the spectacular, called it a "significant space accomplishment." It was, he said, "a clear indication that the Russians are continuing a large space program for the achievement of national power and prestige." *Additional Details*: here....

1964 October 14 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 48** - . *Payload*: Zenit-2 11F61 s/n 24. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 6.00 days. *Decay Date*: 1964-10-20 . *USAF Sat Cat*: 908 . *COSPAR*: 1964-066A. *Apogee*: 284 km (176 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.1000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite. Program partially completed. Returned early due to failure of spacecraft thermoregulation system; internal temperature rose to 43 degrees C..

1964 October 28 - . 10:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 50** - . *Payload*: Zenit-2 11F61 s/n 25. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1964-11-05 . *USAF Sat Cat*: 919 . *COSPAR*: 1964-070A. *Apogee*: 232 km (144 mi). *Perigee*: 190 km (110 mi). *Inclination*: 51.2000 deg. *Period*: 88.70 min. Area survey photo reconnaissance satellite. Unsuccessful mission. Failure of the braking engine system. Spacecraft ordered to self destruct..

1964 November 30 - . 13:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Zond 2** - . *Payload*: 3MV-4A s/n 2. *Mass*: 890 kg (1,960 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Mars. *Class*: Mars. *Type*: Mars probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Mars 3MV-4A. *USAF Sat Cat*: 945 . *COSPAR*: 1964-078C.

  Mars probe intended to photograph Mars on a flyby trajectory. Zond 2 was launched from an earth parking orbit towards Mars to test space-borne systems and to carry out scientific investigations. Zond 2 carried six electric rocket engines of plasma type that served as actuators of the attitude control system. The communications system failed during April 1965. The spacecraft flew by Mars on August 6, 1965, at a distance of 1500 km.

1965 January 11 - . 09:36 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 52** - . *Payload*: Zenit-2 11F61 s/n 26. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1965-01-19 . *USAF Sat Cat*: 968 . *COSPAR*: 1965-001A. *Apogee*: 298 km (185 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite..

1965 February 21 - . *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 57 roll-out** - . *Nation*: Russia. *Program*: Voskhod. *Flight*: Voskhod 2. *Spacecraft Bus*: Vostok. *Spacecraft*: Voskhod. The booster is rolled out to the pad at 08:00, slightly behind schedule after delays in mating the spacecraft the day before. It is -22 deg C at the launch centre; conditions at the landing site are poor, but his will not delay the launch. .

1965 February 22 - . 07:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 57** - . *Payload*: Voskhod 3KD s/n 1. *Mass*: 5,682 kg (12,526 lb). *Nation*: Russia. *Related Persons*: Korolev. *Agency*: Korolev bureau. *Program*: Voskhod. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Voskhod 2. *Spacecraft Bus*: Vostok. *Spacecraft*: Voskhod. *Duration*: 0.22 days. *Decay Date*: 1965-02-22 . *USAF Sat Cat*: 1093 . *COSPAR*: 1965-012A. *Apogee*: 708 km (439 mi). *Perigee*: 159 km (98 mi). *Inclination*: 64.8000 deg. *Period*: 93.20 min.

  Unsuccessful mission. Voskhod 2 test. Immediately after orbital insertion airlock and spacesuit inflated normally. Then two ground control stations sent commands to the spacecraft simultaneously. The combined signals accidentally set off the retrofire sequence, which some time later triggered the self destruct mechanism (designed to prevent the spacecraft from falling into enemy hands).
  Officially: Investigation of the upper atmosphere and outer space. *Additional Details*: here....

1965 February 26 - . 05:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 58** - . *Payload*: Meteor no. 2. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *Decay Date*: 1990-02-25 . *USAF Sat Cat*: 1097 . *COSPAR*: 1965-014A. *Apogee*: 345 km (214 mi). *Perigee*: 333 km (206 mi). *Inclination*: 65.0000 deg. *Period*: 91.30 min. Probable weather satellite. Investigation of the upper atmosphere and outer space. .

1965 March 7 - . 09:07 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 59** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-03-15 . *USAF Sat Cat*: 1191 . *COSPAR*: 1965-015A. *Apogee*: 321 km (199 mi). *Perigee*: 205 km (127 mi). *Inclination*: 64.9000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule fitted with airlock mating ring planned for Voskhod-2 spacecraft..

1965 March 12 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: The escape stage Block L's engine failed to ignite due to failure of a transformer in the power supply of the control system.. *Failed Stage*: U.

- **Cosmos 60** - . *Payload*: E-6 s/n 9. *Mass*: 6,530 kg (14,390 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1965-03-17 . *USAF Sat Cat*: 1246 . *COSPAR*: 1965-018A. *Apogee*: 248 km (154 mi). *Perigee*: 195 km (121 mi). *Inclination*: 64.7000 deg. *Period*: 88.90 min. The stage with the payload remained in Earth orbit as Kosmos-60..

1965 March 18 - . 07:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Voskhod 2** - . *Call Sign*: Almaz (Diamond). *Crew*: Belyayev, Leonov. *Backup Crew*: Gorbatko, Khrunov, Zaikin. *Payload*: Voskhod 3KD s/n 4. *Mass*: 5,682 kg (12,526 lb). *Nation*: Russia. *Related Persons*: Belyayev, Gagarin, Gorbatko, Khrunov, Korolev, Leonov, Rudenko, Tyulin, Zaikin. *Agency*: MOM. *Program*: Voskhod. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Voskhod 2. *Spacecraft Bus*: Vostok. *Spacecraft*: Voskhod. *Duration*: 1.08 days. *Decay Date*: 1965-03-19 . *USAF Sat Cat*: 1274 . *COSPAR*: 1965-022A. *Apogee*: 475 km (295 mi). *Perigee*: 167 km (103 mi). *Inclination*: 64.8000 deg. *Period*: 90.90 min.

  First spacewalk, with a two man crew of Colonel Pavel Belyayev and Lt. Colonel Aleksey Leonov. During *Voskhod 2*'s second orbit, Leonov stepped from the vehicle and performed mankind's first "walk in space." After 10 min of extravehicular activity, he returned safely to the spacecraft through an inflatable airlock.

  This mission was originally named 'Vykhod ('Exit/Advance'). It almost ended in disaster when Leonov was unable to reenter the airlock due to stiffness of the inflated spacesuit. He had to bleed air from the suit in order to get into the airlock. After Leonov finally managed to get back into the spacecraft cabin, the primary hatch would not seal completely. The environmental control system compensated by flooding the cabin with oxygen, creating a serious fire hazard in a craft only qualified for sea level nitrogen-oxygen gas mixes (Cosmonaut Bondarenko had burned to death in a ground accident in such circumstances, preceding the Apollo 204 disaster by many years). *Additional Details*: here....

1965 March 25 - . 10:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 64** - . *Payload*: Zenit-2 11F61 s/n 17. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1965-04-02 . *USAF Sat Cat*: 1305 . *COSPAR*: 1965-025A. *Apogee*: 250 km (150 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.0000 deg. *Period*: 89.10 min. Area

survey photo reconnaissance satellite..

1965 April 10 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: Stage 3's engine 8D715K failed due to depressurization of the nitrogen pipeline of the LOX tank pressurization system of Block I.. *Failed Stage*: U.

- **Luna failure - stage 3 engine failure.** - . *Payload*: E-6 s/n 8. *Mass*: 1,422 kg (3,134 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1965-04-10 . The upper stages fell apart on re-entry into the atmosphere...

1965 April 17 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 65** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-04-25 . *USAF Sat Cat*: 1320 . *COSPAR*: 1965-029A. *Apogee*: 315 km (195 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; also carried weather experiments..

1965 April 23 - . 01:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya 1-01** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1979-08-16 . *USAF Sat Cat*: 1324 . *COSPAR*: 1965-030A. *Apogee*: 39,300 km (24,400 mi). *Perigee*: 538 km (334 mi). *Inclination*: 65.5000 deg. *Period*: 707.30 min. First announced launch of Soviet communications satellite. Television programme transmission and long range two way multi channel telephone and telegraph communications. Orbital characteristics after correction of 2 May 1965..

1965 May 7 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 66** - . *Payload*: Zenit-2 11F61 s/n 27. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1965-05-15 . *USAF Sat Cat*: 1362 . *COSPAR*: 1965-035A. *Apogee*: 397 km (246 mi). *Perigee*: 285 km (177 mi). *Inclination*: 64.9000 deg. *Period*: 91.30 min. Returned after 8 days. Unsuccessful mission. Parachute deployment failure. Spacecraft destroyed in crash..

1965 May 9 - . 07:49 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Luna 5** - . *Payload*: E-6 s/n 10. *Mass*: 1,474 kg (3,249 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1965-05-12 . *USAF Sat Cat*: 1366 . *COSPAR*: 1965-036A. *Apogee*: 219 km (136 mi). *Perigee*: 159 km (98 mi). *Inclination*: 64.8000 deg. *Period*: 88.27 min.

  Soft lunar landing attempt. Western observers, among them England's Sir Bernard Lovell, correctly speculated that the craft's mission was a soft landing. After launch fom Baikonur and five successful communications sessions the spacecraft performed a midcourse correction maneuver on 10 May. Unfortunately a problem developed in a flotation gyroscope (it did not have enough time to warm up properly) in the I-100 guidance control unit and control was lost so the spacecraft began spinning around its main axis. It was brought back under control, but at the time of the next maneuver, the main retrorocket system failed due to a ground control error in calculating the setpoints, and the spacecraft, though still headed for the Moon, was far off its intended landing site. Problems again cropped up with the I-100 unit so a retrorocket burn could not take place and Luna 5 impacted the lunar surface some 700 km from the target point at about 19:10 UT on 12 May 1965, becoming the second Soviet probe to hit the Moon. A Soviet announcement gave the impact point as the Sea of Clouds at roughly 31 degrees S, 8 degrees W. (Although a later analysis gave a very different estimate of 8 degrees N, 23 degrees W.)

1965 May 25 - . 10:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 67** - . *Payload*: Zenit-4. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-06-02 . *USAF Sat Cat*: 1382 . *COSPAR*: 1965-040A. *Apogee*: 351 km (218 mi). *Perigee*: 203 km (126 mi). *Inclination*: 51.8000 deg. *Period*: 90.10 min. High resolution photo reconnaissance satellite; returned film capsule.

1965 June 8 - . 07:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Luna 6** - . *Payload*: E-6 s/n 7. *Mass*: 1,440 kg (3,170 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *USAF Sat Cat*: 1393 . *COSPAR*: 1965-044A.

  Attempted unmanned lunar soft lander. Tass reported that all onboard equipment was functioning normally. During the mid-course correction on 9 June the main retro-rocket failed to cut off as scheduled and fired until all of its propellant was exhausted, due to an erroneous ground command sent to the timer. This put the spacecraft on a trajectory to miss the Moon. The spacecraft was put through all the

motions of an actual landing, jettisoning the lander and deploying the airbags, as an apparently successful practice run for the ground crew despite the fact that it flew by the Moon at a distance of 161,000 km on 11 June. Contact was lost at a distance of 600,000 km from Earth, the spacecraft presumably entering a heliocentric orbit.

1965 June 15 - . 10:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 68** - . *Payload*: Zenit-2 11F61 s/n 29. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1965-06-23 . *USAF Sat Cat*: 1404 . *COSPAR*: 1965-046A. *Apogee*: 306 km (190 mi). *Perigee*: 208 km (129 mi). *Inclination*: 65.0000 deg. *Period*: 89.70 min. Area survey photo reconnaissance satellite..

1965 June 25 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 69** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-07-03 . *USAF Sat Cat*: 1421 . *COSPAR*: 1965-049A. *Apogee*: 310 km (190 mi). *Perigee*: 206 km (128 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1965 July 13 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92. *FAILURE*: Second stage guidance failure.. *Failed Stage*: 2.

- **Zenit-2 11F61 s/n 28** - . *Payload*: Zenit-2 11F61 s/n 28. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Decay Date*: 1965-07-13 . Area survey photo reconnaissance satellite..

1965 July 18 - . 14:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Zond 3** - . *Payload*: 3MV-4A s/n 3. *Mass*: 959 kg (2,114 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mars. *Class*: Mars. *Type*: Mars probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Mars 3MV-4A. *USAF Sat Cat*: 1454 . *COSPAR*: 1965-056A.

  Zond 3 was towards the moon and interplanetary space. The spacecraft was equipped with a TV system that provided automatic inflight film processing. On July 20, during lunar flyby, 25 pictures of very good quality were taken of the lunar farside from distances of 11,570 to 9960 km. The photos covered 19,000,000 km

square of the lunar surface. Photo transmissions by facsimile were returned to earth from a distance of 2,200,000 km on July 29 and were retransmitted later from a distance of 31,500,000 km, thus proving the ability of the communications system. After the lunar flyby, Zond 3 continued space exploration in a heliocentric orbit. Those pictures showed clearly the heavily cratered nature of the surface. This mission dramatized the advances in space photography that the U.S.S.R. had made since its first far-side effort six years earlier.

1965 August 3 - . 11:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 77** - . *Payload*: Zenit-4. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-08-11 . *USAF Sat Cat*: 1469 . *COSPAR*: 1965-061A. *Apogee*: 281 km (174 mi). *Perigee*: 200 km (120 mi). *Inclination*: 51.8000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule.

1965 August 14 - . 11:16 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 78** - . *Payload*: Zenit-2 11F61 s/n 30. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1965-08-22 . *USAF Sat Cat*: 1505 . *COSPAR*: 1965-066A. *Apogee*: 379 km (235 mi). *Perigee*: 330 km (200 mi). *Inclination*: 69.0000 deg. *Period*: 91.60 min. Area survey photo reconnaissance satellite..

1965 August 25 - . 10:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 79** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-09-02 . *USAF Sat Cat*: 1523 . *COSPAR*: 1965-069A. *Apogee*: 338 km (210 mi). *Perigee*: 206 km (128 mi). *Inclination*: 64.9000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule.

1965 September 4 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **E-6 Launch Postponement** - . *Payload*: E-6. *Nation*: Russia. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. The launch was delayed due to malfunction of the RKS system of the Stages 1/2's control system during pre-launch service..

1965 September 9 - . 09:36 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 85** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-09-17 . *USAF Sat Cat*: 1578 . *COSPAR*: 1965-071A. *Apogee*: 291 km (180 mi). *Perigee*: 202 km (125 mi). *Inclination*: 64.9000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule.

1965 September 23 - . 09:07 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 91** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-10-01 . *USAF Sat Cat*: 1603 . *COSPAR*: 1965-075A. *Apogee*: 324 km (201 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1965 October 4 - . 07:56 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Luna 7** - . *Payload*: E-6 s/n 11. *Mass*: 1,504 kg (3,315 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1965-10-07 . *USAF Sat Cat*: 1610 . *COSPAR*: 1965-077A.

  Lunar soft landing attempt. The Luna 7 spacecraft was intended to achieve a soft landing on the Moon. However, due to loss of attitude control during the final approach to the lunar surface, the retrorockets were prevented from firing to slow the spacecraft and it impacted the lunar surface at 9.8 N, 47.8 W in the Sea of Storms on 7 October 1965 at 22:08:24 UT.

1965 October 14 - . 19:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya 1-02** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1967-03-17 . *USAF Sat Cat*: 1621 . *COSPAR*: 1965-080A. *Apogee*: 39,921 km (24,805 mi). *Perigee*: 487 km (302 mi). *Inclination*: 65.2000 deg. *Period*: 718.80 min. France - USSR communications link. Second communications satellite 'Molniya-1'. Television programme transmission and long-range, two-way multi-channel telephone, phototelegraph and telegraph communications..

1965 October 16 - . 08:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 92** - . *Payload*: Bion precursor. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-10-24 . *USAF Sat Cat*: 1626 . *COSPAR*: 1965-083A. *Apogee*: 331 km (205 mi). *Perigee*: 204 km (126 mi). *Inclination*: 64.9000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule; also carried weather and biological experiments..

1965 October 28 - . 08:24 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 94** - . *Payload*: Bion precursor. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1965-11-05 . *USAF Sat Cat*: 1636 . *COSPAR*: 1965-085A. *Apogee*: 271 km (168 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.0000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; also carried biological experiments..

1965 November 12 - . 05:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Venera 2** - . *Payload*: 3MV-4 s/n 4. *Mass*: 962 kg (2,120 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3MV-4. *USAF Sat Cat*: 1730 . *COSPAR*: 1965-091A. *Apogee*: 315 km (195 mi). *Perigee*: 205 km (127 mi). *Inclination*: 51.8000 deg. *Period*: 89.71 min.

  Venera 2 was launched towards the planet Venus and carried a TV system and scientific instruments. On February 27, 1966, the spacecraft passed Venus at a distance of 24,000 km and entered a heliocentric orbit. The spacecraft system had ceased to operate before the planet was reached and returned no data.

1965 November 16 - . 04:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Venera 3** - . *Payload*: 3MV-3 s/n 1. *Mass*: 958 kg (2,112 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3MV-3. *Decay Date*: 1966-03-01 . *USAF Sat Cat*: 1733 . *COSPAR*: 1965-092A.

  Venera 3 was launched towards the planet Venus. The mission was to land on the Venusian surface. The entry vehicle contained a radio communication system,

scientific instruments, electrical power sources, and medallions bearing the coat of arms of the U.S.S.R. The station impacted Venus on March 1, 1966. However, the communications systems had failed before planetary data could be returned.

1965 November 23 - . 03:21 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: At T+528 sec, during the final thrust phase of the Block I's 8D715K engine, one of the combustion chambers blew up due to a tear in the fuel pipeline. This resulted in an abnormal separation of the upper stages.. *Failed Stage*: U.

- **Cosmos 96** - . *Payload*: 3MV-4 s/n 6. *Mass*: 960 kg (2,110 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3MV-4. *Decay Date*: 1965-12-09 . *USAF Sat Cat*: 1742 . *COSPAR*: 1965-094A. *Apogee*: 296 km (183 mi). *Perigee*: 222 km (137 mi). *Inclination*: 51.9000 deg. *Period*: 89.70 min. The escape stage Block L entered parking orbit tumbling and was not able to operate properly..

1965 November 26 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Venus launch delayed.** - . *Payload*: 3MV-3. *Nation*: Russia. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3MV-3. *Decay Date*: 1965-11-26 . The launch attempt was abandoned due to a launch vehicle malfunction during pre-launch preparations..

1965 November 27 - . 08:24 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 98** - . *Payload*: Zenit-2 11F61 s/n 31. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1965-12-05 . *USAF Sat Cat*: 1780 . *COSPAR*: 1965-097A. *Apogee*: 547 km (339 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.0000 deg. *Period*: 92.10 min. Area survey photo reconnaissance satellite..

1965 December 3 - . 10:46 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Luna 8** - . *Payload*: E-6 s/n 12. *Mass*: 1,550 kg (3,410 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1965-12-06 . *USAF Sat Cat*: 1810 . *COSPAR*: 1965-099A.

  Lunar soft landing attempt failed. Luna 8's objectives were to test a soft lunar landing system and scientific research. Weighing 1,552 kg (3,422 lbs), the spacecraft was following a trajectory close to the calculated one and the equipment was

functioning normally. However, a puncture to a cushioning airbag caused the spacecraft to spin, losing attitude control and preventing full firing of the retrorockets. The spacecraft impacted the lunar surface at 9.1 N, 63.3 W in the Sea of Storms at 21:51:30 UT on 6 December 1965. The mission did complete the experimental development of the star-orientation system and ground control of radio equipment, flight trajectory, and other instrumentation.

1965 December 10 - . 08:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 99** - . *Payload*: Zenit-2 11F61 s/n 32. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1965-12-18 . *USAF Sat Cat*: 1817 . *COSPAR*: 1965-103A. *Apogee*: 309 km (192 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite..

1965 December 14 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Test mission** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1965 December 17 - . 02:24 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 100** - . *Payload*: Meteor no. 3. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *Decay Date*: 2002-02-15 . *USAF Sat Cat*: 1843 . *COSPAR*: 1965-106A. *Apogee*: 547 km (339 mi). *Perigee*: 485 km (301 mi). *Inclination*: 65.0000 deg. *Period*: 95.00 min. Probable weather satellite. Investigation of the upper atmosphere and outer space. .

1965 December 21 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Test mission** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1965 December 27 - . 22:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A510.

- **Cosmos 102** - . *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: RORSAT. *Class*: Surveillance. *Type*: Military naval surveillance radar satellite. *Spacecraft Bus*: Kosmoplan. *Spacecraft*: US-A. *Decay Date*: 1966-01-13 . *USAF Sat Cat*: 1867 . *COSPAR*: 1965-111A. *Apogee*: 267 km (165 mi). *Perigee*: 205 km (127 mi). *Inclination*: 64.9000 deg. *Period*: 89.20 min. Prototype RORSAT hardware using chemical batteries in place of nuclear reactor..

1966 January 7 - . 08:24 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 104** - . *Payload*: Zenit-2 11F61 s/n 36. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-01-15 . *USAF Sat Cat*: 1903 . *COSPAR*: 1966-001A. *Apogee*: 379 km (235 mi). *Perigee*: 195 km (121 mi). *Inclination*: 65.0000 deg. *Period*: 90.20 min. Area survey photo reconnaissance satellite. Program not completely met. Spacecraft put into incorrect orbit by abnormal function of second and third stages of booster..

1966 January 22 - . 08:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 105** - . *Payload*: Zenit-2 11F61 s/n 38. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-01-30 . *USAF Sat Cat*: 1945 . *COSPAR*: 1966-003A. *Apogee*: 311 km (193 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite..

1966 January 31 - . 11:41 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Luna 9** - . *Payload*: E-6M s/n 13. *Mass*: 1,580 kg (3,480 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft*: Luna E-6. *Decay Date*: 1966-02-03 . *USAF Sat Cat*: 1954 . *COSPAR*: 1966-006A.

  Soft landed on Moon; photographed surface for 3 days. Landed on Moon 3 February 1966 at 18:44:52 GMT, Latitude 7.08 N, Longitude 295.63 E - Oceanus Procellarum. The Luna 9 spacecraft was the first spacecraft to achieve a lunar soft landing and to transmit photographic data to Earth. Seven radio sessions, totaling 8 hours and 5 minutes, were transmitted as were three series of TV pictures. When assembled, the photographs provided a panoramic view of the nearby lunar surface. The pictures included views of nearby rocks and of the horizon 1.4 Km away from the spacecraft.

1966 February 10 - . 08:52 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 107** - . *Payload*: Zenit-2 11F61 s/n 34. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-02-18 . *USAF Sat Cat*: 1998 . *COSPAR*: 1966-010A. *Apogee*: 313 km (194 mi). *Perigee*: 216 km (134 mi). *Inclination*: 65.0000 deg. *Period*: 89.70 min. Area survey photo reconnaissance satellite..

1966 February 19 - . 08:52 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 109** - . *Payload*: Bion precursor. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1966-02-27 . *USAF Sat Cat*: 2019 . *COSPAR*: 1966-014A. *Apogee*: 288 km (178 mi). *Perigee*: 204 km (126 mi). *Inclination*: 64.9000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; also carried biological experiments..

1966 February 22 - . 20:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 110** - . *Payload*: Voskhod 3KV s/n 5. *Mass*: 5,700 kg (12,500 lb). *Nation*: Russia. *Related Persons*: Beregovoi, Shatalov, Shonin, Volynov. *Agency*: MOM. *Program*: Voskhod. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Voskhod 3. *Spacecraft Bus*: Vostok. *Spacecraft*: Voskhod. *Duration*: 20.69 days. *Decay Date*: 1966-03-16 . *USAF Sat Cat*: 2070 . *COSPAR*: 1966-015A. *Apogee*: 887 km (551 mi). *Perigee*: 181 km (112 mi). *Inclination*: 51.8000 deg. *Period*: 95.30 min.

  Successfully recovered March 15, 1966 13:00 GMT. Precursor mission for Voskhod 3 hardware. Two dogs carried into lower Van Allen radiation belts.
  Officially: Biological research.

  Voskhod s/n 5 launched at 23:10 Moscow time, with two dogs, Veterka and Ygolka, aboard. This will be a 25-day mission. Kamanin is disgusted, he had proposed this as a 25-day mission by a single cosmonaut, but Korolev had constantly held with the 'dog variant'. Preparations for Voskhod-3 are proceeding well. The prime and back-up crews have completed their training and will take their examinations on 28 February. Parallel trials of the oxygen regeneration system at IMBP and OKB-124 both went well (IMBP, 12 days so far, temperature 16-24 deg C, 70% humidity; OKB-124, 10 days so far, temperature 18-16 deg C, 65% humidity).

1966 March 1 - . 11:03 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: The escape stage Block L lost roll control during unpowered coast in parking orbit because the axis of the course regulator of the control system jammed in the zero position. The stage's engine was not fired.. *Failed Stage*: U.

- **Cosmos 111** - . *Payload*: Ye-6S s/n 204. *Mass*: 6,540 kg (14,410 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft Bus*: Luna E-6. *Spacecraft*: Luna E-6S. *Decay Date*: 1966-03-03 . *USAF Sat Cat*: 2093 . *COSPAR*: 1966-017A. *Apogee*: 180 km (110 mi). *Perigee*: 168 km (104 mi). *Inclination*: 51.8000 deg. *Period*: 88.00 min.

1966 March 17 - . 10:28 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 112** - . *Payload*: Zenit-2 11F61 s/n 37. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-03-25 . *USAF Sat Cat*: 2107 . *COSPAR*: 1966-021A. *Apogee*: 664 km (412 mi). *Perigee*: 214 km (132 mi). *Inclination*: 72.0000 deg. *Period*: 93.30 min. Area survey photo reconnaissance satellite..

1966 March 21 - . 09:36 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 113** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1966-03-29 . *USAF Sat Cat*: 2114 . *COSPAR*: 1966-023A. *Apogee*: 314 km (195 mi). *Perigee*: 202 km (125 mi). *Inclination*: 64.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule.

1966 March 27 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78. *FAILURE*: The booster failed during ascent. The launcher and payload broke up on impact with the ground.. *Failed Stage*: 1.

- **Molniya-1 s/n 5 Failure** - . *Payload*: Molniya-1 s/n 5. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1.

1966 March 31 - . 10:47 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Luna 10** - . *Payload*: E-6S s/n 206 ISL. *Mass*: 1,597 kg (3,520 lb). *Nation*: Russia. *Agency*: Korolev bureau. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft Bus*: Luna E-6. *Spacecraft*: Luna E-6S. *USAF Sat Cat*: 2126 . *COSPAR*: 1966-027A.

  Lunar Orbit (Selenocentric). Development of system to permit the creation of an artificial lunar satellite for the investigation of circumlunar space; development of onboard systems for putting a station into a selenocentric (circumlunar) orbit. Orbit: Lunar Orbiter. The Luna 10 spacecraft was launched towards the Moon from an Earth orbiting platform. The spacecraft entered lunar orbit 3 50 x 1017 km, inclination 71.9 deg to plane of the lunar equator. on April 4, 1966. Scientific instruments included a gamma-ray spectrometer for energies between 0.3--3 MeV, a triaxial magnetometer, a meteorite detector, instruments for solar-plasma studies, and devices for measuring infrared emissions from the Moon and radiation

conditions of the lunar environment. Gravitational studies were also conducted. The spacecraft played back to Earth the `Internationale' during the Twenty-third Congress of the Communist Party of the Soviet Union. Luna 10 was battery powered and operated for 460 lunar orbits and 219 active data transmissions before radio signals were discontinued on May 30, 1966.

1966 April 6 - . 11:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 114** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1966-04-14 . *USAF Sat Cat*: 2133 . *COSPAR*: 1966-028A. *Apogee*: 337 km (209 mi). *Perigee*: 202 km (125 mi). *Inclination*: 72.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1966 April 20 - . 10:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 115** - . *Payload*: Zenit-2 11F61 s/n 35. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-04-28 . *USAF Sat Cat*: 2147 . *COSPAR*: 1966-033A. *Apogee*: 283 km (175 mi). *Perigee*: 189 km (117 mi). *Inclination*: 65.0000 deg. *Period*: 89.20 min. . Program partially completed. Abnormal operation of SA-10 camera..

1966 April 22 - . *Launch Vehicle*: R-7.

- **Waiting on Voskhod** - . *Nation*: Russia. *Related Persons*: Popovich, Tereshkova. *Program*: Voskhod. *Flight*: Voskhod 3.

  The search for the cause of the Molniya booster failure continues. A high oscillation vibration problem with the engine that has cropped up twice (but only on the test stand) has been cleared of responsibility. Tereshkova is going on a tour of Sweden. The cosmonauts' wives are preparing a letter denouncing Popovich for shutting down his wife's career and his abuse of her. Throughout the period April to May Kamanin is preoccupied with his wife, who is extremely ill in the hospital.

1966 April 25 - . 07:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya 1-03** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1973-06-11 . *USAF Sat Cat*: 2151 . *COSPAR*: 1966-035A. *Apogee*: 39,414 km

(24,490 mi). *Perigee*: 546 km (339 mi). *Inclination*: 65.0000 deg. *Period*: 709.80 min. Also transmitted cloud cover images. Television programme transmission and long-range two-way multi-channel telephone, phototelegraph and telegraph communicaitons. .

1966 May 6 - . 11:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 117** - . *Payload*: Zenit-2 11F61 s/n 39. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-05-14 . *USAF Sat Cat*: 2163 . *COSPAR*: 1966-037A. *Apogee*: 314 km (195 mi). *Perigee*: 200 km (120 mi). *Inclination*: 64.9000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite..

1966 May 11 - . 14:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 118** - . *Payload*: Meteor no. 4. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *Decay Date*: 1988-11-23 . *USAF Sat Cat*: 2168 . *COSPAR*: 1966-038A. *Apogee*: 339 km (210 mi). *Perigee*: 316 km (196 mi). *Inclination*: 65.0000 deg. *Period*: 91.10 min. Probable weather satellite. Investigation of the upper atmosphere and outer space. .

1966 May 12 - . *Launch Vehicle*: R-7.

- **Voskhod 3 State Commission** - . *Nation*: Russia. *Related Persons*: Shabarov, Tsybin, Voronin. *Program*: Voskhod. *Flight*: Voskhod 3. *Spacecraft Bus*: Vostok. *Spacecraft*: Voskhod.

  Chief Designer A A Golubev from OKB-154 Voronezh discusses the failure of his engines on the third stage of the Molniya launch on 27 March. He points out that the third stage has operated successfully in 500 stand trials and over 100 flights. It is true there have been seven instances of high-frequency oscillations in test stand runs of the engines, going back to the time of Tereshkova's flight, but these are felt to be due to the test stand propellant feed set-up and would not occur in flight engines. Despite no definite cause having been found for the third stage failure on 27 March, he guarantees his engines ready for flight. Other commission members question his optimism, but finally his guarantee is accepted, dependent on a thorough quality assurance review and certification by military officials responsible for control of the production processes at the factory. Voronin certifies the ECS system for an 18 day flight. Tsybin certifies the readiness of the spacecraft, and Shabarov the readiness of the booster at the launch centre. The absence of Korolev's presence is sorely felt, especially in handling the opposition of Smirnov and Pashkov to the flight. Nevertheless, the order is given for final preparations to proceed, with launch set for

22-28 May. However the confidence of the commission members in standing up to Smirnov is tenuous, and it is clear that any delay into June or July will kill the flight.

1966 May 16 - . *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Voskhod 3 delays** - . *Nation*: Russia. *Related Persons*: Tyulin. *Program*: Voskhod. *Flight*: Voskhod 3. *Spacecraft Bus*: Vostok. *Spacecraft*: Voskhod.

  Tyulin has already warned that military crews at Baikonur are 'going slow' in Voskhod 3 preparations. Now it is reported from Voronezh that the military quality control official is refusing to certify the engines for the third stage of Voskhod 3 as ready for flight. It is clear that the flight will slip into June at this rate...

1966 May 17 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. High resolution photo reconnaissance mission..

1966 May 27 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- *Nation*: Kazakhstan. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1966 June 8 - . 11:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 120** - . *Payload*: Zenit-2 11F61 s/n 41. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-06-16 . *USAF Sat Cat*: 2196 . *COSPAR*: 1966-050A. *Apogee*: 331 km (205 mi). *Perigee*: 201 km (124 mi). *Inclination*: 51.7000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite..

1966 June 17 - . 11:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 121** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1966-06-25 . *USAF Sat Cat*: 2210 . *COSPAR*: 1966-054A. *Apogee*: 327 km (203 mi). *Perigee*: 205 km (127 mi). *Inclination*: 72.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1966 June 25 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*:

R-7. *Launch Vehicle*: R-7A.

- *Nation*: Kazakhstan. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1966 June 25 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 122** - . *Payload*: Meteor no. 5. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *Decay Date*: 1989-11-14 . *USAF Sat Cat*: 2254 . *COSPAR*: 1966-057A. *Apogee*: 388 km (241 mi). *Perigee*: 371 km (230 mi). *Inclination*: 65.0000 deg. *Period*: 92.10 min. Investigation of the upper atmosphere and outer space. .

1966 July 14 - . 10:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 124** - . *Payload*: Zenit-2 11F61 s/n 42. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-07-22 . *USAF Sat Cat*: 2325 . *COSPAR*: 1966-064A. *Apogee*: 282 km (175 mi). *Perigee*: 205 km (127 mi). *Inclination*: 51.8000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite..

1966 July 20 - . 09:07 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A510.

- **Cosmos 125** - . *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: RORSAT. *Class*: Surveillance. *Type*: Military naval surveillance radar satellite. *Spacecraft Bus*: Kosmoplan. *Spacecraft*: US-A. *Decay Date*: 1966-08-02 . *USAF Sat Cat*: 2351 . *COSPAR*: 1966-067A. *Apogee*: 260 km (160 mi). *Perigee*: 204 km (126 mi). *Inclination*: 64.9000 deg. *Period*: 89.10 min. Prototype RORSAT hardware using chemical batteries in place of nuclear reactor. Lost on the 52nd revolution as a result of a possible failure in the chemical power units placed on board instead of the nuclear BES-5..

1966 July 28 - . 10:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 126** - . *Payload*: Zenit-4. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 9.00 days. *Decay Date*: 1966-08-06 . *USAF Sat Cat*: 2368 . *COSPAR*: 1966-068A. *Apogee*: 343 km (213 mi). *Perigee*: 209 km (129 mi). *Inclination*: 51.8000 deg. *Period*: 90.10 min. High resolution photo reconnaissance satellite; returned film capsule.

1966 August 8 - . 11:16 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 127** - . *Payload*: Zenit-4. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1966-08-16 . *USAF Sat Cat*: 2391 . *COSPAR*: 1966-071A. *Apogee*: 263 km (163 mi). *Perigee*: 201 km (124 mi). *Inclination*: 51.8000 deg. *Period*: 89.10 min. High resolution photo reconnaissance satellite; returned film capsule.

1966 August 24 - . 08:03 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31?. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Luna 11** - . *Payload*: E-6LF s/n 101. *Mass*: 1,638 kg (3,611 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft Bus*: Luna E-6. *Spacecraft*: Luna E-6LF. *USAF Sat Cat*: 2406 . *COSPAR*: 1966-078A.

  Automatic station Luna 11. Further development of artificial lunar satellite systems and conduct of scientific experiments in circumlunar space. Lunar orbit 160 km x 1200 km x 27 degrees. Luna 11 was launched towards the Moon from an earth-orbiting platform and entered lunar orbit on August 28, 1966. The objectives of the mission included the study of: (1) lunar gamma- and X-ray emissions in order to determine the Moon's chemical composition; (2) lunar gravitational anomalies; (3) the concentration of meteorite streams near the Moon; and, (4) the intensity of hard corpuscular radiation near the Moon. A total of 137 radio transmissions and 277 orbits of the Moon were completed before the batteries failed on October 1, 1966.

1966 August 27 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1?. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 128** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1966-09-04 . *USAF Sat Cat*: 2409 . *COSPAR*: 1966-079A. *Apogee*: 343 km (213 mi). *Perigee*: 207 km (128 mi). *Inclination*: 64.9000 deg. *Period*: 90.00 min. High resolution photo reconnaissance satellite; returned film capsule.

1966 September 16 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92. *FAILURE*: Launch vehicle destroyed. Failure of Block D core stage.. *Failed Stage*: 1.

- **Zenit-2 11F61 s/n 40** - . *Payload*: Zenit-2 11F61 s/n 40. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Decay Date*: 1966-09-16 . Area survey photo reconnaissance satellite..

1966 October 14 - . 12:13 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 129** - . *Payload*: Zenit-2 11F61 s/n 33. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 7.00 days. *Decay Date*: 1966-10-21 . *USAF Sat Cat*: 2491 . *COSPAR*: 1966-091A. *Apogee*: 288 km (178 mi). *Perigee*: 199 km (123 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite..

1966 October 20 - . 07:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya 1-04** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1968-09-11 . *USAF Sat Cat*: 2501 . *COSPAR*: 1966-092A. *Apogee*: 39,689 km (24,661 mi). *Perigee*: 500 km (310 mi). *Inclination*: 65.3000 deg. *Period*: 714.40 min. Television programme transmission and long-range two-way multi-channel telephone, phototelegraph and telegraph communicaitons..

1966 October 20 - . 08:52 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 130** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1966-10-28 . *USAF Sat Cat*: 2502 . *COSPAR*: 1966-093A. *Apogee*: 316 km (196 mi). *Perigee*: 204 km (126 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1966 October 22 - . 08:42 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Luna 12** - . *Payload*: E-6LF s/n 102. *Mass*: 1,620 kg (3,570 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft Bus*: Luna E-6. *Spacecraft*: Luna E-6LF. *USAF Sat Cat*: 2508 . *COSPAR*: 1966-094A.

  Lunar Orbiter, further development of artificial lunar satellite systems and conduct of scientific experiments in circumlunar space. Luna 12 was launched towards the Moon from an earth-orbiting platform and achieved a lunar orbit of of 100 km x 1740 km on October 25, 1966. The spacecraft was equipped with a television system that obtained and transmitted photographs of the lunar surface. The photographs contained 1100 scan lines with a maximum resolution of 14.9--19.8 m. Pictures of the lunar surface were returned on October 27, 1966. According to contemporary US intelligence sources, only four pictures were returned. Radio transmissions from

Luna 12 ceased on January 19, 1967, after 602 lunar orbits and 302 radio transmissions.

1966 November 12 - . 09:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 131** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1966-11-20 . *USAF Sat Cat*: 2568 . *COSPAR*: 1966-105A. *Apogee*: 335 km (208 mi). *Perigee*: 202 km (125 mi). *Inclination*: 72.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1966 November 19 - . 08:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 132** - . *Payload*: Zenit-2 11F61 s/n 46. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-11-27 . *USAF Sat Cat*: 2599 . *COSPAR*: 1966-106A. *Apogee*: 257 km (159 mi). *Perigee*: 202 km (125 mi). *Inclination*: 65.0000 deg. *Period*: 89.10 min. Area survey photo reconnaissance satellite..

1966 November 28 - . 11:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 133** - . *Payload*: Soyuz 7K-OK (A) s/n 2. *Mass*: 6,450 kg (14,210 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 1.97 days. *Decay Date*: 1966-11-30 . *USAF Sat Cat*: 2601 . *COSPAR*: 1966-107A. *Apogee*: 219 km (136 mi). *Perigee*: 173 km (107 mi). *Inclination*: 51.8000 deg. *Period*: 88.40 min.

  First test flight of Soyuz 7K-OK earth orbit spacecraft. A planned 'all up' test, with a second Soyuz to be launched the following day and automatically dock with Kosmos 133. This was to be followed by a manned link-up in December 1966. However Kosmos 133's attitude control system malfunctioned, resulting in rapid consumption of orientation fuel, leaving it spinning at 2 rpm. After heroic efforts by ground control and five attempts at retrofire over two days, the craft was finally brought down for a landing on its 33rd revolution. However due to the inaccuracy of the reentry burn, it was determined that the capsule would land in China. The APO self destruct system detected the course deviation and the destruct charge of several dozen kilogrammes of explosive was thought to have destroyed the ship on November 30, 1966 at 10:21 GMT. But stories persisted over the years of the Chinese having a Soyuz capsule in their possession....

1966 December 3 - . 08:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 134** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1966-12-11 . *USAF Sat Cat*: 2603 . *COSPAR*: 1966-108A. *Apogee*: 286 km (177 mi). *Perigee*: 206 km (128 mi). *Inclination*: 64.9000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; also carried scientific experiments..

1966 December 14 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511. *FAILURE*: Erroneous firing of launch escape tower ignited launch vehicle on the pad.. *Failed Stage*: P.

- **Soyuz 7K-OK s/n 2** - . *Payload*: Soyuz 7K-OK (A) s/n 1. *Mass*: 6,560 kg (14,460 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK.

  Second attempted flight of Soyuz 7K-OK (the spacecraft planned for the linkup with Ksomos 133). An analogue to Mercury Redstone's 'day we launched the tower' but with more disastorous consequences. The core stage ignited, but the strap-ons did not. A booster shutdown was commanded. The service towers were brought back around the booster, and ground crew began work to defuel the launch vehicle. At 27 minutes after the original launch attempt, the Soyuz launch escape system, having received the signal that liftoff had occurred, detected that the booster was not on course (either because a tower arm nudged the booster or because the earth's rotation as detected by the gyros had moved the spacecraft out of limits relative to its original inertial position). The launch escape system ignited, pulling the Soyuz away from the booster, igniting the third stage fuel tanks, leading to an explosion that severely damaged the pad and killed at least one person (the Soviet Rocket Forces major supervising the launch team) and injured many others.

1966 December 19 - . 12:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 136** - . *Payload*: Zenit-2 11F61 s/n 47. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1966-12-27 . *USAF Sat Cat*: 2624 . *COSPAR*: 1966-115A. *Apogee*: 281 km (174 mi). *Perigee*: 197 km (122 mi). *Inclination*: 64.6000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite. Also carried science package..

1966 December 21 - . 10:17 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Luna 13** - . *Payload*: E-6M s/n 205. *Mass*: 1,700 kg (3,700 lb). *Nation*: Russia.

Agency: Korolev bureau. *Program*: Luna. *Class*: Moon. *Type*: Lunar probe. *Spacecraft Bus*: Luna E-6. *Spacecraft*: Luna E-6M. *Decay Date*: 1966-12-24 . *USAF Sat Cat*: 2626 . *COSPAR*: 1966-116A.

Soft landed on Moon 24 December 1966 at 18:01:00 GMT, Latitude 18.87 N, 297.95 E - Oceanus Procellarum. The petal encasement of the spacecraft was opened, antennas were erected, and radio transmissions to Earth began four minutes after the landing. On December 25 and 26, 1966, the spacecraft television system transmitted panoramas of the nearby lunar landscape at different sun angles. Each panorama required approximately 100 minutes to transmit. The spacecraft was equipped with a mechanical soil-measuring penetrometer, a dynamograph, and a radiation densitometer for obtaining data on the mechanical and physical properties and the cosmic-ray reflectivity of the lunar surface. It is believed that transmissions from the spacecraft ceased before the end of December 1966.

1967 January 1 - . *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Zenit-2 spysat moved to more powerful Voskhod launcher.** - . *Nation*: Russia. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. Ministry of Defence Decree 15 'On transfer of Zenit-2 from the 8A92 to the 11A57 launcher' was issued..

1967 January 19 - . 12:39 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 138** - . *Payload*: Zenit-2 11F61 s/n 43. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-01-27 . *USAF Sat Cat*: 2646 . *COSPAR*: 1967-004A. *Apogee*: 273 km (169 mi). *Perigee*: 190 km (110 mi). *Inclination*: 64.6000 deg. *Period*: 89.10 min. Area survey photo reconnaissance satellite..

1967 February 7 - . 03:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 140** - . *Payload*: Soyuz 7K-OK (P) s/n 3. *Mass*: 6,450 kg (14,210 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 1.98 days. *Decay Date*: 1967-02-09 . *USAF Sat Cat*: 2667 . *COSPAR*: 1967-009A. *Apogee*: 216 km (134 mi). *Perigee*: 169 km (105 mi). *Inclination*: 51.6000 deg. *Period*: 88.30 min.

  After the self-destruction of the first Soyuz 7K-OK on re-entry, and the loss of the second one on the pad fire in December, the state commission ruled that the third 7K-OK model would be flown unpiloted on a solo mission. If this was successful then the fourth and fifth Soyuz would be flown on a manned docking mission. Once in orbit Cosmos 140 experienced attitude control problems due to a faulty star sensor resulting in excessive fuel consumption. The spacecraft couldn't keep the required

orientation towards the sun to keep the solar panels illuminated, and the batteries discharged. Despite all of these problems the spacecraft remained controllable. An attempted manoeuvre on the 22nd revolution still showed problems with the control system. It malfunctioned yet again during retrofire, leading to a steeper than planned uncontrolled ballistic re-entry. The re-entry capsule itself had depressurised on separation from the service module due to a fault in the base of the capsule. A 300 mm hole burned through in the heat shield during re-entry. Although such events would have been lethal to any human occupants, the capsule's recovery systems operated and the capsule crashed through the ice of the frozen Aral Sea, 3 km from shore and 500 kilometres short of the intended landing zone. The spacecraft finally sank in 10 meters of water and had to be retrieved by divers. Still, the mission was deemed 'good enough' for the next mission to be a manned two-craft docking and crew transfer space spectacular. Mishin and Kamanin felt that a human crew could have sorted out the problems. They were also under intense pressure to achieve a manned circumlunar flight before the 50th Anniversary of the Soviet Revolution in October.

1967 February 8 - . 10:19 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 141** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-02-16 . *USAF Sat Cat*: 2670 . *COSPAR*: 1967-012A. *Apogee*: 316 km (196 mi). *Perigee*: 205 km (127 mi). *Inclination*: 72.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 February 27 - . 08:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 143** - . *Payload*: Zenit-2 11F61 s/n 45. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-03-07 . *USAF Sat Cat*: 2693 . *COSPAR*: 1967-017A. *Apogee*: 390 km (240 mi). *Perigee*: 202 km (125 mi). *Inclination*: 64.9000 deg. *Period*: 90.50 min. Placed into orbit with 22.8 second period different from that planned. Area survey photo reconnaissance satellite. Also carried science package..

1967 February 28 - . 14:34 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 144** - . *Payload*: Meteor no. 6. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *Decay Date*: 1982-09-14 . *USAF Sat Cat*: 2695 . *COSPAR*: 1967-018A. *Apogee*: 644 km (400 mi). *Perigee*: 574 km (356 mi). *Inclination*: 81.3000 deg. *Period*: 96.90 min.

Investigation of the upper atmosphere and outer space. .

1967 March 13 - . 12:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 147** - . *Payload*: Zenit-2 11F61 s/n 44. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-03-21 . *USAF Sat Cat*: 2710 . *COSPAR*: 1967-022A. *Apogee*: 298 km (185 mi). *Perigee*: 195 km (121 mi). *Inclination*: 64.5000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite. Program partially completed..

1967 March 22 - . 12:44 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 150** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-03-30 . *USAF Sat Cat*: 2715 . *COSPAR*: 1967-025A. *Apogee*: 341 km (211 mi). *Perigee*: 178 km (110 mi). *Inclination*: 65.4000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 April 4 - . 14:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 153** - . *Payload*: Zenit-2 11F61 s/n 48. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-04-12 . *USAF Sat Cat*: 2740 . *COSPAR*: 1967-030A. *Apogee*: 279 km (173 mi). *Perigee*: 199 km (123 mi). *Inclination*: 64.6000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite. Program partially completed. Failure of primary SA-20 camera..

1967 April 12 - . 10:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 155** - . *Payload*: Zenit-4. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-04-20 . *USAF Sat Cat*: 2750 . *COSPAR*: 1967-033A. *Apogee*: 267 km (165 mi). *Perigee*: 200 km (120 mi). *Inclination*: 51.8000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 April 23 - . 00:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 1** - . *Call Sign*: Rubin (Ruby). *Crew*: Komarov. *Backup Crew*: Gagarin. *Payload*: Soyuz 7K-OK s/n 4. *Mass*: 6,450 kg (14,210 lb). *Nation*: Russia. *Related Persons*: Gagarin, Komarov. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 1, Soyuz 2A. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 1.12 days. *Decay Date*: 1967-04-24 . *USAF Sat Cat*: 2759 . *COSPAR*: 1967-037A. *Apogee*: 223 km (138 mi). *Perigee*: 197 km (122 mi). *Inclination*: 50.8000 deg. *Period*: 88.70 min.

  Space disaster that put back Soviet lunar program 18 months. Soyuz 1 as active spacecraft was launched first. Soyuz 2, with a 3 man crew would launch the following day, with 2 cosmonauts spacewalking to Soyuz 1. However immediately after orbital insertion Komarov's problems started. One of the solar panels failed to deploy, staying wrapped around the service module. Although only receiving half of the planned solar power, an attempt was made to manoeuvre the spacecraft. This failed because of interference of the reaction control system exhaust with the ion flow sensors that were one of the Soyuz' main methods of orientation. *Additional Details*: here....

1967 April 27 - . 12:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 156** - . *Payload*: Meteor no. 7. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *Decay Date*: 1989-10-23 . *USAF Sat Cat*: 2762 . *COSPAR*: 1967-039A. *Apogee*: 375 km (233 mi). *Perigee*: 368 km (228 mi). *Inclination*: 81.1000 deg. *Period*: 92.00 min. Worked with Cosmos 144. Investigation of the upper atmosphere and outer space. .

1967 May 12 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92.

- **Cosmos 157** - . *Payload*: Zenit-2 11F61 s/n 49. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-05-20 . *USAF Sat Cat*: 2781 . *COSPAR*: 1967-044A. *Apogee*: 262 km (162 mi). *Perigee*: 249 km (154 mi). *Inclination*: 51.3000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite. Program partially completed. Bad quality film loaded into SA-20 camera..

1967 May 16 - . 21:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 159** - . *Payload*: E-6LS s/n 111. *Mass*: 4,490 kg (9,890 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Lunar L1. *Class*: Moon. *Type*: Lunar probe. *Flight*: Soyuz 7K-L1 mission 1. *Spacecraft Bus*: Luna E-6. *Spacecraft*: Luna E-6LS. *Decay Date*: 1977-11-11 . *USAF Sat Cat*: 2805 . *COSPAR*: 1967-046A. *Apogee*: 60,637 km (37,678

mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 1,174.20 min. The E-6LS was a radio-equipped version of the E-6 used to test tracking and communications networks for the Soviet manned lunar program. The payload entered the desired orbit as Kosmos-159..

1967 May 22 - . 14:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 161** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-05-30 . *USAF Sat Cat*: 2812 . *COSPAR*: 1967-049A. *Apogee*: 321 km (199 mi). *Perigee*: 201 km (124 mi). *Inclination*: 65.6000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 May 24 - . 22:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya 1-05** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1971-11-26 . *USAF Sat Cat*: 2822 . *COSPAR*: 1967-052A. *Apogee*: 35,690 km (22,170 mi). *Perigee*: 90 km (55 mi). *Inclination*: 64.6000 deg. *Period*: 627.00 min. Further development and experimental operation of long-range two-way television and telephone-telegraph radio-communication..

1967 June 1 - . 10:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 162** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-06-09 . *USAF Sat Cat*: 2827 . *COSPAR*: 1967-054A. *Apogee*: 275 km (170 mi). *Perigee*: 196 km (121 mi). *Inclination*: 51.8000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 June 8 - . 13:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 164** - . *Payload*: Zenit-2 11F61 s/n 50. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 6.00 days. *Decay Date*: 1967-06-14 . *USAF Sat Cat*: 2836 . *COSPAR*: 1967-057A. *Apogee*: 317 km (196 mi). *Perigee*: 185 km (114 mi). *Inclination*: 65.6000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite..

1967 June 12 - . 02:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Venera 4** - . *Payload*: 1V (V-67) s/n 310. *Mass*: 1,104 kg (2,433 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Venera 1V (V-67). *Decay Date*: 1967-10-18 . *USAF Sat Cat*: 2840 . *COSPAR*: 1967-058A.

  Venera 4 was successfully launched towards the planet Venus with the announced mission of direct atmospheric studies. On October 18, 1967, the descent vehicle entered the Venusian atmosphere. Signals were returned by the spacecraft, which deployed a parachute after braking to subsonic velocity in the Venusian atmosphere, until it reached an altitude of 24.96 km.

1967 June 17 - . 02:36 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: Stage 4's engine 11D33 failed to ignite because the turbopump had not been cooled before ignition.. *Failed Stage*: U.

- **Cosmos 167** - . *Payload*: 1V (V-67) s/n 311. *Mass*: 1,106 kg (2,438 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Venera 1V (V-67). *Decay Date*: 1967-06-25 . *USAF Sat Cat*: 2852 . *COSPAR*: 1967-063A. *Apogee*: 264 km (164 mi). *Perigee*: 211 km (131 mi). *Inclination*: 51.8000 deg. *Period*: 89.20 min.

  Suggestions for the cause of the failure included incorrect soldering of wires in multiple pin plugs, wrong attachments of the plugs to the pyrotechnic connectors, or a mix-up of the pyrotechnic connectors during assembly.. Investigation of the upper atmosphere and outer space.

1967 June 20 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. High resolution photo reconnaissance mission..

1967 July 4 - . 05:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 168** - . *Payload*: Zenit-2 11F61 s/n 52. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-07-12 . *USAF Sat Cat*: 2869 . *COSPAR*: 1967-067A. *Apogee*: 230 km (140 mi). *Perigee*: 223 km (138 mi). *Inclination*: 51.8000 deg. *Period*: 89.10 min. Area survey photo reconnaissance satellite..

1967 July 21 - . 06:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. High resolution photo reconnaissance mission..

1967 July 25 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: R-7A.

- **Operational test** - . *Nation*: Russia. *Agency*: RVSN. *Apogee*: 1,350 km (830 mi).

1967 August 9 - . 05:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1/LC31?. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 172** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-08-17 . *USAF Sat Cat*: 2914 . *COSPAR*: 1967-078A. *Apogee*: 277 km (172 mi). *Perigee*: 206 km (128 mi). *Inclination*: 51.7000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 August 31 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1/LC31?. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Cosmos 174** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1968-12-30 . *USAF Sat Cat*: 2925 . *COSPAR*: 1967-082A. *Apogee*: 39,796 km (24,728 mi). *Perigee*: 430 km (260 mi). *Inclination*: 64.9000 deg. *Period*: 715.00 min. Probable commsat failure. Investigation of the upper atmosphere and outer space..

1967 September 1 - . 10:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure of Block I stage at 296 seconds. Remnants of spacecraft and stage fell near Novaya Zemlya.. *Failed Stage*: 2.

- **Zenit-2 11F61 s/n 51** - . *Payload*: Zenit-2 11F61 s/n 51. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Decay Date*: 1967-09-01 . Area survey photo reconnaissance satellite..

1967 September 11 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 175** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-09-19 . *USAF Sat Cat*: 2939 . *COSPAR*: 1967-085A. *Apogee*: 356 km (221 mi). *Perigee*: 181 km (112 mi). *Inclination*: 72.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 September 16 - . 06:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 177** - . *Payload*: Zenit-2 11F61 s/n 53. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-09-24 . *USAF Sat Cat*: 2947 . *COSPAR*: 1967-088A. *Apogee*: 267 km (165 mi). *Perigee*: 201 km (124 mi). *Inclination*: 51.7000 deg. *Period*: 89.10 min. Area survey photo reconnaissance satellite..

1967 September 26 - . 10:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 180** - . *Payload*: Zenit-2 11F61 s/n 54. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-10-04 . *USAF Sat Cat*: 2966 . *COSPAR*: 1967-093A. *Apogee*: 350 km (210 mi). *Perigee*: 206 km (128 mi). *Inclination*: 72.8000 deg. *Period*: 90.10 min. Area survey photo reconnaissance satellite..

1967 October 3 - . 05:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya 1-06** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1969-03-04 . *USAF Sat Cat*: 2973 . *COSPAR*: 1967-095A. *Apogee*: 39,709 km (24,673 mi). *Perigee*: 508 km (315 mi). *Inclination*: 64.7000 deg. *Period*: 714.90 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1967 October 11 - . 11:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 181** - . *Payload*: Zenit-2 11F61 s/n 55. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay*

Date: 1967-10-19 . *USAF Sat Cat*: 2981 . *COSPAR*: 1967-097A. *Apogee*: 325 km (201 mi). *Perigee*: 198 km (123 mi). *Inclination*: 65.6000 deg. *Period*: 89.70 min. Area survey photo reconnaissance satellite..

1967 October 16 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 182** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-10-24 . *USAF Sat Cat*: 2995 . *COSPAR*: 1967-098A. *Apogee*: 374 km (232 mi). *Perigee*: 197 km (122 mi). *Inclination*: 64.9000 deg. *Period*: 90.20 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 October 22 - . 08:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78.

- **Molniya 1-07** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1969-12-31 . *USAF Sat Cat*: 3008 . *COSPAR*: 1967-101A. *Apogee*: 39,709 km (24,673 mi). *Perigee*: 508 km (315 mi). *Inclination*: 64.8000 deg. *Period*: 714.90 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1967 October 24 - . 22:49 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 184** - . *Payload*: Meteor no. 8. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *Decay Date*: 1989-04-02 . *USAF Sat Cat*: 3010 . *COSPAR*: 1967-102A. *Apogee*: 414 km (257 mi). *Perigee*: 409 km (254 mi). *Inclination*: 81.2000 deg. *Period*: 92.80 min. Investigation of the upper atmosphere and outer space. .

1967 October 27 - . 09:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 186** - . *Payload*: Soyuz 7K-OK (A) s/n 6. *Mass*: 6,530 kg (14,390 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 3.95 days. *Decay Date*: 1967-10-31 . *USAF Sat Cat*: 3014 . *COSPAR*: 1967-105A. *Apogee*: 223 km (138 mi). *Perigee*: 179 km (111 mi). *Inclination*: 51.6000 deg. *Period*: 88.60 min.

  Docked with Cosmos 188; first automated rendezvous and docking of two spacecraft.

The dockings were timed to celebrate the 50th Anniversary of the October Revolution (in lieu of a succession of manned space feats that all had to be cancelled due to schedule delays). Achieved automatic rendezvous on second attempt. Capture achieved but hard docking and electric connections unsuccessful due to misallignment of spacecraft. Star tracker failed and had to make a high-G ballistic re-entry. Recovered October 31, 1967 08:20 GMT.

1967 October 30 - . 08:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 188** - . *Payload*: Soyuz 7K-OK (P) s/n 5. *Mass*: 6,530 kg (14,390 lb). *Nation*: Russia. *Related Persons*: Mishin, Mnatsakanian. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 3.04 days. *Decay Date*: 1967-11-02 . *USAF Sat Cat*: 3020 . *COSPAR*: 1967-107A. *Apogee*: 247 km (153 mi). *Perigee*: 180 km (110 mi). *Inclination*: 51.7000 deg. *Period*: 88.70 min.

  Docking target craft for Cosmos 186, which achieved world's first automatic rendezvous on second attempt. Hard docking achieved but electric connections unsuccessful due to misallignment of spacecraft. Ion flow sensor failed and Cosmos 188 had to make a high-G uncontrolled re-entry. When it deviated too far off course, it was destroyed by the on-board self-destruct system,. However officially the Soviet Union reported that it landed succesfully on November 2, 1967 at 09:10 GMT, and that its mission was 'investigation of outer space, development of new systems and elements to be used in the construction of space devices'. *Additional Details*: here....

1967 November 3 - . 11:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 190** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-11-11 . *USAF Sat Cat*: 3026 . *COSPAR*: 1967-110A. *Apogee*: 327 km (203 mi). *Perigee*: 197 km (122 mi). *Inclination*: 65.6000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 November 25 - . 11:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 193** - . *Payload*: Zenit-2 11F61 s/n 58. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-12-03 . *USAF Sat Cat*: 3052 . *COSPAR*: 1967-117A. *Apogee*: 756 km (469 mi). *Perigee*: 745 km (462 mi). *Inclination*: 74.0000 deg. *Period*: 99.90 min. Area survey photo reconnaissance satellite..

1967 December 3 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 194** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1967-12-11 . *USAF Sat Cat*: 3055 . *COSPAR*: 1967-119A. *Apogee*: 312 km (193 mi). *Perigee*: 201 km (124 mi). *Inclination*: 65.6000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule.

1967 December 16 - . 12:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 195** - . *Payload*: Zenit-2 11F61 s/n 57. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1967-12-24 . *USAF Sat Cat*: 3071 . *COSPAR*: 1967-124A. *Apogee*: 352 km (218 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.6000 deg. *Period*: 90.00 min. Area survey photo reconnaissance satellite..

1968 January 16 - . 12:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 199** - . *Payload*: Zenit-2 11F61 s/n 59. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 16.00 days. *Decay Date*: 1968-02-01 . *USAF Sat Cat*: 3099 . *COSPAR*: 1968-003C. *Apogee*: 363 km (225 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.6000 deg. *Period*: 90.20 min.

  Area survey photo reconnaissance satellite. Unsuccessful mission. Spacecraft failed to separate from Block I stage. Attempt was made to conduct mission without orientation system. APO self destruct system destroyed spacecraft on 126th revolution over Sea of Okhotsk. First generation, low resolution photo surveillance; recovery probably failed.

1968 February 6 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 201** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-02-14 . *USAF Sat Cat*: 3118 . *COSPAR*: 1968-009A. *Apogee*: 334 km (207 mi). *Perigee*: 207 km (128 mi). *Inclination*: 64.9000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 February 7 - . 10:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: At T+524.6 sec Stage 3's engine 11D55 cut off prematurely because it ran out of fuel due to an excessive fuel consumption rate through the gas-generator.. *Failed Stage*: U.

- **E-6LS s/n 112** - . *Payload*: E-6LS s/n 112. *Mass*: 1,700 kg (3,700 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Lunar L1. *Class*: Moon. *Type*: Lunar probe. *Flight*: Soyuz 7K-L1 mission 1. *Spacecraft Bus*: Luna E-6. *Spacecraft*: Luna E-6LS. *Decay Date*: 1968-02-07 .

  Failed launch of an E-6LS radio-equipped version of the E-6 used to test tracking and communications networks for the Soviet manned lunar program. Suggestions for the abnormal consumption included the seizing up of a pintle valve for controlling fuel supply into the regulator or the seizing up of the fuel inlet control. The upper stages broke up in the atmosphere.

1968 March 5 - . 12:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 205** - . *Payload*: Zenit-2 11F61 s/n 56. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1968-03-13 . *USAF Sat Cat*: 3140 . *COSPAR*: 1968-016A. *Apogee*: 293 km (182 mi). *Perigee*: 197 km (122 mi). *Inclination*: 65.7000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite..

1968 March 14 - . 09:34 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 206** - . *Payload*: Meteor no. 9. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *Decay Date*: 1989-04-22 . *USAF Sat Cat*: 3150 . *COSPAR*: 1968-019A. *Apogee*: 405 km (251 mi). *Perigee*: 396 km (246 mi). *Inclination*: 81.2000 deg. *Period*: 92.60 min. Visual, IR cloud cover images. Investigation of the upper atmosphere and outer space. .

1968 March 16 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 207** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-03-24 . *USAF Sat Cat*: 3154 . *COSPAR*: 1968-021A. *Apogee*: 320 km (190 mi). *Perigee*: 201 km (124 mi). *Inclination*: 65.6000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 March 21 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 208** - . *Payload*: Zenit-2M. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1968-04-02 . *USAF Sat Cat*: 3156 . *COSPAR*: 1968-022A. *Apogee*: 287 km (178 mi). *Perigee*: 205 km (127 mi). *Inclination*: 64.9000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule; deployed high energy gamma ray experiment capsule. First flight of modernised Zenit-2 area survey reconnaissance satellite..

- **Nauka** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1968-04-06 . *USAF Sat Cat*: 3167 . *COSPAR*: 1968-022C. *Apogee*: 263 km (163 mi). *Perigee*: 195 km (121 mi). *Inclination*: 64.9000 deg. *Period*: 89.08 min.

1968 April 3 - . 11:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 210** - . *Payload*: Zenit-2 11F61 s/n 60. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1968-04-11 . *USAF Sat Cat*: 3168 . *COSPAR*: 1968-024A. *Apogee*: 373 km (231 mi). *Perigee*: 200 km (120 mi). *Inclination*: 81.4000 deg. *Period*: 90.30 min. Area survey photo reconnaissance satellite..

1968 April 7 - . 10:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Luna 14** - . *Payload*: E-6LS s/n 113. *Mass*: 1,700 kg (3,700 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Lunar L3. *Class*: Moon. *Type*: Lunar probe. *Spacecraft Bus*: Luna E-6. *Spacecraft*: Luna E-6LS. *USAF Sat Cat*: 3178 . *COSPAR*: 1968-027A.

  Lunar Orbiter; studied lunar gravitational field, Earth-Moon gravitational relationship, and conducted further scientific experiments in circumlunar space. Not revealed until years later was that the E-6LS was primarily intended to test tracking and communications networks for the Soviet manned lunar program. The Luna 14 spacecraft entered a 140 x 870 km x 42 degree lunar orbit on April 10, 1966. The spacecraft instrumentation was similar to that of Luna 10 and provided data for studies of the interaction of the earth and lunar masses, the lunar gravitational field, the propagation and stability of radio communications to the spacecraft at different orbital positions, solar charged particles and cosmic rays, and the motion of the Moon. This flight was the final flight of the second generation of the Luna series.

1968 April 14 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 212** - . *Payload*: Soyuz 7K-OK (A) s/n 8. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 4.92 days. *Decay Date*: 1968-04-19 . *USAF Sat Cat*: 3183 . *COSPAR*: 1968-029A. *Apogee*: 200 km (120 mi). *Perigee*: 180 km (110 mi). *Inclination*: 51.6000 deg. *Period*: 88.30 min. Cosmos 212 docked with Cosmos 213 in the first completely successful test of the Soyuz 7K-OK attitude control, automatic rendezvous and docking systems. Cosmos 212 was successfully recovered on April 19, 1968 at 08:10 GMT.. *Additional Details*: here....

1968 April 15 - . 09:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 213** - . *Payload*: Soyuz 7K-OK (P) s/n 7. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Related Persons*: Beregovoi. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 5.02 days. *Decay Date*: 1968-04-20 . *USAF Sat Cat*: 3193 . *COSPAR*: 1968-030A. *Apogee*: 254 km (157 mi). *Perigee*: 188 km (116 mi). *Inclination*: 51.7000 deg. *Period*: 88.90 min.

  Cosmos 213 was the target for Cosmos 212 in a successful test of Soyuz 7K-OK rendezvous and docking systems. The Cosmos 213 launch was the most accurate yet. The spacecraft was placed in orbit only 4 km from Cosmos 212, ready for a first-orbit docking. Both spacecraft were recovered, but Cosmos 213 was dragged by heavy wind across the steppes when the parachute lines didn't jettison at touchdown. This failure caused the upcoming Soyuz 2/3 manned docking mission to be scaled back. Officially: Investigation of outer space, development of new systems and elements to be used in the construction of space devices. *Additional Details*: here....

1968 April 18 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 214** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-04-26 . *USAF Sat Cat*: 3203 . *COSPAR*: 1968-032A. *Apogee*: 373 km (231 mi). *Perigee*: 200 km (120 mi). *Inclination*: 81.4000 deg. *Period*: 90.30 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 April 20 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 216** - . *Payload*: Zenit-2 11F61 s/n 62. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay*

Date: 1968-04-28 . *USAF Sat Cat*: 3207 . *COSPAR*: 1968-034A. *Apogee*: 267 km (165 mi). *Perigee*: 198 km (123 mi). *Inclination*: 51.0000 deg. *Period*: 89.20 min. Area survey photo reconnaissance satellite. Unsuccessful mission. Spacecraft landed in River Volga 1 km from shore and sank after 42 minutes. 85% of the data was ruined..

1968 April 21 - . 04:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-08** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1974-01-29 . *USAF Sat Cat*: 3209 . *COSPAR*: 1968-035A. *Apogee*: 40,099 km (24,916 mi). *Perigee*: 405 km (251 mi). *Inclination*: 64.0000 deg. *Period*: 720.80 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1968 June 1 - . 10:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 223** - . *Payload*: Zenit-2 11F61 s/n 63. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Completed Operations Date*: 1968-06-09 . *Decay Date*: 1968-06-09 . *USAF Sat Cat*: 3274 . *COSPAR*: 1968-045A. *Apogee*: 317 km (196 mi). *Perigee*: 221 km (137 mi). *Inclination*: 72.9000 deg. *Period*: 89.90 min. Area survey photo reconnaissance satellite..

1968 June 4 - . 06:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 224** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-06-12 . *USAF Sat Cat*: 3276 . *COSPAR*: 1968-046A. *Apogee*: 256 km (159 mi). *Perigee*: 203 km (126 mi). *Inclination*: 51.8000 deg. *Period*: 89.10 min. High resolution photo reconnaissance satellite; returned film capsule; also measured atmospheric composition..

1968 June 12 - . 13:14 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 226** - . *Payload*: Meteor no. 10. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: Meteor. *Decay Date*: 1983-10-18 . *USAF Sat Cat*: 3282 . *COSPAR*: 1968-049A. *Apogee*: 639

km (397 mi). *Perigee*: 579 km (359 mi). *Inclination*: 81.2000 deg. *Period*: 96.90 min. Investigation of the upper atmosphere and outer space. .

1968 June 18 - . 06:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 227** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-06-26 . *USAF Sat Cat*: 3294 . *COSPAR*: 1968-051A. *Apogee*: 271 km (168 mi). *Perigee*: 202 km (125 mi). *Inclination*: 51.8000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 June 21 - . 12:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 228** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1968-07-03 . *USAF Sat Cat*: 3298 . *COSPAR*: 1968-053A. *Apogee*: 245 km (152 mi). *Perigee*: 205 km (127 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min. Area survey photo reconnaissance satellite; returned film capsule; deployed cosmic ray experiment capsule..

- **Nauka** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1968-07-07 . *USAF Sat Cat*: 3306 . *COSPAR*: 1968-053G. *Apogee*: 213 km (132 mi). *Perigee*: 194 km (120 mi). *Inclination*: 51.6000 deg. *Period*: 88.56 min.

1968 June 26 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 229** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-07-04 . *USAF Sat Cat*: 3304 . *COSPAR*: 1968-054A. *Apogee*: 327 km (203 mi). *Perigee*: 207 km (128 mi). *Inclination*: 72.9000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 July 5 - . 15:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-09** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1971-05-15 . *USAF Sat Cat*: 3310 . *COSPAR*: 1968-057A. *Apogee*: 39,806 km

(24,734 mi). *Perigee*: 396 km (246 mi). *Inclination*: 65.1000 deg. *Period*: 714.70 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1968 July 10 - . 19:49 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 231** - . *Payload*: Zenit-2 11F61 s/n 64. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1968-07-18 . *USAF Sat Cat*: 3316 . *COSPAR*: 1968-058A. *Apogee*: 311 km (193 mi). *Perigee*: 206 km (128 mi). *Inclination*: 64.9000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite..

1968 July 16 - . 13:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 232** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-07-24 . *USAF Sat Cat*: 3322 . *COSPAR*: 1968-060A. *Apogee*: 348 km (216 mi). *Perigee*: 189 km (117 mi). *Inclination*: 65.3000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule; also performed weather experiments..

1968 July 30 - . 07:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 234** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 6.00 days. *Decay Date*: 1968-08-05 . *USAF Sat Cat*: 3332 . *COSPAR*: 1968-062A. *Apogee*: 288 km (178 mi). *Perigee*: 208 km (129 mi). *Inclination*: 51.8000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 August 9 - . 07:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 235** - . *Payload*: Zenit-2 11F61 s/n 61. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1968-08-17 . *USAF Sat Cat*: 3339 . *COSPAR*: 1968-067A. *Apogee*: 281 km (174 mi). *Perigee*: 201 km (124 mi). *Inclination*: 51.8000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite. Partially successful. Hard landing due to parachute sytem failure. 30% of the film damaged..

1968 August 27 - . 12:29 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 237** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-09-04 . *USAF Sat Cat*: 3348 . *COSPAR*: 1968-071A. *Apogee*: 320 km (190 mi). *Perigee*: 200 km (120 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 August 28 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 238** - . *Payload*: Soyuz 7K-OK s/n 9. *Mass*: 6,520 kg (14,370 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 3.96 days. *Decay Date*: 1968-09-01 . *USAF Sat Cat*: 3351 . *COSPAR*: 1968-072A. *Apogee*: 210 km (130 mi). *Perigee*: 203 km (126 mi). *Inclination*: 51.7000 deg. *Period*: 88.60 min. Recovered September 1, 1968 9:03 GMT. Final test of redesigned Soyuz 7K-OK spacecraft for Soyuz 3 manned mission..

1968 September 5 - . 07:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 239** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-09-13 . *USAF Sat Cat*: 3353 . *COSPAR*: 1968-073A. *Apogee*: 274 km (170 mi). *Perigee*: 201 km (124 mi). *Inclination*: 51.8000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 September 14 - . 06:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 240** - . *Payload*: Zenit-2 11F61 s/n 66. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 7.00 days. *Decay Date*: 1968-09-21 . *USAF Sat Cat*: 3388 . *COSPAR*: 1968-075A. *Apogee*: 283 km (175 mi). *Perigee*: 203 km (126 mi). *Inclination*: 51.8000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite..

1968 September 16 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 241** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-09-24 . *USAF Sat Cat*: 3398 . *COSPAR*: 1968-077A. *Apogee*: 326 km (202 mi). *Perigee*: 198 km (123 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 September 23 - . 07:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 243** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 9.00 days. *Decay Date*: 1968-10-04 . *USAF Sat Cat*: 3418 . *COSPAR*: 1968-080A. *Apogee*: 293 km (182 mi). *Perigee*: 213 km (132 mi). *Inclination*: 71.3000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule; deployed passive microwave radio telescope capsule..

- **Nauka** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1968-10-12 . *USAF Sat Cat*: 3452 . *COSPAR*: 1968-080C. *Apogee*: 274 km (170 mi). *Perigee*: 199 km (123 mi). *Inclination*: 71.3000 deg. *Period*: 89.23 min.

1968 October 5 - . 00:32 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-10** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1976-07-16 . *USAF Sat Cat*: 3469 . *COSPAR*: 1968-085A. *Apogee*: 39,596 km (24,603 mi). *Perigee*: 498 km (309 mi). *Inclination*: 64.9000 deg. *Period*: 712.50 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1968 October 7 - . 12:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 246** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 5.00 days. *Decay Date*: 1968-10-12 . *USAF Sat Cat*: 3473 . *COSPAR*: 1968-087A. *Apogee*: 321 km (199 mi). *Perigee*: 149 km (92 mi). *Inclination*: 65.4000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 October 11 - . 12:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 247** - . *Payload*: Zenit-2 11F61 s/n 65. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1968-10-19 . *USAF Sat Cat*: 3484 . *COSPAR*: 1968-088A. *Apogee*: 345 km (214 mi). *Perigee*: 199 km (123 mi). *Inclination*: 65.4000 deg. *Period*: 89.90 min. Area survey photo reconnaissance satellite..

1968 October 25 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 2** - . *Payload*: Soyuz 7K-OK s/n 11. *Mass*: 6,450 kg (14,210 lb). *Nation*: Russia. *Related Persons*: Beregovoi. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 2.95 days. *Decay Date*: 1968-10-28 . *USAF Sat Cat*: 3511 . *COSPAR*: 1968-093A. *Apogee*: 229 km (142 mi). *Perigee*: 191 km (118 mi). *Inclination*: 51.7000 deg. *Period*: 88.60 min.

  Unmanned docking target for Soyuz 3. Soyuz 2 launched on time at 12:00 local time, in 0 deg C temperatures and 5 m/s winds. Launch was on time 'as in Korolev's time', notes Kamanin. Docking with Soyuz 3 a failure. Recovered October 28, 1968 7:51 GMT, 5 km from its aim point. Maneuver Summary: 177km X 196km orbit to 184km X 230km orbit. Delta V: 12 m/s.
  Officially: Complex testing of spaceship systems in conditions of space flight.

1968 October 26 - . 08:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 3** - . *Call Sign*: Argon (Argon). *Crew*: Beregovoi. *Backup Crew*: Shatalov, Volynov. *Payload*: Soyuz 7K-OK s/n 10. *Mass*: 6,575 kg (14,495 lb). *Nation*: Russia. *Related Persons*: Beregovoi, Shatalov, Volynov. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 3.95 days. *Decay Date*: 1968-10-30 . *USAF Sat Cat*: 3516 . *COSPAR*: 1968-094A. *Apogee*: 205 km (127 mi). *Perigee*: 183 km (113 mi). *Inclination*: 51.7000 deg. *Period*: 88.30 min.

  Second manned Soyuz flight. Rendezvoused with the unmanned Soyuz 2 but failed to dock. Complex testing of spaceship systems; development, in joint flight with space ship Soyuz 2 of processes of space ship manoeuvring and docking in artificial earth satellite orbit; development of elements of celestial navigation; conduct of research under space flight conditions. The failed docking was blamed on manual control of the Soyuz by Beregovoi, who repeatedly put the spacecraft in an orientation that nulled the automatic docking system. Beregovoi used nearly all of his orientation fuel in his first attempt to dock - of 80 kg allocated, only 8 to 10 kg was remaining. *Additional Details*: here....

1968 October 31 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 251** - . *Payload*: Zenit-4M no. 1. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 18.00 days. *Decay Date*: 1968-11-18 . *USAF Sat Cat*: 3528 . *COSPAR*: 1968-096A. *Apogee*: 255 km (158 mi). *Perigee*: 201 km (124 mi). *Inclination*: 64.9000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; deployed radio astronony and gamma ray experiment capsule; maneuverable..

1968 November 13 - . 12:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 253** - . *Payload*: Zenit-2 11F61 s/n 67. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 5.00 days. *Decay Date*: 1968-11-18 . *USAF Sat Cat*: 3542 . *COSPAR*: 1968-102A. *Apogee*: 337 km (209 mi). *Perigee*: 216 km (134 mi). *Inclination*: 65.4000 deg. *Period*: 90.00 min. Area survey photo reconnaissance satellite. Unsuccessful mission. On 13th orbit the SA-20-1 camera's shutter responded to an uncommanded order to open. Radiation levels inside reached 3 times normal levels. 53% of the data was lost..

1968 November 21 - . 12:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 254** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1968-11-29 . *USAF Sat Cat*: 3562 . *COSPAR*: 1968-104A. *Apogee*: 335 km (208 mi). *Perigee*: 197 km (122 mi). *Inclination*: 65.4000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule.

1968 November 29 - . 12:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 255** - . *Payload*: Zenit-2 11F61 s/n 68. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1968-12-07 . *USAF Sat Cat*: 3574 . *COSPAR*: 1968-105A. *Apogee*: 317 km (196 mi). *Perigee*: 197 km (122 mi). *Inclination*: 65.4000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite..

1968 December 10 - . 08:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 258** - . *Payload*: Zenit-2 11F61 s/n 69. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1968-12-18 . *USAF Sat Cat*: 3602 . *COSPAR*: 1968-111A. *Apogee*: 298 km (185 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite..

1968 December 16 - . 09:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 260** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1973-07-09 . *USAF Sat Cat*: 3619 . *COSPAR*: 1968-115A. *Apogee*: 39,573 km (24,589 mi). *Perigee*: 506 km (314 mi). *Inclination*: 65.0000 deg. *Period*: 712.20 min. Investigation of the upper atmosphere and outer space..

1969 January 5 - . 06:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Venera 5** - . *Payload*: 2V (V-69) s/n 330. *Mass*: 1,128 kg (2,486 lb). *Nation*: Russia. *Related Persons*: Babakin. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Venera 2V (V-69). *Decay Date*: 1969-05-16 . *USAF Sat Cat*: 3642 . *COSPAR*: 1969-001A.

  Venera 5 is launched at 9:26 Moscow time from LC-31 in -23 deg C temperatures. All proceeds according to plan. Afterwards Kamanin meets Babakin. Venera 6 is planned for launch in 10 January. He also plans two moon landings in 1969 and two in 1970 of soil sample return spacecraft. Kamanin does not believe America can achieve a manned moon landing in 1969, and therefore that Babakin has a very good chance of stealing their thunder.

  Meanwhile Venera 5 was launched from its parking orbit towards Venus to obtain atmospheric data. The spacecraft was very similar to Venera 4 although it was of a stronger design. When the atmosphere of Venus was approached, a capsule weighing 405 kg and containing scientific instruments was jettisoned from the main spacecraft. During satellite descent towards the surface of Venus, a parachute opened to slow the rate of descent. For 53 min on May 16, 1969, while the capsule was suspended from the parachute, data from the Venusian atmosphere were returned. The spacecraft also carried a medallion bearing the coat of arms of the U.S.S.R. and a bas-relief of V.I. Lenin to the night side of Venus.

1969 January 10 - . 05:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Venera 6** - . *Payload*: 2V (V-69) s/n 331. *Mass*: 1,128 kg (2,486 lb). *Nation*: Russia.

Agency: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 2MV. *Spacecraft*: Venera 2V (V-69). *Decay Date*: 1969-05-17 . *USAF Sat Cat*: 3648 . *COSPAR*: 1969-002A.

Venera 6 was launched towards Venus to obtain atmospheric data. When the atmosphere of Venus was approached, a capsule weighing 405 kg was jettisoned from the main spacecraft. This capsule contained scientific instruments. During descent towards the surface of Venus, a parachute opened to slow the rate of descent. For 51 min on May 17, 1969, while the capsule was suspended from the parachute, data from the Venusian atmosphere were returned. The spacecraft also carried a medallion bearing the coat of arms of the U.S.S.R. and a bas-relief of V.I. Lenin to the night side of Venus.

1969 January 12 - . 12:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 263** - . *Payload*: Zenit-2 11F61 s/n 70. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1969-01-20 . *USAF Sat Cat*: 3651 . *COSPAR*: 1969-003A. *Apogee*: 325 km (201 mi). *Perigee*: 200 km (120 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. Area survey photo reconnaissance satellite..

1969 January 14 - . 07:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 4** - . *Call Sign*: Amur (Amur - river). *Crew*: Shatalov. *Backup Crew*: Shonin. *Payload*: Soyuz 7K-OK (A) s/n 12. *Mass*: 6,625 kg (14,605 lb). *Nation*: Russia. *Related Persons*: Shatalov, Shonin. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 4, Soyuz 4/5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 2.97 days. *Decay Date*: 1969-01-17 . *USAF Sat Cat*: 3654 . *COSPAR*: 1969-004A. *Apogee*: 224 km (139 mi). *Perigee*: 213 km (132 mi). *Inclination*: 51.7000 deg. *Period*: 88.80 min.

  Soyuz 4 is launched with Vladimir Shatalov aboard without further problems at 10:30. This time the rockets gyroscopes, the capsule communications, and the television camera all functioned perfectly. Volynov and his crew for Soyuz 5 watched the launch from Area 17. Later Soyuz 4 would dock with Soyuz 5, and following a transfer of two cosmonauts, return with Shatalov, Yevgeni Khrunov and Alexsei Yeliseyev from Soyuz 5. Official purpose: scientific, technical and medico-biological research, checking and testing of onboard systems and design elements of space craft, docking of piloted space craft and construction of an experimental space station, transfer of cosmonauts from one craft to another in orbit. This mission finally successfully completed the simulated lunar orbit docking and crew transfer mission attempted by Soyuz 1 in April 1967. In making the transfer Khrunov and Yeliseyev avoided the most spectacular survivable incident of the space age - the

nose-first reentry of Soyuz 5, still attached to its service module.

1969 January 15 - . 07:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 5** - . *Call Sign*: Baikal (Baikal - lake in Siberia). *Crew*: Khrunov, Volynov, Yeliseyev. *Backup Crew*: Filipchenko, Gorbatko, Kubasov. *Payload*: Soyuz 7K-OK (P) s/n 13. *Mass*: 6,585 kg (14,517 lb). *Nation*: Russia. *Related Persons*: Filipchenko, Gorbatko, Khrunov, Kubasov, Volynov, Yeliseyev. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 4/5, Soyuz 5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 3.04 days. *Decay Date*: 1969-01-18 . *USAF Sat Cat*: 3656 . *COSPAR*: 1969-005A. *Apogee*: 212 km (131 mi). *Perigee*: 196 km (121 mi). *Inclination*: 51.7000 deg. *Period*: 88.60 min.

  At 3 am an An-12 arrives from Moscow with ten newspapers, and letters for Shatalov, to be delivered by the Soyuz 5 crew to him as the first 'space mail'. At 05:15 the State Commission convened and approved launch at 10:04:30. The countdown proceeds normally; meanwhile communications sessions are held with Shatalov on Soyuz 4. The commission is taken by automobile convoy from Area 2, to Area 17, where the Soyuz 5 crew declares itself ready for flight. At T-25 minutes, with the crew already aboard the spacecraft, a piece of electrical equipment fails and needs to be replaced. Engineer-Captain Viktor Vasilyevich Alyeshin goes to the fuelled booster and replaces it. While doing this he notices that the access hatch has been secured with only three bolts, instead of the four required. Nevertheless the launch proceeds successfully. After Soyuz 5 is in orbit, it and Soyuz 4 begin their mutual series of manoeuvres for rendezvous and docking. Officially the flight conducted scientific, technical and medico-biological research, checking and testing of onboard systems and design elements of space craft, docking of piloted space craft and construction of an experimental space station, transfer of cosmonauts from one craft to another in orbit.

1969 January 23 - . 09:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 264** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1969-02-05 . *USAF Sat Cat*: 3667 . *COSPAR*: 1969-008A. *Apogee*: 295 km (183 mi). *Perigee*: 209 km (129 mi). *Inclination*: 69.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; carried radio astronony and gamma ray experiments; maneuverable..

1969 February 1 - . 12:11 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M. *FAILURE*: Upper stage failure.. *Failed Stage*: 2.

- **Meteor** - . *Payload*: Meteor no. 11. *Mass*: 4,730 kg (10,420 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft*: Meteor.

1969 February 25 - . 10:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 266** - . *Payload*: Zenit-2 11F61 s/n 71. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1969-03-05 . *USAF Sat Cat*: 3761 . *COSPAR*: 1969-015A. *Apogee*: 336 km (208 mi). *Perigee*: 202 km (125 mi). *Inclination*: 72.0000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite..

1969 February 26 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 267** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-03-06 . *USAF Sat Cat*: 3765 . *COSPAR*: 1969-017A. *Apogee*: 331 km (205 mi). *Perigee*: 202 km (125 mi). *Inclination*: 70.0000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 March 6 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 270** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-03-14 . *USAF Sat Cat*: 3777 . *COSPAR*: 1969-022A. *Apogee*: 331 km (205 mi). *Perigee*: 200 km (120 mi). *Inclination*: 65.4000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 March 15 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 271** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-03-23 . *USAF Sat Cat*: 3807 . *COSPAR*: 1969-023A. *Apogee*: 324 km (201 mi). *Perigee*: 196 km (121 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 March 22 - . 12:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 273** - . *Payload*: Zenit-2 11F61 s/n 77. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1969-03-30 . *USAF Sat Cat*: 3831 . *COSPAR*: 1969-027A. *Apogee*: 336 km (208 mi). *Perigee*: 200 km (120 mi). *Inclination*: 65.4000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite..

1969 March 24 - . 10:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 274** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-04-01 . *USAF Sat Cat*: 3833 . *COSPAR*: 1969-028A. *Apogee*: 300 km (180 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; also carried science package..

1969 March 26 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-01** - . *Payload*: Meteor M no. 1. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *Decay Date*: 2012-03-26 . *USAF Sat Cat*: 3835 . *COSPAR*: 1969-029A. *Apogee*: 576 km (357 mi). *Perigee*: 549 km (341 mi). *Inclination*: 81.2000 deg. *Period*: 95.90 min. Cloud, snow, ice cover data. Acquisition of meteorological information needed for use by the weather service. .

1969 April 4 - . 10:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 276** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 7.00 days. *Decay Date*: 1969-04-11 . *USAF Sat Cat*: 3854 . *COSPAR*: 1969-032A. *Apogee*: 371 km (230 mi). *Perigee*: 200 km (120 mi). *Inclination*: 81.4000 deg. *Period*: 90.30 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 April 9 - . 13:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 278** - . *Payload*: Zenit-2 11F61 s/n 78. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1969-04-17 . *USAF Sat Cat*: 3883 . *COSPAR*: 1969-034A. *Apogee*: 310 km (190 mi). *Perigee*: 198 km (123 mi). *Inclination*: 65.4000 deg. *Period*: 89.60 min. Area

survey photo reconnaissance satellite..

1969 April 11 - . 02:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-11** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1974-04-17 . *USAF Sat Cat*: 3885 . *COSPAR*: 1969-035A. *Apogee*: 39,595 km (24,603 mi). *Perigee*: 483 km (300 mi). *Inclination*: 64.9000 deg. *Period*: 712.10 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1969 April 15 - . 08:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 279** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-04-23 . *USAF Sat Cat*: 3893 . *COSPAR*: 1969-038A. *Apogee*: 267 km (165 mi). *Perigee*: 192 km (119 mi). *Inclination*: 51.7000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 April 23 - . 09:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 280** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1969-05-06 . *USAF Sat Cat*: 3906 . *COSPAR*: 1969-040A. *Apogee*: 250 km (150 mi). *Perigee*: 207 km (128 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; carried weather experiments; maneuverable..

1969 May 13 - . 09:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 281** - . *Payload*: Zenit-2 11F61 s/n 72. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1969-05-21 . *USAF Sat Cat*: 3939 . *COSPAR*: 1969-042A. *Apogee*: 303 km (188 mi). *Perigee*: 191 km (118 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite..

1969 May 20 - . 08:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 282** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-05-28 . *USAF Sat Cat*: 3944 . *COSPAR*: 1969-044A. *Apogee*: 321 km (199 mi). *Perigee*: 202 km (125 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 May 29 - . 06:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 284** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-06-06 . *USAF Sat Cat*: 3971 . *COSPAR*: 1969-048A. *Apogee*: 297 km (184 mi). *Perigee*: 204 km (126 mi). *Inclination*: 51.7000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 June 15 - . 08:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 286** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-06-23 . *USAF Sat Cat*: 3988 . *COSPAR*: 1969-052A. *Apogee*: 322 km (200 mi). *Perigee*: 197 km (122 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 June 24 - . 06:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 287** - . *Payload*: Zenit-2 11F61 s/n 76. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1969-07-02 . *USAF Sat Cat*: 3991 . *COSPAR*: 1969-054A. *Apogee*: 265 km (164 mi). *Perigee*: 189 km (117 mi). *Inclination*: 51.8000 deg. *Period*: 89.00 min. Area survey photo reconnaissance satellite..

1969 June 27 - . 06:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 288** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok.

Spacecraft: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-07-05 . *USAF Sat Cat*: 3994 . *COSPAR*: 1969-055A. *Apogee*: 273 km (169 mi). *Perigee*: 199 km (123 mi). *Inclination*: 51.8000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 July 10 - . 09:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 289** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 5.00 days. *Decay Date*: 1969-07-15 . *USAF Sat Cat*: 4034 . *COSPAR*: 1969-057A. *Apogee*: 324 km (201 mi). *Perigee*: 194 km (120 mi). *Inclination*: 65.3000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 July 22 - . 12:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 290** - . *Payload*: Zenit-2 11F61 s/n 75. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1969-07-30 . *USAF Sat Cat*: 4042 . *COSPAR*: 1969-060A. *Apogee*: 332 km (206 mi). *Perigee*: 195 km (121 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. Area survey photo reconnaissance satellite..

1969 July 22 - . 12:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-12** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1971-06-18 . *USAF Sat Cat*: 4043 . *COSPAR*: 1969-061A. *Apogee*: 39,526 km (24,560 mi). *Perigee*: 496 km (308 mi). *Inclination*: 64.9000 deg. *Period*: 711.00 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1969 August 16 - . 11:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 293** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1969-08-28 . *USAF Sat Cat*: 4072 . *COSPAR*: 1969-071A. *Apogee*: 244 km (151 mi). *Perigee*: 215 km (133 mi). *Inclination*: 51.7000 deg. *Period*: 89.10 min. Area survey photo

reconnaissance satellite; returned film capsule; carried science package..

1969 August 19 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 294** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-08-27 . *USAF Sat Cat*: 4074 . *COSPAR*: 1969-072A. *Apogee*: 329 km (204 mi). *Perigee*: 200 km (120 mi). *Inclination*: 65.4000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 August 29 - . 09:05 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 296** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-09-06 . *USAF Sat Cat*: 4080 . *COSPAR*: 1969-075A. *Apogee*: 302 km (187 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 September 2 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 297** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-09-10 . *USAF Sat Cat*: 4082 . *COSPAR*: 1969-076A. *Apogee*: 314 km (195 mi). *Perigee*: 207 km (128 mi). *Inclination*: 72.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 September 18 - . 08:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 299** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 4.00 days. *Decay Date*: 1969-09-22 . *USAF Sat Cat*: 4097 . *COSPAR*: 1969-078A. *Apogee*: 284 km (176 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 September 24 - . 12:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 301** - . *Payload*: Zenit-2 11F61 s/n 79. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1969-10-02 . *USAF Sat Cat*: 4106 . *COSPAR*: 1969-081A. *Apogee*: 271 km (168 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.4000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite..

1969 October 6 - . 01:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-02** - . *Payload*: Meteor M no. 2. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *Decay Date*: 2002-08-20 . *USAF Sat Cat*: 4119 . *COSPAR*: 1969-084A. *Apogee*: 552 km (342 mi). *Perigee*: 513 km (318 mi). *Inclination*: 81.2000 deg. *Period*: 95.30 min. Cloud and ice cover imaging; investigated IR, thermal reflection/radiation from Earth's atmosphere. Acquisition of meteorological information needed for use by the weather service. .

1969 October 11 - . 11:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 6** - . *Call Sign*: Antey (Antaeus - mythological giant). *Crew*: Kubasov, Shonin. *Backup Crew*: Shatalov, Yeliseyev. *Payload*: Soyuz 7K-OK s/n 14. *Mass*: 6,577 kg (14,499 lb). *Nation*: Russia. *Related Persons*: Kubasov, Shatalov, Shonin, Yeliseyev. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 6, Soyuz 7, Soyuz 8. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 4.95 days. *Decay Date*: 1969-10-16 . *USAF Sat Cat*: 4122 . *COSPAR*: 1969-085A. *Apogee*: 218 km (135 mi). *Perigee*: 212 km (131 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Tested spacecraft systems and designs, manoeuvring of space craft with respect to each other in orbit, conducted scientific, technical and medico-biological experiments in group flight. Carried Vulkan welding furnace for vacuum welding experiments in depressurized orbital module. Was to have taken spectacular motion pictures of Soyuz 7 - Soyuz 8 docking but failure of rendezvous electronics in all three craft due to new helium pressurization integrity test prior to mission did not permit successful rendezvous and dockings. *Additional Details*: here....

1969 October 12 - . 10:44 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 7** - . *Call Sign*: Buran (Snowstorm). *Crew*: Filipchenko, Gorbatko, Volkov. *Backup Crew*: Kolodin, Shatalov, Yeliseyev. *Payload*: Soyuz 7K-OK s/n 15. *Mass*: 6,570 kg (14,480 lb). *Nation*: Russia. *Related Persons*: Filipchenko, Gorbatko, Kolodin, Kubasov, Mishin, Shatalov, Shonin, Volkov, Yeliseyev. *Agency*: MOM.

Program: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 6, Soyuz 7, Soyuz 8. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 4.94 days. *Decay Date*: 1969-10-17 . *USAF Sat Cat*: 4124 . *COSPAR*: 1969-086A. *Apogee*: 223 km (138 mi). *Perigee*: 210 km (130 mi). *Inclination*: 51.7000 deg. *Period*: 88.80 min.

Tested spacecraft systems and designs, manoeuvring of space craft with respect to each other in orbit, conducted scientific, technical and medico-biological experiments in group flight. Was to have docked with Soyuz 8 and transferred crew while Soyuz 6 took film from nearby. However failure of rendezvous electronics in all three craft due to a new helium pressurization integrity test prior to the mission did not permit successful rendezvous and dockings. *Additional Details*: here....

1969 October 13 - . 10:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 8** - . *Call Sign*: Granit (Granite). *Crew*: Shatalov, Yeliseyev. *Backup Crew*: Nikolayev, Sevastyanov. *Payload*: Soyuz 7K-OK s/n 16. *Mass*: 6,646 kg (14,651 lb). *Nation*: Russia. *Related Persons*: Nikolayev, Sevastyanov, Shatalov, Yeliseyev. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 6, Soyuz 7, Soyuz 8. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 4.95 days. *Decay Date*: 1969-10-18 . *USAF Sat Cat*: 4126 . *COSPAR*: 1969-087A. *Apogee*: 227 km (141 mi). *Perigee*: 201 km (124 mi). *Inclination*: 51.7000 deg. *Period*: 88.70 min.

  Tested spacecraft systems and designs, manoeuvring of space craft with respect to each other in orbit, conducted scientific, technical and medico-biological experiments in group flight. Was to have docked with Soyuz 7 and transferred crew while Soyuz 6 took film from nearby. However failure of rendezvous electronics in all three craft due to a new helium pressurization integrity test prior to the mission did not permit successful rendezvous and dockings. Recovered October 18, 1969 10:19 GMT. *Additional Details*: here....

1969 October 17 - . 11:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 302** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-10-25 . *USAF Sat Cat*: 4130 . *COSPAR*: 1969-089A. *Apogee*: 321 km (199 mi). *Perigee*: 198 km (123 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 October 24 - . 09:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 306** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1969-11-05 . *USAF Sat Cat*: 4182 . *COSPAR*: 1969-093A. *Apogee*: 299 km (185 mi). *Perigee*: 215 km (133 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule..

1969 November 12 - . 11:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 309** - . *Payload*: Zenit-2 11F61 s/n 80. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1969-11-20 . *USAF Sat Cat*: 4223 . *COSPAR*: 1969-098A. *Apogee*: 364 km (226 mi). *Perigee*: 185 km (114 mi). *Inclination*: 64.5000 deg. *Period*: 90.00 min. Area survey photo reconnaissance satellite. First flight with Nauka external experiment container..

- **Nauka** - . *Payload*: Nauka 3KS. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1969-11-30 . *USAF Sat Cat*: 4236 . *COSPAR*: 1969-098E. *Apogee*: 334 km (207 mi). *Perigee*: 188 km (116 mi). *Inclination*: 65.4000 deg. *Period*: 89.73 min.

1969 November 15 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 310** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1969-11-23 . *USAF Sat Cat*: 4232 . *COSPAR*: 1969-100A. *Apogee*: 336 km (208 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule.

1969 December 3 - . 13:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 313** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1969-12-15 . *USAF Sat Cat*: 4262 . *COSPAR*: 1969-104A. *Apogee*: 335 km (208 mi). *Perigee*: 198 km (123 mi). *Inclination*: 65.4000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite; returned film capsule..

1969 December 23 - . 13:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 317** - . *Payload*: Zenit-4MK no. 1. *Mass*: 6,300 kg (13,800 lb). *Nation*:

Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1970-01-05 . *USAF Sat Cat*: 4280 . *COSPAR*: 1969-109A. *Apogee*: 280 km (170 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.4000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; carried charged particle experiments; maneuverable..

1970 January 9 - . 09:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 318** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1970-01-21 . *USAF Sat Cat*: 4292 . *COSPAR*: 1970-001A. *Apogee*: 379 km (235 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 90.30 min. Area survey photo reconnaissance satellite; returned film capsule..

1970 January 21 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 322** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1970-01-29 . *USAF Sat Cat*: 4315 . *COSPAR*: 1970-007A. *Apogee*: 298 km (185 mi). *Perigee*: 216 km (134 mi). *Inclination*: 65.3000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule.

1970 February 10 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 323** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1970-02-18 . *USAF Sat Cat*: 4328 . *COSPAR*: 1970-010A. *Apogee*: 314 km (195 mi). *Perigee*: 201 km (124 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1970 February 19 - . 18:57 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-13** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1975-09-29 . *USAF Sat Cat*: 4336 . *COSPAR*: 1970-013A. *Apogee*: 39,170 km (24,330 mi). *Perigee*: 461 km (286 mi). *Inclination*: 65.4000 deg. *Period*: 703.10

min. The first launch of the 8K78M vehicle from the Plesetsk launch site. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1970 March 4 - . 12:14 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 325** - . *Payload*: Zenit-2 11F61 s/n 73. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1970-03-12 . *USAF Sat Cat*: 4340 . *COSPAR*: 1970-015A. *Apogee*: 327 km (203 mi). *Perigee*: 200 km (120 mi). *Inclination*: 65.4000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite..

1970 March 13 - . 08:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 326** - . *Payload*: Zenit-2 11F61 s/n 74. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1970-03-21 . *USAF Sat Cat*: 4346 . *COSPAR*: 1970-018A. *Apogee*: 232 km (144 mi). *Perigee*: 208 km (129 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min. Area survey photo reconnaissance satellite..

1970 March 17 - . 11:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-03** - . *Payload*: Meteor M no. 3. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *Decay Date*: 1983-11-18 . *USAF Sat Cat*: 4349 . *COSPAR*: 1970-019A. *Apogee*: 635 km (394 mi). *Perigee*: 537 km (333 mi). *Inclination*: 81.2000 deg. *Period*: 96.40 min. Acquisition of meteorological information needed for use by the weather service. .

1970 March 27 - . 11:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 328** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1970-04-09 . *USAF Sat Cat*: 4355 . *COSPAR*: 1970-022A. *Apogee*: 299 km (185 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.9000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1970 April 3 - . 08:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 329** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1970-04-15 . *USAF Sat Cat*: 4357 . *COSPAR*: 1970-023A. *Apogee*: 228 km (141 mi). *Perigee*: 198 km (123 mi). *Inclination*: 81.3000 deg. *Period*: 88.80 min. Area survey photo reconnaissance satellite; returned film capsule..

1970 April 8 - . 10:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 331** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1970-04-16 . *USAF Sat Cat*: 4364 . *COSPAR*: 1970-026A. *Apogee*: 320 km (190 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1970 April 15 - . 09:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 333** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1970-04-28 . *USAF Sat Cat*: 4373 . *COSPAR*: 1970-030A. *Apogee*: 239 km (148 mi). *Perigee*: 219 km (136 mi). *Inclination*: 81.3000 deg. *Period*: 89.10 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1970 April 28 - . 10:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-04** - . *Payload*: Meteor M no. 4. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *Decay Date*: 2004-03-16 . *USAF Sat Cat*: 4393 . *COSPAR*: 1970-037A. *Apogee*: 578 km (359 mi). *Perigee*: 534 km (331 mi). *Inclination*: 81.2000 deg. *Period*: 95.80 min. Acquisition of meteorological information needed for use by the weather service. .

1970 May 12 - . 10:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 344** - . *Payload*: Zenit-2 11F61 s/n 81. *Mass*: 4,720 kg (10,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite.

Spacecraft Bus: Vostok. *Spacecraft*: Zenit-2 satellite. *Duration*: 8.00 days. *Decay Date*: 1970-05-20 . *USAF Sat Cat*: 4401 . *COSPAR*: 1970-038A. *Apogee*: 326 km (202 mi). *Perigee*: 204 km (126 mi). *Inclination*: 72.9000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite. Partially successful. Failure of SA-10B camera on 42nd orbit..

1970 May 20 - . 09:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 345** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1970-05-28 . *USAF Sat Cat*: 4403 . *COSPAR*: 1970-039A. *Apogee*: 296 km (183 mi). *Perigee*: 153 km (95 mi). *Inclination*: 52.0000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule.

1970 June 1 - . 19:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 9** - . *Call Sign*: Sokol (Falcon). *Crew*: Nikolayev, Sevastyanov. *Backup Crew*: Filipchenko, Grechko. *Support Crew*: Lazarev, Yazdovsky. *Payload*: Soyuz 7K-OK s/n 17. *Mass*: 6,590 kg (14,520 lb). *Nation*: Russia. *Related Persons*: Filipchenko, Grechko, Lazarev, Nikolayev, Sevastyanov, Yazdovsky. *Agency*: MOM. *Program*: Soyuz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-OK. *Duration*: 17.71 days. *Decay Date*: 1970-06-19 . *USAF Sat Cat*: 4407 . *COSPAR*: 1970-041A. *Apogee*: 227 km (141 mi). *Perigee*: 176 km (109 mi). *Inclination*: 51.6000 deg. *Period*: 88.50 min. Manned flight endurance test. Medico-biological, scientific and technical studies and experiments in prolonged orbital flight. Inconclusive results due to slow sun-oriented rotation of spacecraft to conserve fuel producing motion sickness in cosmonauts.. *Additional Details*: here....

1970 June 10 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 346** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 7.00 days. *Decay Date*: 1970-06-17 . *USAF Sat Cat*: 4409 . *COSPAR*: 1970-042A. *Apogee*: 351 km (218 mi). *Perigee*: 206 km (128 mi). *Inclination*: 51.8000 deg. *Period*: 90.00 min. High resolution photo reconnaissance satellite; returned film capsule.

1970 June 17 - . 12:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 349** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1970-06-25 . *USAF Sat Cat*: 4416 . *COSPAR*: 1970-045A. *Apogee*: 332 km (206 mi). *Perigee*: 199 km (123 mi). *Inclination*: 65.4000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1970 June 23 - . 14:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-05** - . *Payload*: Meteor M no. 5. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 4419 . *COSPAR*: 1970-047A. *Apogee*: 872 km (541 mi). *Perigee*: 815 km (506 mi). *Inclination*: 81.2000 deg. *Period*: 101.80 min. Acquisition of meteorological information needed for use by the weather service. .

1970 June 26 - . 03:23 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-14** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1976-02-16 . *USAF Sat Cat*: 4430 . *COSPAR*: 1970-049A. *Apogee*: 39,172 km (24,340 mi). *Perigee*: 459 km (285 mi). *Inclination*: 65.5000 deg. *Period*: 703.10 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1970 June 26 - . 12:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 350** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1970-07-08 . *USAF Sat Cat*: 4425 . *COSPAR*: 1970-050A. *Apogee*: 274 km (170 mi). *Perigee*: 180 km (110 mi). *Inclination*: 51.7000 deg. *Period*: 89.00 min. Area survey photo reconnaissance satellite; returned film capsule..

1970 July 7 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 352** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1970-07-15 . *USAF Sat Cat*:

4446 . *COSPAR*: 1970-052A. *Apogee*: 340 km (210 mi). *Perigee*: 203 km (126 mi). *Inclination*: 51.8000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule.

1970 July 9 - . 13:35 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 353** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1970-07-21 . *USAF Sat Cat*: 4455 . *COSPAR*: 1970-053A. *Apogee*: 304 km (188 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.4000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule..

1970 July 21 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. High resolution photo reconnaissance mission..

1970 August 7 - . 09:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 355** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4. *Duration*: 8.00 days. *Decay Date*: 1970-08-15 . *USAF Sat Cat*: 4484 . *COSPAR*: 1970-058A. *Apogee*: 321 km (199 mi). *Perigee*: 198 km (123 mi). *Inclination*: 65.3000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule.

1970 August 17 - . 05:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Venera 7** - . *Payload*: 3V (V-70) s/n 630. *Mass*: 1,180 kg (2,600 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3V (V-70). *Decay Date*: 1970-12-15 . *USAF Sat Cat*: 4489 . *COSPAR*: 1970-060A.

  Venera 7 was launched from an earth parking orbit towards Venus to study the Venusian atmosphere and other phenomena of the planet. Venera 7 entered the atmosphere of Venus on December 15, 1970, and a landing capsule was jettisoned. After aerodynamic braking, a parachute system was deployed. The capsule antenna was extended, and signals were returned for 35 min. Another 23 min of very weak signals were received after the spacecraft landed on Venus. The capsule was the first man-made object to return data after landing on another planet.

1970 August 22 - . 05:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: The escape stage Block L's engine 11D33 was late igniting and cut off early at 25 seconds after firing due to abnormal operation of the sequencer and a DC transformer failure.. *Failed Stage*: U.

- **Cosmos 359** - . *Payload*: 3V (V-70) s/n 631. *Mass*: 1,180 kg (2,600 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3V (V-70). *Decay Date*: 1970-11-06 . *USAF Sat Cat*: 4501 . *COSPAR*: 1970-065A. *Apogee*: 908 km (564 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.2000 deg. *Period*: 95.70 min. Probable Venus probe failure..

1970 August 29 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 360** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 10.00 days. *Decay Date*: 1970-09-08 . *USAF Sat Cat*: 4508 . *COSPAR*: 1970-068A. *Apogee*: 287 km (178 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable; deployed capsule..

1970 September 8 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 361** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1970-09-21 . *USAF Sat Cat*: 4524 . *COSPAR*: 1970-071A. *Apogee*: 338 km (210 mi). *Perigee*: 195 km (121 mi). *Inclination*: 72.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1970 September 17 - . 08:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 363** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1970-09-29 . *USAF Sat Cat*: 4538 . *COSPAR*: 1970-074A. *Apogee*: 294 km (182 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule..

1970 September 22 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 364** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 10.00 days. *Decay Date*: 1970-10-02 . *USAF Sat Cat*: 4553 . *COSPAR*: 1970-075A. *Apogee*: 297 km (184 mi). *Perigee*: 202 km (125 mi). *Inclination*: 65.4000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1970 September 29 - . 08:14 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-15** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1976-03-20 . *USAF Sat Cat*: 4569 . *COSPAR*: 1970-077A. *Apogee*: 39,296 km (24,417 mi). *Perigee*: 492 km (305 mi). *Inclination*: 65.2000 deg. *Period*: 706.30 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1970 October 1 - . 08:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 366** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1970-10-13 . *USAF Sat Cat*: 4561 . *COSPAR*: 1970-078A. *Apogee*: 284 km (176 mi). *Perigee*: 216 km (134 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule..

1970 October 8 - . 12:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 368** - . *Payload*: Bion precursor. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 6.00 days. *Decay Date*: 1970-10-14 . *USAF Sat Cat*: 4571 . *COSPAR*: 1970-080A. *Apogee*: 383 km (237 mi). *Perigee*: 202 km (125 mi). *Inclination*: 65.0000 deg. *Period*: 90.40 min. Bion precursor mission. Conducted biological investigations and study of the physical characteristics of outer space..

1970 October 9 - . 11:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 370** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok.

Spacecraft: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1970-10-22 . *USAF Sat Cat*: 4576 . *COSPAR*: 1970-082A. *Apogee*: 280 km (170 mi). *Perigee*: 203 km (126 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1970 October 15 - . 11:22 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-06** - . *Payload*: Meteor M no. 6. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *Decay Date*: 1999-01-08 . *USAF Sat Cat*: 4583 . *COSPAR*: 1970-085A. *Apogee*: 443 km (275 mi). *Perigee*: 441 km (274 mi). *Inclination*: 81.2000 deg. *Period*: 93.40 min. Acquisition of meteorological information needed for use by the weather service. .

1970 October 30 - . 13:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 376** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1970-11-12 . *USAF Sat Cat*: 4599 . *COSPAR*: 1970-092A. *Apogee*: 286 km (177 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1970 November 11 - . 09:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 377** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1970-11-23 . *USAF Sat Cat*: 4695 . *COSPAR*: 1970-096A. *Apogee*: 286 km (177 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule..

1970 November 24 - . 05:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511L.

- **Cosmos 379** - . *Payload*: Lunar Craft T2K no. 1. *Mass*: 5,500 kg (12,100 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Lunar L3. *Class*: Moon. *Type*: Manned lunar lander. *Spacecraft Bus*: Soyuz. *Spacecraft*: LK. *Duration*: 4,683.78 days. *Decay Date*: 1983-09-21 . *USAF Sat Cat*: 4760 . *COSPAR*: 1970-099A. *Apogee*: 232 km (144 mi). *Perigee*: 198 km (123 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  LK moon lander test using the T2K version. First use of the Soyuz 11A511L booster

modified especially for this purpose. The spacecraft made a series of engine burns, simulating the lunar landing profile. After 3.5 days in orbit, the first burn was made in imitation of a descent to the lunar surface after separation of the Block D lunar crasher stage. The orbit changed from 192 km X 233 km to 196 km X 1206 km orbit; delta V: 263 m/s. After 4 days in orbit, a large manoeuvre was made simulating the ascent from the lunar surface. The orbit was changed from 188 km X 1198 km to 177 km X 14,041 km; delta V: 1518 m/s. These main manoeuvres were followed by a series of small adjustments simulating rendezvous and docking with the LOK. The LK tested out without major problems and decayed from orbit on September 21, 1983.

1970 November 27 - . 15:47 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-16** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1975-11-25 . *USAF Sat Cat*: 4779 . *COSPAR*: 1970-101A. *Apogee*: 39,895 km (24,789 mi). *Perigee*: 463 km (287 mi). *Inclination*: 65.5000 deg. *Period*: 717.80 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1970 December 3 - . 13:55 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 383** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1970-12-16 . *USAF Sat Cat*: 4787 . *COSPAR*: 1970-104A. *Apogee*: 279 km (173 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.4000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1970 December 10 - . 11:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 384** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1970-12-22 . *USAF Sat Cat*: 4791 . *COSPAR*: 1970-105A. *Apogee*: 292 km (181 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.9000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule; deployed science capsule..

1970 December 15 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 386** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1970-12-28 . *USAF Sat Cat*: 4804 . *COSPAR*: 1970-110A. *Apogee*: 242 km (150 mi). *Perigee*: 222 km (137 mi). *Inclination*: 65.0000 deg. *Period*: 89.10 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1970 December 18 - . 16:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 389** - . *Payload*: Tselina-D no. 1. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2003-11-24 . *USAF Sat Cat*: 4813 . *COSPAR*: 1970-113A. *Apogee*: 568 km (352 mi). *Perigee*: 543 km (337 mi). *Inclination*: 81.2000 deg. *Period*: 95.80 min.

1970 December 25 - . 03:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-17** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1975-12-22 . *USAF Sat Cat*: 4829 . *COSPAR*: 1970-114A. *Apogee*: 39,881 km (24,780 mi). *Perigee*: 474 km (294 mi). *Inclination*: 65.0000 deg. *Period*: 717.80 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1971 January 12 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 390** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-01-25 . *USAF Sat Cat*: 4845 . *COSPAR*: 1971-001A. *Apogee*: 276 km (171 mi). *Perigee*: 196 km (121 mi). *Inclination*: 65.0000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 January 20 - . 11:24 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-07** - . *Payload*: Meteor M no. 7. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *Decay Date*: 2005-06-14 . *USAF Sat Cat*: 4849 . *COSPAR*: 1971-003A. *Apogee*: 550 km (340 mi). *Perigee*: 538 km (334 mi).

Inclination: 81.2000 deg. *Period*: 95.50 min. Acquisition of meteorological information needed for use by the weather service. .

1971 January 21 - . 08:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 392** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1971-02-02 . *USAF Sat Cat*: 4872 . *COSPAR*: 1971-004A. *Apogee*: 278 km (172 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule..

1971 February 18 - . 13:59 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 396** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-03-03 . *USAF Sat Cat*: 4959 . *COSPAR*: 1971-014A. *Apogee*: 285 km (177 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 February 26 - . 05:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511L.

- **Cosmos 398** - . *Payload*: Lunar Craft T2K no. 2. *Mass*: 5,500 kg (12,100 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Lunar L3. *Class*: Moon. *Type*: Manned lunar lander. *Spacecraft Bus*: Soyuz. *Spacecraft*: LK. *Duration*: 8,463.78 days. *Decay Date*: 1995-12-10 . *USAF Sat Cat*: 4966 . *COSPAR*: 1971-016A. *Apogee*: 1,958 km (1,216 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.5000 deg. *Period*: 106.70 min.

  Second space test of the LK moon lander test using the T2K version. Followed the same programme as Cosmos 379.
  Maneuver Summary:
  189km X 252km orbit to 186km X 1189km orbit. Delta V: 251 m/s
  186km X 1189km orbit to 200km X 10905km orbit. Delta V: 1320 m/s
  Total Delta V: 2832 m/s.
  Officially: Investigation of the upper atmosphere and outer space.

1971 March 3 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 399** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 14.00 days. *Decay Date*: 1971-03-17 . *USAF Sat Cat*: 5003 . *COSPAR*: 1971-017A. *Apogee*: 285 km (177 mi). *Perigee*: 200 km (120 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 March 5 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC43/4. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-2M** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. Area survey photo reconnaissance satellite..

1971 March 26 - . *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Yantar-1FKT development authorised.** - . *Nation*: Russia. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. Central Committee of the Communist Party and Council of Soviet Ministers Decree 182-63 'On development of the Yantar-1KFT reconnaissance and cartographic satellite and the 11A511K launcher' was issued..

1971 March 27 - . 10:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 401** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-04-09 . *USAF Sat Cat*: 5086 . *COSPAR*: 1971-023A. *Apogee*: 290 km (180 mi). *Perigee*: 185 km (114 mi). *Inclination*: 72.8000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 April 2 - . 08:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 403** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1971-04-14 . *USAF Sat Cat*: 5108 . *COSPAR*: 1971-026A. *Apogee*: 229 km (142 mi). *Perigee*: 216 km (134 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min. Area survey photo reconnaissance satellite; returned film capsule..

1971 April 7 - . 07:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 405** - . *Payload*: Tselina-D no. 2. *Mass*: 3,800 kg (8,300 lb). *Nation*:

Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *USAF Sat Cat*: 5117 . *COSPAR*: 1971-028A. *Apogee*: 603 km (374 mi). *Perigee*: 594 km (369 mi). *Inclination*: 81.2000 deg. *Period*: 96.70 min.

1971 April 14 - . 08:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 406** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 10.00 days. *Decay Date*: 1971-04-24 . *USAF Sat Cat*: 5124 . *COSPAR*: 1971-029A. *Apogee*: 246 km (152 mi). *Perigee*: 217 km (134 mi). *Inclination*: 81.3000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 April 17 - . 11:44 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-08** - . *Payload*: Meteor M no. 8. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *Decay Date*: 1991-01-10 . *USAF Sat Cat*: 5142 . *COSPAR*: 1971-031A. *Apogee*: 248 km (154 mi). *Perigee*: 243 km (150 mi). *Inclination*: 81.2000 deg. *Period*: 89.40 min. Acquisition of meteorological information needed for use by the weather service. .

1971 April 22 - . 23:54 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 10** - . *Call Sign*: Granit (Granite). *Crew*: Rukavishnikov, Shatalov, Yeliseyev. *Backup Crew*: Kolodin, Kubasov, Leonov. *Support Crew*: Dobrovolsky, Patsayev, Volkov. *Payload*: Soyuz 7K-OKS s/n 31. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Dobrovolsky, Kolodin, Kubasov, Leonov, Patsayev, Rukavishnikov, Shatalov, Volkov, Yeliseyev. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7KT-OK. *Duration*: 1.99 days. *Decay Date*: 1971-04-24 . *USAF Sat Cat*: 5172 . *COSPAR*: 1971-034A. *Apogee*: 258 km (160 mi). *Perigee*: 209 km (129 mi). *Inclination*: 51.6000 deg. *Period*: 89.10 min.

  Intended first space station mission; soft docked with Salyut 1. Launch nearly scrubbed due to poor weather. Soyuz 10 approached to 180 m from Salyut 1 automatically. It was hand docked after faillure of the automatic system, but hard docking could not be achieved because of the angle of approach. Post-flight analysis indicated that the cosmonauts had no instrument to proivde the angle and range rate data necessary for a successful manual docking. Soyuz 10 was connected to the station for 5 hours and 30 minutes. Despite the lack of hard dock, it is said that the

crew were unable to enter the station due to a faulty hatch on their own spacecraft. When Shatalov tried to undock from the Salyut, the jammed hatch impeded the docking mechanism, preventing undocking. After several attempts he was unable to undock and land.

1971 May 6 - . 06:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 410** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1971-05-18 . *USAF Sat Cat*: 5207 . *COSPAR*: 1971-040A. *Apogee*: 280 km (170 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.0000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule; deployed science capsule..

- **Nauka** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1971-05-25 . *USAF Sat Cat*: 5228 . *COSPAR*: 1971-040C. *Apogee*: 257 km (159 mi). *Perigee*: 195 km (121 mi). *Inclination*: 64.9000 deg. *Period*: 89.02 min.

1971 May 18 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 420** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 11.00 days. *Decay Date*: 1971-05-29 . *USAF Sat Cat*: 5230 . *COSPAR*: 1971-043A. *Apogee*: 257 km (159 mi). *Perigee*: 199 km (123 mi). *Inclination*: 51.8000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 May 28 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 424** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-06-10 . *USAF Sat Cat*: 5248 . *COSPAR*: 1971-048A. *Apogee*: 282 km (175 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 June 6 - . 04:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 11** - . *Call Sign*: Yantar (Amber). *Crew*: Dobrovolsky, Patsayev, Volkov. *Backup Crew*: Kolodin, Kubasov, Leonov. *Payload*: Soyuz 7K-OKS s/n 32. *Mass*: 6,790 kg (14,960 lb). *Nation*: Russia. *Related Persons*: Dobrovolsky, Kolodin,

Kubasov, Leonov, Patsayev, Volkov. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 11. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7KT-OK. *Duration*: 23.77 days. *Decay Date*: 1971-06-29 . *USAF Sat Cat*: 5283 . *COSPAR*: 1971-053A. *Apogee*: 237 km (147 mi). *Perigee*: 163 km (101 mi). *Inclination*: 51.5000 deg. *Period*: 88.40 min.

First space station flight, two years before the American Skylab. The Soyuz 11 launch proceeds without any difficulties. The first orbital correction in the set of rendezvous manoeuvres to head for Salyut 1 is made on the fourth revolution. At 15:00 Kamanin and other critical staff board a plane for the mission control centre at Yevpatoriya. The aircraft takes 4 hours 30 minutes to get there.

Equipment aboard Salyut 1 included a telescope, spectrometer, electrophotometer, and television. The crew checked improved on-board spacecraft systems in different conditions of flight and conducted medico-biological research. The main instrument, a large solar telescope, was inoperative because its cover failed to jettison. A small fire and difficult working conditions will lead to a decision to return crew before planned full duration of 30 days.

1971 June 11 - . 10:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 427** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1971-06-23 . *USAF Sat Cat*: 5289 . *COSPAR*: 1971-055A. *Apogee*: 314 km (195 mi). *Perigee*: 204 km (126 mi). *Inclination*: 72.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 June 24 - . 07:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 428** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1971-07-06 . *USAF Sat Cat*: 5305 . *COSPAR*: 1971-057A. *Apogee*: 257 km (159 mi). *Perigee*: 205 km (127 mi). *Inclination*: 51.7000 deg. *Period*: 89.10 min. Area survey photo reconnaissance satellite; returned film capsule; deployed electron and gamma ray science capsule..

- **Nauka** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1971-07-13 . *USAF Sat Cat*: 5315 . *COSPAR*: 1971-057G. *Apogee*: 239 km (148 mi). *Perigee*: 199 km (123 mi). *Inclination*: 51.7000 deg. *Period*: 88.88 min.

1971 June 25 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC43/pad?. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed*

Stage: U.

- **Zenit-4M** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. Photo surveillance mission..

1971 July 16 - . 01:41 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-09** - . *Payload*: Meteor M no. 9. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *Decay Date*: 1991-08-27 . *USAF Sat Cat*: 5327 . *COSPAR*: 1971-059A. *Apogee*: 349 km (216 mi). *Perigee*: 342 km (212 mi). *Inclination*: 81.2000 deg. *Period*: 91.50 min. Acquisition of meteorological information needed for use by the weather service. .

1971 July 20 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 429** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-08-02 . *USAF Sat Cat*: 5331 . *COSPAR*: 1971-061A. *Apogee*: 252 km (156 mi). *Perigee*: 202 km (125 mi). *Inclination*: 51.8000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 July 23 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 430** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-08-05 . *USAF Sat Cat*: 5340 . *COSPAR*: 1971-062A. *Apogee*: 305 km (189 mi). *Perigee*: 199 km (123 mi). *Inclination*: 65.4000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 July 28 - . 03:29 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-18** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1977-07-19 . *USAF Sat Cat*: 5367 . *COSPAR*: 1971-064A. *Apogee*: 39,877 km (24,778 mi). *Perigee*: 478 km (297 mi). *Inclination*: 65.4000 deg. *Period*: 717.80 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the

Orbita network..

1971 July 30 - . 08:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 431** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1971-08-11 . *USAF Sat Cat*: 5364 . *COSPAR*: 1971-065A. *Apogee*: 284 km (176 mi). *Perigee*: 165 km (102 mi). *Inclination*: 51.7000 deg. *Period*: 89.00 min. Area survey photo reconnaissance satellite; returned film capsule..

1971 August 5 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 432** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-08-18 . *USAF Sat Cat*: 5379 . *COSPAR*: 1971-066A. *Apogee*: 252 km (156 mi). *Perigee*: 200 km (120 mi). *Inclination*: 51.7000 deg. *Period*: 89.10 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 August 12 - . 05:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511L.

- **Cosmos 434** - . *Payload*: Lunar Craft T2K no. 3. *Mass*: 5,500 kg (12,100 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Lunar L3. *Class*: Moon. *Type*: Manned lunar lander. *Spacecraft Bus*: Soyuz. *Spacecraft*: LK. *Duration*: 8,296.77 days. *Decay Date*: 1981-08-22 . *USAF Sat Cat*: 5407 . *COSPAR*: 1971-069A. *Apogee*: 1,253 km (778 mi). *Perigee*: 193 km (119 mi). *Inclination*: 51.6000 deg. *Period*: 99.30 min.

  Final LK moon lander test using the T2K version.
  Maneuver Summary:
  188km X 267km orbit to 190km X 1261km orbit. Delta V: 266 m/s
  188km X 1262km orbit to 180km X 11384km orbit. Delta V: 1333 m/s
  Total Delta V: 1599 m/s. Ten years later the spacecraft was due to re-enter over Australia soon after the Skylab scare. The Soviet Union told the people of Australia not to worry, it was only an experimental lunar cabin - the first inadvertent admission that their manned lunar project even existed!

1971 August 19 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4M** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. High resolution photo

reconnaissance mission..

1971 September 14 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 438** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1971-09-27 . *USAF Sat Cat*: 5475 . *COSPAR*: 1971-077A. *Apogee*: 279 km (173 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.4000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 September 21 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 439** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 11.00 days. *Decay Date*: 1971-10-02 . *USAF Sat Cat*: 5478 . *COSPAR*: 1971-078A. *Apogee*: 263 km (163 mi). *Perigee*: 226 km (140 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule..

1971 September 28 - . 07:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 441** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 12.00 days. *Decay Date*: 1971-10-10 . *USAF Sat Cat*: 5486 . *COSPAR*: 1971-081A. *Apogee*: 266 km (165 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 September 29 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 442** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-10-12 . *USAF Sat Cat*: 5493 . *COSPAR*: 1971-084A. *Apogee*: 313 km (194 mi). *Perigee*: 182 km (113 mi). *Inclination*: 72.9000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 October 7 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 443** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1971-10-19 . *USAF Sat Cat*: 5536 . *COSPAR*: 1971-085A. *Apogee*: 300 km (180 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.4000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule; deployed science capsule..

- **Nauka** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1971-10-30 . *USAF Sat Cat*: 5562 . *COSPAR*: 1971-085F. *Apogee*: 288 km (178 mi). *Perigee*: 198 km (123 mi). *Inclination*: 65.4000 deg. *Period*: 89.36 min.

1971 October 14 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 452** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-10-27 . *USAF Sat Cat*: 5558 . *COSPAR*: 1971-088A. *Apogee*: 248 km (154 mi). *Perigee*: 193 km (119 mi). *Inclination*: 64.9000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 November 2 - . 14:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 454** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 14.00 days. *Decay Date*: 1971-11-16 . *USAF Sat Cat*: 5585 . *COSPAR*: 1971-094A. *Apogee*: 346 km (214 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.4000 deg. *Period*: 90.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 November 19 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 456** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1971-12-02 . *USAF Sat Cat*: 5611 . *COSPAR*: 1971-098A. *Apogee*: 304 km (188 mi). *Perigee*: 178 km (110 mi). *Inclination*: 72.9000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 November 24 - . 09:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-01** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia.

Agency: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1976-05-10 . *USAF Sat Cat*: 5620 . *COSPAR*: 1971-100A. *Apogee*: 39,553 km (24,577 mi). *Perigee*: 516 km (320 mi). *Inclination*: 65.0000 deg. *Period*: 712.00 min.

Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1971 December 3 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC43/4. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-2M** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. Area survey photo reconnaissance satellite..
- **Nauka** - . *Nation*: Russia. *Agency*: RVSN. *Spacecraft*: Nauka.

1971 December 6 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 463** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 5.00 days. *Decay Date*: 1971-12-11 . *USAF Sat Cat*: 5661 . *COSPAR*: 1971-107A. *Apogee*: 272 km (169 mi). *Perigee*: 202 km (125 mi). *Inclination*: 64.0000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 December 10 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 464** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 6.00 days. *Decay Date*: 1971-12-16 . *USAF Sat Cat*: 5670 . *COSPAR*: 1971-108A. *Apogee*: 311 km (193 mi). *Perigee*: 180 km (110 mi). *Inclination*: 72.0000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 December 16 - . 09:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 466** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 11.00 days. *Decay Date*: 1971-12-27 . *USAF Sat Cat*: 5687 . *COSPAR*: 1971-112A. *Apogee*: 375 km (233 mi). *Perigee*: 175 km (108 mi). *Inclination*: 64.0000 deg. *Period*: 90.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1971 December 19 - . 22:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-19** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1977-04-13 . *USAF Sat Cat*: 5712 . *COSPAR*: 1971-115A. *Apogee*: 39,126 km (24,311 mi). *Perigee*: 522 km (324 mi). *Inclination*: 65.0000 deg. *Period*: 703.50 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1971 December 27 - . 14:04 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511M.

- **Cosmos 470** - . *Payload*: Zenit-4MT no. 1. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 10.00 days. *Decay Date*: 1972-01-06 . *USAF Sat Cat*: 5727 . *COSPAR*: 1971-118A. *Apogee*: 259 km (160 mi). *Perigee*: 192 km (119 mi). *Inclination*: 65.0000 deg. *Period*: 89.00 min. Military topography satellite; returned film capsule; deployed science capsule..

1971 December 29 - . 10:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-10** - . *Payload*: Meteor M no. 10. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 5731 . *COSPAR*: 1971-120A. *Apogee*: 912 km (566 mi). *Perigee*: 838 km (520 mi). *Inclination*: 81.3000 deg. *Period*: 102.50 min. Acquisition of meteorological information needed for use by the weather service. .

1972 January 12 - . 09:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 471** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1972-01-25 . *USAF Sat Cat*: 5764 . *COSPAR*: 1972-001A. *Apogee*: 316 km (196 mi). *Perigee*: 201 km (124

mi). *Inclination*: 65.0000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 February 3 - . 08:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 473** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1972-02-15 . *USAF Sat Cat*: 5821 . *COSPAR*: 1972-006A. *Apogee*: 309 km (192 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule..

1972 February 16 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 474** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1972-02-29 . *USAF Sat Cat*: 5839 . *COSPAR*: 1972-008A. *Apogee*: 325 km (201 mi). *Perigee*: 177 km (109 mi). *Inclination*: 64.9000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 March 1 - . 11:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 476** - . *Payload*: Tselina-D no. 3. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1991-10-25 . *USAF Sat Cat*: 5852 . *COSPAR*: 1972-011A. *Apogee*: 388 km (241 mi). *Perigee*: 379 km (235 mi). *Inclination*: 81.2000 deg. *Period*: 92.20 min.

1972 March 4 - . 10:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 477** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1972-03-16 . *USAF Sat Cat*: 5862 . *COSPAR*: 1972-013A. *Apogee*: 306 km (190 mi). *Perigee*: 202 km (125 mi). *Inclination*: 72.9000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule; separated particle flux and radiation experiment capsule..

- **Nauka Cosmos 477** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1972-03-23 . *USAF Sat Cat*: 5882 . *COSPAR*:

1972-013E. *Apogee*: 291 km (180 mi). *Perigee*: 197 km (122 mi). *Inclination*: 72.8000 deg. *Period*: 89.38 min.

1972 March 15 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 478** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1972-03-28 . *USAF Sat Cat*: 5885 . *COSPAR*: 1972-015A. *Apogee*: 282 km (175 mi). *Perigee*: 176 km (109 mi). *Inclination*: 65.0000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 March 27 - . 04:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Venera 8** - . *Payload*: 3V (V-72) s/n 670. *Mass*: 1,180 kg (2,600 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3V (V-72). *Decay Date*: 1972-07-22 . *USAF Sat Cat*: 5912 . *COSPAR*: 1972-021A. *Apogee*: 246 km (152 mi). *Perigee*: 194 km (120 mi). *Inclination*: 51.7000 deg. *Period*: 88.90 min.

  Venus atmospheric probe. The spacecraft took 117 days to reach Venus, entering the atmosphere on 22 July 1972. Descent speed was reduced from 41,696 km/hr to about 900 km/hr by aerobraking. The 2.5 meter diameter parachute opened at an altitude of 60 km, and a refrigeration system was used to cool the interior components. Venera 8 transmitted data during the descent and continued to send back data for 50 minutes after landing. The probe confirmed the earlier data on the high Venus surface temperature and pressure returned by Venera 7, and also measured the light level as being suitable for surface photography, finding it to be similar to the amount of light on Earth on an overcast day.

1972 March 30 - . 14:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-11** - . *Payload*: Meteor M no. 11. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 5917 . *COSPAR*: 1972-022A. *Apogee*: 877 km (544 mi). *Perigee*: 855 km (531 mi). *Inclination*: 81.2000 deg. *Period*: 102.30 min. Acquisition of meteorological information needed for use by the weather service. .

1972 March 31 - . 04:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: The escape stage Block L's engine cut off 125 seconds after ignition due to timer failure.. *Failed Stage*: U.

- **Cosmos 482** - . *Payload*: 3V (V-72) s/n 671. *Mass*: 1,180 kg (2,600 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Venera. *Class*: Venus. *Type*: Venus probe. *Spacecraft Bus*: 3MV. *Spacecraft*: Venera 3V (V-72). *Decay Date*: 1981-05-05 . *USAF Sat Cat*: 5919 . *COSPAR*: 1972-023A. *Apogee*: 9,806 km (6,093 mi). *Perigee*: 204 km (126 mi). *Inclination*: 52.0000 deg. *Period*: 201.40 min.

1972 April 3 - . 10:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 483** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 12.00 days. *Decay Date*: 1972-04-15 . *USAF Sat Cat*: 5924 . *COSPAR*: 1972-024A. *Apogee*: 313 km (194 mi). *Perigee*: 209 km (129 mi). *Inclination*: 72.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 April 4 - . 20:38 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-20** - . *Payload*: Molniya-1 s/n 27. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1974-01-30 . *USAF Sat Cat*: 5927 . *COSPAR*: 1972-025A. *Apogee*: 40,006 km (24,858 mi). *Perigee*: 343 km (213 mi). *Inclination*: 65.7000 deg. *Period*: 717.60 min. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

- **SRET 1** - . *Payload*: MAS/SRET 1. *Mass*: 15 kg (33 lb). *Nation*: France. *Agency*: CNES. *Class*: Technology. *Type*: Navigation technology satellite. *Spacecraft*: SRET. *Decay Date*: 1974-02-26 . *USAF Sat Cat*: 5928 . *COSPAR*: 1972-025B. *Apogee*: 39,250 km (24,380 mi). *Perigee*: 458 km (284 mi). *Inclination*: 65.6000 deg. *Period*: 704.70 min. Test satellite. Investigation of the upper atmosphere and outer space..

1972 April 6 - . 08:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 484** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1972-04-18 . *USAF Sat Cat*: 5933 . *COSPAR*: 1972-026A. *Apogee*: 223 km (138 mi). *Perigee*: 194 km (120 mi). *Inclination*: 81.0000 deg. *Period*: 88.60 min. Area survey photo reconnaissance satellite; returned film capsule; separated cosmic ray experiment capsule..

- **Nauka Cosmos 484** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1972-04-18 . *USAF Sat Cat*: 6002 . *COSPAR*: 1972-026C. *Apogee*: 177 km (109 mi). *Perigee*: 168 km (104 mi). *Inclination*: 81.3000 deg. *Period*: 87.94 min.

1972 April 7 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Intercosmos 6** - . *Payload*: Energia s/n 1. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Intercosmos. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Energia satellite. *Completed Operations Date*: 1972-04-11 . *Decay Date*: 1972-04-11 . *USAF Sat Cat*: 5936 . *COSPAR*: 1972-027A. *Apogee*: 326 km (202 mi). *Perigee*: 203 km (126 mi). *Inclination*: 51.8000 deg. *Period*: 89.80 min. Investigation of primary cosmic radiation and meteoritic particles in near-earth outer space. .

1972 April 14 - . 00:54 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Prognoz 1** - . *Payload*: SO-M s/n 501. *Mass*: 845 kg (1,862 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *Decay Date*: 1981-03-31 . *USAF Sat Cat*: 5941 . *COSPAR*: 1972-029A. *Apogee*: 199,667 km (124,067 mi). *Perigee*: 1,005 km (624 mi). *Inclination*: 65.0000 deg. *Period*: 5,782.10 min. Study of the processes of solar activity and of their influence on interplanetary space and the Earth's magnetosphere. .

1972 April 14 - . 08:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 486** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1972-04-27 . *USAF Sat Cat*: 5945 . *COSPAR*: 1972-030A. *Apogee*: 234 km (145 mi). *Perigee*: 178 km (110 mi). *Inclination*: 81.3000 deg. *Period*: 88.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 May 5 - . 11:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 488** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1972-05-18 . *USAF Sat Cat*: 6016 . *COSPAR*: 1972-034A. *Apogee*: 294 km (182 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.4000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 May 17 - . 10:19 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 490** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1972-05-29 . *USAF Sat Cat*: 6021 . *COSPAR*: 1972-036A. *Apogee*: 285 km (177 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.0000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule; separated electron flux cosmic ray experiment capsule..

- **Nauka Cosmos 490** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1972-06-06 . *USAF Sat Cat*: 6040 . *COSPAR*: 1972-036D. *Apogee*: 258 km (160 mi). *Perigee*: 209 km (129 mi). *Inclination*: 65.3000 deg. *Period*: 89.17 min.

1972 May 19 - . 14:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-02** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1977-03-22 . *USAF Sat Cat*: 6031 . *COSPAR*: 1972-037A. *Apogee*: 39,293 km (24,415 mi). *Perigee*: 479 km (297 mi). *Inclination*: 65.0000 deg. *Period*: 706.00 min. Continued operation of the long-range telephone and telegraph radio-communication system; transmission of USSR central television programmes to stations in the Orbita network and international cooperation. .

1972 May 25 - . 06:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 491** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 14.00 days. *Decay Date*: 1972-06-08 . *USAF Sat Cat*: 6035 . *COSPAR*: 1972-038A. *Apogee*: 268 km (166 mi). *Perigee*: 177 km (109 mi). *Inclination*: 64.9000 deg. *Period*: 88.90 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 June 9 - . 06:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 492** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1972-06-22 . *USAF Sat Cat*: 6049 . *COSPAR*: 1972-040A. *Apogee*: 323 km (200 mi). *Perigee*: 204 km (126

mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 June 21 - . 06:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 493** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1972-07-03 . *USAF Sat Cat*: 6053 . *COSPAR*: 1972-042A. *Apogee*: 267 km (165 mi). *Perigee*: 202 km (125 mi). *Inclination*: 64.9000 deg. *Period*: 89.10 min. Area survey photo reconnaissance satellite; returned film capsule..

1972 June 23 - . 11:19 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 495** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1972-07-06 . *USAF Sat Cat*: 6060 . *COSPAR*: 1972-044A. *Apogee*: 277 km (172 mi). *Perigee*: 202 km (125 mi). *Inclination*: 65.4000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 June 26 - . 14:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 496** - . *Payload*: Soyuz 7K-T s/n 33L. *Mass*: 6,675 kg (14,715 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 9.95 days. *Decay Date*: 1972-07-02 . *USAF Sat Cat*: 6066 . *COSPAR*: 1972-045A. *Apogee*: 253 km (157 mi). *Perigee*: 176 km (109 mi). *Inclination*: 51.5000 deg. *Period*: 88.70 min. Recovered July 6, 1972 13:54 GMT. Soyuz 7K-T redesign test..

1972 June 29 - . 03:47 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Prognoz 2** - . *Payload*: SO-M no. 2. *Mass*: 845 kg (1,862 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *Decay Date*: 1982-12-15 . *USAF Sat Cat*: 6068 . *COSPAR*: 1972-046A. *Apogee*: 201,804 km (125,394 mi). *Perigee*: 517 km (321 mi). *Inclination*: 65.3000 deg. *Period*: 5,849.20 min. Study of the processes of solar activity and of their influence on interplanetary space and the Earth's magnetosphere. .

1972 June 30 - . 18:52 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-12** - . *Payload*: Meteor M no. 12. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 6079 . *COSPAR*: 1972-049A. *Apogee*: 893 km (554 mi). *Perigee*: 876 km (544 mi). *Inclination*: 81.2000 deg. *Period*: 102.70 min. Acquisition of meteorological information needed for use by the weather service. .

1972 July 6 - . 10:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 499** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 11.00 days. *Decay Date*: 1972-07-17 . *USAF Sat Cat*: 6090 . *COSPAR*: 1972-051A. *Apogee*: 283 km (175 mi). *Perigee*: 204 km (126 mi). *Inclination*: 51.8000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 July 13 - . 14:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511M.

- **Cosmos 502** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1972-07-25 . *USAF Sat Cat*: 6105 . *COSPAR*: 1972-055A. *Apogee*: 262 km (162 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.10 min. Military topography satellite; returned film capsule; carried science package..

1972 July 19 - . 13:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 503** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1972-08-01 . *USAF Sat Cat*: 6114 . *COSPAR*: 1972-056A. *Apogee*: 288 km (178 mi). *Perigee*: 202 km (125 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 July 28 - . 10:19 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 512** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1972-08-09 . *USAF Sat Cat*: 6130 . *COSPAR*: 1972-059A. *Apogee*: 273 km (169 mi). *Perigee*: 202 km (125 mi). *Inclination*: 65.3000 deg. *Period*: 89.20 min. Area survey photo

reconnaissance satellite; returned film capsule..

1972 August 2 - . 08:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 513** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 14.00 days. *Decay Date*: 1972-08-15 . *USAF Sat Cat*: 6135 . *COSPAR*: 1972-060A. *Apogee*: 307 km (190 mi). *Perigee*: 172 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 August 18 - . 10:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 515** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1972-08-31 . *USAF Sat Cat*: 6150 . *COSPAR*: 1972-063A. *Apogee*: 309 km (192 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 August 30 - . 08:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 517** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1972-09-11 . *USAF Sat Cat*: 6168 . *COSPAR*: 1972-067A. *Apogee*: 285 km (177 mi). *Perigee*: 203 km (126 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule..

1972 September 2 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC43/4. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4M** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. High resolution photo reconnaissance mission..

1972 September 15 - . 09:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 518** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok.

Spacecraft: Zenit-2M satellite. *Duration*: 9.00 days. *Decay Date*: 1972-09-24 . *USAF Sat Cat*: 6186 . *COSPAR*: 1972-070A. *Apogee*: 306 km (190 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.8000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 518** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1972-09-27 . *USAF Sat Cat*: 6198 . *COSPAR*: 1972-070C. *Apogee*: 271 km (168 mi). *Perigee*: 196 km (121 mi). *Inclination*: 72.8000 deg. *Period*: 89.17 min.

1972 September 16 - . 08:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 519** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 10.00 days. *Decay Date*: 1972-09-26 . *USAF Sat Cat*: 6188 . *COSPAR*: 1972-071A. *Apogee*: 360 km (220 mi). *Perigee*: 207 km (128 mi). *Inclination*: 71.3000 deg. *Period*: 90.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 September 19 - . 19:19 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 520** - . *Payload*: Oko #1. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 6192 . *COSPAR*: 1972-072A. *Apogee*: 33,393 km (20,749 mi). *Perigee*: 6,841 km (4,250 mi). *Inclination*: 69.9000 deg. *Period*: 715.30 min. Covered Oko constellation plane 3 - 355 degree longitude of ascending node..

1972 September 30 - . 20:19 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-03** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1978-01-12 . *USAF Sat Cat*: 6208 . *COSPAR*: 1972-075A. *Apogee*: 39,170 km (24,330 mi). *Perigee*: 470 km (290 mi). *Inclination*: 65.0000 deg. *Period*: 703.30 min. Continued operation of the long-range telephone and telegraph radio-communication system; transmission of USSR central television programmes to stations in the Orbita network and international cooperation. .

1972 October 4 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 522** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1972-10-17 . *USAF Sat Cat*: 6219 . *COSPAR*: 1972-077A. *Apogee*: 309 km (192 mi). *Perigee*: 212 km (131 mi). *Inclination*: 72.0000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 October 14 - . 06:16 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-21** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1977-11-01 . *USAF Sat Cat*: 6231 . *COSPAR*: 1972-081A. *Apogee*: 34,684 km (21,551 mi). *Perigee*: 494 km (306 mi). *Inclination*: 65.4000 deg. *Period*: 615.40 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1972 October 18 - . 11:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 525** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 11.00 days. *Decay Date*: 1972-10-29 . *USAF Sat Cat*: 6248 . *COSPAR*: 1972-083A. *Apogee*: 268 km (166 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.20 min. Area survey photo reconnaissance satellite; returned film capsule; separated Nauka autonomous subsatellite 16KS No 161 / 1L which tested Kondor control system for Yantar satellite..

- **Nauka Cosmos 525** - . *Payload*: Nauka 16KS No. 1L. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1972-11-01 . *USAF Sat Cat*: 6258 . *COSPAR*: 1972-083C. *Apogee*: 258 km (160 mi). *Perigee*: 191 km (118 mi). *Inclination*: 65.3000 deg. *Period*: 88.99 min.

1972 October 26 - . 22:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-13** - . *Payload*: Meteor M no. 13. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 6256 . *COSPAR*: 1972-085A. *Apogee*: 880 km (540 mi). *Perigee*: 851 km (528 mi). *Inclination*: 81.2000 deg. *Period*: 102.30 min. Investigation of the upper atmosphere and outer space. .

1972 October 31 - . 13:29 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch*

Vehicle: Voskhod 11A57.

- **Cosmos 527** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1972-11-13 . *USAF Sat Cat*: 6260 . *COSPAR*: 1972-086A. *Apogee*: 306 km (190 mi). *Perigee*: 207 km (128 mi). *Inclination*: 65.4000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 November 25 - . 09:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 537** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1972-12-07 . *USAF Sat Cat*: 6287 . *COSPAR*: 1972-093A. *Apogee*: 303 km (188 mi). *Perigee*: 203 km (126 mi). *Inclination*: 64.0000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule..

1972 December 2 - . 04:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-22** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1976-02-11 . *USAF Sat Cat*: 6294 . *COSPAR*: 1972-095A. *Apogee*: 39,608 km (24,611 mi). *Perigee*: 462 km (287 mi). *Inclination*: 64.0000 deg. *Period*: 712.00 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1972 December 12 - . 06:51 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-04** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1975-01-22 . *USAF Sat Cat*: 6308 . *COSPAR*: 1972-098A. *Apogee*: 39,284 km (24,409 mi). *Perigee*: 507 km (315 mi). *Inclination*: 65.3000 deg. *Period*: 706.40 min. Continued operation of the long-range telephone and telegraph radio-communication system; transmission of USSR central television programmes to stations in the Orbita network and international cooperation. .

1972 December 14 - . 13:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 538** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1972-12-27 . *USAF Sat Cat*: 6311 . *COSPAR*: 1972-099A. *Apogee*: 283 km (175 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1972 December 27 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511M.

- **Cosmos 541** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1973-01-08 . *USAF Sat Cat*: 6326 . *COSPAR*: 1972-105A. *Apogee*: 348 km (216 mi). *Perigee*: 218 km (135 mi). *Inclination*: 81.0000 deg. *Period*: 90.20 min. Military topography satellite; returned film capsule; separated science capsule..

1972 December 28 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 542** - . *Payload*: Tselina-D no. 4. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1983-10-09 . *USAF Sat Cat*: 6328 . *COSPAR*: 1972-106A. *Apogee*: 640 km (390 mi). *Perigee*: 527 km (327 mi). *Inclination*: 81.0000 deg. *Period*: 96.30 min.

1973 January 11 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 543** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1973-01-24 . *USAF Sat Cat*: 6339 . *COSPAR*: 1973-002A. *Apogee*: 274 km (170 mi). *Perigee*: 191 km (118 mi). *Inclination*: 64.9000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 February 1 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 547** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1973-02-13 . *USAF Sat Cat*: 6353 . *COSPAR*: 1973-006A. *Apogee*: 309 km (192 mi). *Perigee*: 203 km (126 mi). *Inclination*: 64.0000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule..

1973 February 3 - . 05:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-23** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1977-10-23 . *USAF Sat Cat*: 6356 . *COSPAR*: 1973-007A. *Apogee*: 39,602 km (24,607 mi). *Perigee*: 476 km (295 mi). *Inclination*: 65.0000 deg. *Period*: 712.20 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1973 February 8 - . 13:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 548** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1973-02-21 . *USAF Sat Cat*: 6359 . *COSPAR*: 1973-008A. *Apogee*: 300 km (180 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.4000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 February 15 - . 01:11 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Prognoz 3** - . *Payload*: SO-M no. 3. *Mass*: 845 kg (1,862 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *Decay Date*: 1976-12-31 . *USAF Sat Cat*: 6364 . *COSPAR*: 1973-009A. *Apogee*: 199,442 km (123,927 mi). *Perigee*: 896 km (556 mi). *Inclination*: 65.0000 deg. *Period*: 5,768.60 min. Solar flare monitor. Study of the processes of solar activity and of their influence on interplanetary space and the Earth's magnetosphere. .

1973 March 1 - . 12:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 550** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 10.00 days. *Decay Date*: 1973-03-11 . *USAF Sat Cat*: 6376 . *COSPAR*: 1973-011A. *Apogee*: 317 km (196 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 March 6 - . 09:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 551** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 14.00 days. *Decay Date*: 1973-03-20 . *USAF Sat Cat*: 6378 . *COSPAR*: 1973-012A. *Apogee*: 296 km (183 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 March 20 - . 11:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-14** - . *Payload*: Meteor M no. 14. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 6392 . *COSPAR*: 1973-015A. *Apogee*: 878 km (545 mi). *Perigee*: 860 km (530 mi). *Inclination*: 81.2000 deg. *Period*: 102.30 min. Acquisition of meteorological information needed for use by the weather service. .

1973 March 22 - . 10:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 552** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1973-04-03 . *USAF Sat Cat*: 6394 . *COSPAR*: 1973-016A. *Apogee*: 308 km (191 mi). *Perigee*: 202 km (125 mi). *Inclination*: 72.0000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule; separated Nauka autonomous subsatellite 16KS No 162 / 2L which tested Kondor control system for Yantar satellite..

- **Nauka Cosmos 552** - . *Payload*: Nauka 16KS No. 2L. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1973-04-09 . *USAF Sat Cat*: 6397 . *COSPAR*: 1973-016C. *Apogee*: 283 km (175 mi). *Perigee*: 192 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 89.25 min.

1973 April 5 - . 11:11 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-05** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1979-01-06 . *USAF Sat Cat*: 6418 . *COSPAR*: 1973-018A. *Apogee*: 39,822 km (24,744 mi). *Perigee*: 532 km (330 mi). *Inclination*: 65.2000 deg. *Period*: 717.70 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central

television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1973 April 19 - . 08:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 554** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 38.00 days. *Decay Date*: 1973-05-07 . *USAF Sat Cat*: 6432 . *COSPAR*: 1973-021A. *Apogee*: 304 km (188 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable; exploded in orbit..

1973 April 25 - . 10:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 555** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1973-05-07 . *USAF Sat Cat*: 6440 . *COSPAR*: 1973-024A. *Apogee*: 230 km (140 mi). *Perigee*: 216 km (134 mi). *Inclination*: 81.0000 deg. *Period*: 88.90 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..
- **Nauka Cosmos 555** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1973-05-09 . *USAF Sat Cat*: 6445 . *COSPAR*: 1973-024D. *Apogee*: 204 km (126 mi). *Perigee*: 192 km (119 mi). *Inclination*: 81.3000 deg. *Period*: 88.45 min.

1973 May 5 - . 07:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 556** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 9.00 days. *Decay Date*: 1973-05-14 . *USAF Sat Cat*: 6446 . *COSPAR*: 1973-025A. *Apogee*: 240 km (140 mi). *Perigee*: 199 km (123 mi). *Inclination*: 81.3000 deg. *Period*: 88.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 May 18 - . 11:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 559** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 5.00 days. *Decay Date*: 1973-05-23 . *USAF Sat Cat*: 6647 . *COSPAR*: 1973-030A. *Apogee*: 325 km (201 mi). *Perigee*: 204 km (126

mi). *Inclination*: 65.4000 deg. *Period*: 89.80 min. First flight of Soyuz U launch vehicle. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 May 23 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 560** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1973-06-05 . *USAF Sat Cat*: 6652 . *COSPAR*: 1973-031A. *Apogee*: 314 km (195 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 May 25 - . 13:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 561** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1973-06-06 . *USAF Sat Cat*: 6657 . *COSPAR*: 1973-033A. *Apogee*: 295 km (183 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.4000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule; separated gamma ray telescope experiment capsule..
- **Nauka Cosmos 561** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1973-06-20 . *USAF Sat Cat*: 6662 . *COSPAR*: 1973-033D. *Apogee*: 281 km (174 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.3000 deg. *Period*: 89.36 min.

1973 May 29 - . 10:16 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-15** - . *Payload*: Meteor M no. 15. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 6659 . *COSPAR*: 1973-034A. *Apogee*: 879 km (546 mi). *Perigee*: 845 km (525 mi). *Inclination*: 81.2000 deg. *Period*: 102.20 min. Acquisition of meteorological information needed for use by the weather service. .

1973 June 6 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 563** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok.

Spacecraft: Zenit-4M. *Duration*: 12.00 days. *Decay Date*: 1973-06-18 . *USAF Sat Cat*: 6667 . *COSPAR*: 1973-036A. *Apogee*: 298 km (185 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.4000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 June 10 - . 10:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 572** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1973-06-23 . *USAF Sat Cat*: 6684 . *COSPAR*: 1973-038A. *Apogee*: 281 km (174 mi). *Perigee*: 206 km (128 mi). *Inclination*: 51.7000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 June 15 - . 06:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 573** - . *Payload*: Soyuz 7K-T s/n 35. *Mass*: 6,675 kg (14,715 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 2.00 days. *Decay Date*: 1973-06-17 . *USAF Sat Cat*: 6694 . *COSPAR*: 1973-041A. *Apogee*: 308 km (191 mi). *Perigee*: 191 km (118 mi). *Inclination*: 51.6000 deg. *Period*: 89.50 min. Soyuz test flight. Recovered June 17, 1973 6:01 GMT. Soyuz 7K-T redesign test, probably using one of the spacecraft allocated to the failed Salyut 2 or Cosmos 557 stations..

1973 June 21 - . 13:29 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 575** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1973-07-03 . *USAF Sat Cat*: 6709 . *COSPAR*: 1973-043A. *Apogee*: 271 km (168 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.4000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule; separated capsule..

1973 June 27 - . 11:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511M.

- **Cosmos 576** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1973-07-09 . *USAF Sat Cat*: 6713 . *COSPAR*: 1973-044A. *Apogee*: 332 km (206 mi). *Perigee*: 204 km (126 mi). *Inclination*: 72.9000 deg. *Period*: 89.80 min. Military topography satellite; returned film capsule; separated science capsule..

1973 July 4 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC43/pad?. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4M** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. High resolution photo reconnaissance mission..

1973 July 11 - . 09:58 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-06** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1978-08-05 . *USAF Sat Cat*: 6722 . *COSPAR*: 1973-045A. *Apogee*: 39,292 km (24,414 mi). *Perigee*: 479 km (297 mi). *Inclination*: 65.0000 deg. *Period*: 706.00 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1973 July 25 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 577** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1973-08-07 . *USAF Sat Cat*: 6745 . *COSPAR*: 1973-048A. *Apogee*: 309 km (192 mi). *Perigee*: 175 km (108 mi). *Inclination*: 65.4000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 August 1 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 578** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1973-08-13 . *USAF Sat Cat*: 6759 . *COSPAR*: 1973-051A. *Apogee*: 292 km (181 mi). *Perigee*: 200 km (120 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule..

1973 August 21 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 579** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1973-09-03 . *USAF Sat Cat*: 6789 . *COSPAR*: 1973-055A. *Apogee*: 270 km (160 mi). *Perigee*: 171 km (106 mi). *Inclination*: 65.4000 deg. *Period*: 88.90 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 August 24 - . 10:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 581** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1973-09-06 . *USAF Sat Cat*: 6798 . *COSPAR*: 1973-059A. *Apogee*: 276 km (171 mi). *Perigee*: 177 km (109 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 August 30 - . 00:07 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-24** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1979-12-05 . *USAF Sat Cat*: 6805 . *COSPAR*: 1973-061A. *Apogee*: 39,893 km (24,788 mi). *Perigee*: 463 km (287 mi). *Inclination*: 65.5000 deg. *Period*: 717.80 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1973 August 30 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 583** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1973-09-12 . *USAF Sat Cat*: 6809 . *COSPAR*: 1973-062A. *Apogee*: 298 km (185 mi). *Perigee*: 204 km (126 mi). *Inclination*: 64.9000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule; separated capsule..

1973 September 6 - . 10:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 584** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 14.00 days. *Decay Date*: 1973-09-20 . *USAF Sat*

Cat: 6818 . *COSPAR*: 1973-063A. *Apogee*: 336 km (208 mi). *Perigee*: 205 km (127 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 September 21 - . 13:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 587** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1973-10-04 . *USAF Sat Cat*: 6832 . *COSPAR*: 1973-066A. *Apogee*: 301 km (187 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.4000 deg. *Period*: 89.60 min. Second flight of Soyuz U launch vehicle. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 September 27 - . 12:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 12** - . *Call Sign*: Ural (Urals). *Crew*: Lazarev, Makarov. *Backup Crew*: Grechko, Gubarev. *Support Crew*: Klimuk, Sevastyanov. *Payload*: Soyuz 7K-T s/n 36. *Mass*: 6,720 kg (14,810 lb). *Nation*: Russia. *Related Persons*: Grechko, Gubarev, Klimuk, Lazarev, Makarov, Sevastyanov. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 12. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 1.97 days. *Decay Date*: 1973-09-29 . *USAF Sat Cat*: 6836 . *COSPAR*: 1973-067A. *Apogee*: 348 km (216 mi). *Perigee*: 306 km (190 mi). *Inclination*: 51.0000 deg. *Period*: 91.00 min.

  Experimental flight for the purpose of further development of manned space craft Soyuz 7K-T modifications. After the Soyuz 11 disaster, the Soyuz underwent redesign for increased reliability. Two solo test flights of the new design were planned. Crews for the first flight were those already planned for the deferred follow-on missions to the failed DOS 2 and DOS 3 space stations.

1973 October 3 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 596** - . *Payload*: FEU-170 s/n 1L. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 6.00 days. *Decay Date*: 1973-10-09 . *USAF Sat Cat*: 6856 . *COSPAR*: 1973-070A. *Apogee*: 287 km (178 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.4000 deg. *Period*: 89.40 min.

  Area survey photo reconnaissance satellite; returned film capsule. First test of small film return capsules planned for Yantar spacecraft. SpK capsule FEU-170 No. 1L experienced an electrical short circuit, which led to failure to separate the shell of the capsule after reentry, preventing parachute deployment. The capsule crashed into

the ground.

- **Cosmos 596 Nauka** - . *Payload*: FEU-170 s/n 1L. *Nation*: Russia. *Agency*: RVSN. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Nauka. *Decay Date*: 1973-10-09 . *USAF Sat Cat*: 6856 . *COSPAR*: 1973-070xx. *Apogee*: 273 km (169 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.4000 deg. *Period*: 89.30 min.

1973 October 5 - . *LV Family*: N1, Proton, R-7.

- **Mishin presents to the Academic Soviet the high-level justification and purpose of MKBS.** - . *Related Persons*: Mishin, Ustinov, Melnikov. *Spacecraft*: Soyuz, MKBS, Soyuz 7K-S.

  Principal basis for the development of the MOK
  1. Providing solutions in targeted areas of defense, science and the economy as they may change over 10-20 years. Enabling rapid replacement of legacy systems, devices and components by more sophisticated systems without changing the logic of construction of the MOK as a whole and its constituent satellite systems and basic modules.
  2. Solution targets a minimum number of satellite modules using common equipment and apparatus.
  3. Complex solution of defense, economic and scientific problems using MKBS - the main base of the MOK, for logistics and maintenance of a long-term operation and cost-effective transport system.
  4. The modular structure of the MOK. Wide standardization, harmonization of systems, devices, compartments, aggregates. All elements of these systems, devices, units must be maintainable and interchangeable.
  5. Ensuring long-term service life (5-10 years) of the MOK through periodic visits CM astronauts for routine maintenance, based on the MKBS.
  6. MOK should provide the most cost-effective creation of rocket-space tools for addressing the full range of targets, most cost-effective organization of logistics, maintenance and management of the complex in comparison with existing systems. The development of the IOC should be considered as the direction of development of rocket and space technology to solve national problems with the least material costs.
  7. Stages of creation MOK as the development and creation of the necessary special systems.
  And receives the following criticisms:
  1. All elements of MKBS (especially spacecraft based on the 7KS) must have the new layout of systems and equipment, providing repair and replacement.
  2. GP Melnikov - MKBS is necessary, but give priority to modules SM-1 and SM-2 (these are specialized military free-flyers).
  3. You need to rethink the section on handling scientific information.
  4. Do we need to upgrade or add all these launch sites (R-7, UR-500 and N-1) for MOK (especially the UR500K launch complex)? VP Barmin offers not to upgrade the old UR-500 launch complexes, and spend those funds on new complexes (in fact these two additional UR-500 complexes would be the only ones built after the N1 /

MKBS cancellation).
5. You need a special decision of the Central Committee of the CPSU and special funding for construction.
6. Which launch vehicles to implement the MOK.
ND Ustinov suggests use of the UR-500 with a fluorine-ammonia upper stage to launch the SNTV direct television broadcasting system (Mishin Diaries 3-104)

1973 October 6 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 597** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 6.00 days. *Decay Date*: 1973-10-12 . *USAF Sat Cat*: 6858 . *COSPAR*: 1973-071A. *Apogee*: 290 km (180 mi). *Perigee*: 206 km (128 mi). *Inclination*: 65.4000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 October 10 - . 10:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 598** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 6.00 days. *Decay Date*: 1973-10-16 . *USAF Sat Cat*: 6862 . *COSPAR*: 1973-072A. *Apogee*: 334 km (207 mi). *Perigee*: 208 km (129 mi). *Inclination*: 72.8000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 October 15 - . 08:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 599** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1973-10-28 . *USAF Sat Cat*: 6867 . *COSPAR*: 1973-073A. *Apogee*: 280 km (170 mi). *Perigee*: 202 km (125 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule..

1973 October 16 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 600** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 7.00 days. *Decay Date*: 1973-10-23 . *USAF Sat Cat*: 6873 . *COSPAR*: 1973-074A. *Apogee*: 340 km (210 mi). *Perigee*: 205 km (127 mi). *Inclination*: 72.8000 deg. *Period*: 90.00 min. High resolution photo reconnaissance

satellite; returned film capsule; maneuverable..

1973 October 19 - . 10:26 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-07** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1983-07-08 . *USAF Sat Cat*: 6877 . *COSPAR*: 1973-076A. *Apogee*: 40,055 km (24,888 mi). *Perigee*: 555 km (344 mi). *Inclination*: 62.8000 deg. *Period*: 722.90 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1973 October 20 - . 10:14 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 602** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 9.00 days. *Decay Date*: 1973-10-29 . *USAF Sat Cat*: 6885 . *COSPAR*: 1973-077A. *Apogee*: 309 km (192 mi). *Perigee*: 169 km (105 mi). *Inclination*: 72.8000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 October 27 - . 11:09 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 603** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1973-11-09 . *USAF Sat Cat*: 6900 . *COSPAR*: 1973-079A. *Apogee*: 357 km (221 mi). *Perigee*: 205 km (127 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 October 29 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 604** - . *Payload*: Tselina-D no. 5. *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1992-01-19 . *USAF Sat Cat*: 6907 . *COSPAR*: 1973-080A. *Apogee*: 424 km (263 mi). *Perigee*: 413 km (256 mi). *Inclination*: 81.2000 deg. *Period*: 92.90 min.

1973 October 31 - . 18:24 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 605** - . *Payload*: Bion no. 1. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 21.50 days. *Decay Date*: 1973-11-22 . *USAF Sat Cat*: 6913 . *COSPAR*: 1973-083A. *Apogee*: 403 km (250 mi). *Perigee*: 213 km (132 mi). *Inclination*: 62.8000 deg. *Period*: 90.70 min. Investigation of the influence of space flight on living organisms and testing of life-support systems for biological entities. Capsule recovered 53 deg 29 min N, 65 deg 27 min E..

1973 November 2 - . 13:01 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 606** - . *Payload*: Oko #2. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 6916 . *COSPAR*: 1973-084A. *Apogee*: 35,385 km (21,987 mi). *Perigee*: 4,964 km (3,084 mi). *Inclination*: 69.5000 deg. *Period*: 717.70 min. Replaced Cosmos 520. Covered Oko constellation plane 3 - 359 degree longitude of ascending node..

1973 November 10 - . 12:38 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 607** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1973-11-22 . *USAF Sat Cat*: 6926 . *COSPAR*: 1973-087A. *Apogee*: 341 km (211 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.8000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable (?)..

1973 November 14 - . 20:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-25** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1979-05-26 . *USAF Sat Cat*: 6932 . *COSPAR*: 1973-089A. *Apogee*: 39,607 km (24,610 mi). *Perigee*: 461 km (286 mi). *Inclination*: 64.0000 deg. *Period*: 712.00 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network. .

1973 November 21 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 609** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1973-12-04 . *USAF Sat Cat*: 6943 . *COSPAR*: 1973-092A. *Apogee*: 335 km (208 mi). *Perigee*: 175 km (108 mi). *Inclination*: 69.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 November 28 - . 11:43 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 612** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1973-12-11 . *USAF Sat Cat*: 6953 . *COSPAR*: 1973-095A. *Apogee*: 339 km (210 mi). *Perigee*: 188 km (116 mi). *Inclination*: 72.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 November 30 - . 05:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 613** - . *Payload*: Soyuz 7K-T s/n 34L. *Mass*: 6,675 kg (14,715 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 60.00 days. *Decay Date*: 1974-01-29 . *USAF Sat Cat*: 6957 . *COSPAR*: 1973-096A. *Apogee*: 276 km (171 mi). *Perigee*: 199 km (123 mi). *Inclination*: 51.6000 deg. *Period*: 89.30 min. Unmanned Soyuz test flight. Recovered January 29, 1974 5:29 GMT. Soyuz 7K-T duration test..

1973 November 30 - . 13:08 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-26** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1985-06-09 . *USAF Sat Cat*: 6958 . *COSPAR*: 1973-097A. *Apogee*: 40,829 km (25,369 mi). *Perigee*: 619 km (384 mi). *Inclination*: 62.9000 deg. *Period*: 740.00 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1973 December 17 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511M.

- **Cosmos 616** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 11.00 days. *Decay Date*: 1973-12-28 . *USAF Sat*

Cat: 6979 . *COSPAR*: 1973-102A. *Apogee*: 332 km (206 mi). *Perigee*: 206 km (128 mi). *Inclination*: 72.9000 deg. *Period*: 89.90 min. Military topography satellite; returned film capsule; separated science capsule..

1973 December 18 - . 11:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 13** - . *Call Sign*: Kavkas (Caucasus). *Crew*: Klimuk, Lebedev. *Backup Crew*: Vorobyov, Yazdovsky. *Payload*: Soyuz 7K-T s/n 33A. *Mass*: 6,560 kg (14,460 lb). *Nation*: Russia. *Related Persons*: Klimuk, Lebedev, Vorobyov, Yazdovsky. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 13. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 7.87 days. *Decay Date*: 1973-12-26 . *USAF Sat Cat*: 6982 . *COSPAR*: 1973-103A. *Apogee*: 247 km (153 mi). *Perigee*: 188 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  A unique flight of the 7K-T/AF modification of the Soyuz spacecraft. The orbital module was dominated by the large Orion 2 astrophysical camera. The crew conducted astrophysical observations of stars in the ultraviolet range. Additional experiments included spectrozonal photography of specific areas of the earth's surface, and continued testing of space craft's on-board systems.

1973 December 21 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 625** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1974-01-03 . *USAF Sat Cat*: 6995 . *COSPAR*: 1973-105A. *Apogee*: 321 km (199 mi). *Perigee*: 204 km (126 mi). *Inclination*: 72.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1973 December 25 - . 11:17 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-08** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1984-11-24 . *USAF Sat Cat*: 7000 . *COSPAR*: 1973-106A. *Apogee*: 39,934 km (24,813 mi). *Perigee*: 434 km (269 mi). *Inclination*: 62.9000 deg. *Period*: 718.00 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1974 January 2 - . *LV Family*: N1, R-7, N11, Molniya 8K78L.

- **On the first two days of 1974, Mishin catalogues the issues and notes his supporters.** - . *Related Persons*: Mishin, Ustinov, Afanasyev, Sergei, Almaz, Bezverby, . *Spacecraft*: Soyuz, MKBS, Mir, Soyuz 7K-S, LK.

  To do:
  1. Now, when considering our long-term program and the use of near-earth space (including the Moon) for different purposes, it is necessary to clearly define the sequence of its implementation.
  Especially decide - where to start? (Especially in the present situation).
  - It is necessary as soon as possible to show the rationality inherent in the program guidelines.
  Namely a space-based MOK.
  - Optimal location for OAA systems: based on MKBS (DOS) - or visited the MPM for routine maintenance or brought near-MKBS for the same purpose.
  - Reusable transport ship based on the 7M, and then a reusable transport system based on the work on the N-1 (but with a new engine system in stage 1).
  02.I.1973
  - Space problems solved by the OAA.
  - A great resource. (even after these events)
  Where to start?
  ? (7KS)
  1. DOS 5 (6?) + 7KT + 7KTT + 7KS-OR
  7KS-OR (evidently a reconnaissance version of the 7KS) - view as the embodiment of the most efficient use of the developed equipment (Zenit-Yantar)
  Negotiations with DI Kozlov (What does he want?)
  2. All that in the first only on the basis of the 7M, to create the MTK and MPM (talks with EV Shabarov)
  What will branch NII-4 handle?
  1. Operative follow-up exploration.
  2. Armed struggle in outer space.
  (03.I.1974)
  3. The defeat of the moving targets.
  4. Electronic countermeasures
  5. Use of stationary orbit.
  6. Use of of sun-synchronous orbits.
  Means:
  Filial of NII-4 GUKOS support (but only at the lower levels): 1. R-7M; 2. N-1?; 3. N-11
  Support in the MO MO for the N-1 - signed by Alekseev and Tolubko.
  Navy is indifferent to MOK (they do not understand the prospects)
  It is necessary to establish a relationship with the customer. He is interested in this (Attract DI Kozlov!)
  (4.I.1974)
  - Write a detailed letter on MOK to Afanasyev (copied to the Central Committee)

(With a draft work order)
- Draft a memo to the Central Committee for DF Ustinov. (Long-term planning)
- Achieve color television for the Soyuz-M (NN Detinov - CC)
- TsKBEM review of the level of work on special equipment in related organizations.
- Write a memo about the possibilities of "A" in the operational intelligence. (VK Bezverby together with TsNIIMASH).
- Deal with the radio channel on the "Yantar". Orders: VK Bezverby
- The draft memo on the need of long-term integrated planning by the state. TSKBEM work on MOK - 1st to attempt its development. (Mishin Diaries 3-167)

1974 January 24 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 629** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1974-02-05 . *USAF Sat Cat*: 7100 . *COSPAR*: 1974-003A. *Apogee*: 289 km (179 mi). *Perigee*: 197 km (122 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule. First successful test of SpK small film return capsule planned for Yantar. SpK capsule FEU-170-13 No. 1702 / 2L successfully recovered..

- **Cosmos 629 Nauka** - . *Payload*: FEU-170-13 s/n 2L. *Nation*: Russia. *Agency*: RVSN. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Nauka. *Decay Date*: 1974-02-05 . *USAF Sat Cat*: 7100 . *COSPAR*: 1974-003xx. *Apogee*: 280 km (170 mi). *Perigee*: 194 km (120 mi). *Inclination*: 62.8000 deg. *Period*: 89.20 min.

1974 January 30 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 630** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1974-02-13 . *USAF Sat Cat*: 7104 . *COSPAR*: 1974-004A. *Apogee*: 346 km (214 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.8000 deg. *Period*: 90.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 February 12 - . 08:56 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 632** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 14.00 days. *Decay Date*: 1974-02-26 . *USAF Sat Cat*: 7117 . *COSPAR*: 1974-006A. *Apogee*: 303 km (188 mi). *Perigee*: 176 km (109 mi). *Inclination*: 65.0000 deg. *Period*: 89.30 min. High resolution photo

reconnaissance satellite; returned film capsule; maneuverable..

1974 February 28 - . *LV Family*: N1, R-7, N11, Molniya 8K78L.

- **Mishin conducts more brainstorming on all issues.** - . *Related Persons*: Mishin, Afanasyev, Sergei, . *Spacecraft*: , MKBS, Almaz, Mir.

  21. Form a unit in TsKBEM for special equipment (e.g. classified military) (for some complexes).
  22. Develop ideas on the feasibility of developing and creating two-stage rocket for launch into low earth orbit. (Comparison with 3-stage rocket, the advantages and disadvantages).
  23. Conduct a study on the feasibility of establishing MKTS based on two-stage rocket.
  24. Conduct research on performance 2-stage rocket for launch of payloads to earth orbit using different fuel components (Including solid propellant).
  25. Elaborate design for a surveillance module based on MKBS-1 derived from the N-110.
  26. Review a 2-stage N-1 for MKBS-II, a 3-stage for moving heavy SM modules to geostationary orbit and lunar orbits.
  Questions for SA Afanasyev
  1. His attitude to R-7M. Who is going to build it?
  2. His attitude towards the N-11. 2-stage for moving spacecraft to sun-synchronous orbit).
  3. On the sequence of launches of DOS and "Almaz".
  4. On the development work on MOK.
  About MOK - based on our promising developments. Basis MOK - space-based, and it should be checked already on the DOS-5 having two connecting nodes.
  5. On the shuttle on the basis of R-7M. (Mishin Diaries 3-176)

1974 March 5 - . 11:38 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-16** - . *Payload*: Meteor M no. 16. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 7209 . *COSPAR*: 1974-011A. *Apogee*: 877 km (544 mi). *Perigee*: 821 km (510 mi). *Inclination*: 81.2000 deg. *Period*: 101.90 min. Investigation of the upper atmosphere and outer space. .

1974 March 14 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 635** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1974-03-26 .

USAF Sat Cat: 7216 . *COSPAR*: 1974-014A. *Apogee*: 322 km (200 mi). *Perigee*: 204 km (126 mi). *Inclination*: 72.8000 deg. *Period*: 89.70 min. Area survey photo reconnaissance satellite; returned film capsule; separated Nauka autonomous subsatellite 17KS M15000-171 / 1L which tested astro-visir and radio altimeter systems for Yantar..

- **Nauka Cosmos 635** - . *Payload*: Nauka 17KS No. 1L. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1974-04-07 . *USAF Sat Cat*: 7222 . *COSPAR*: 1974-014E. *Apogee*: 303 km (188 mi). *Perigee*: 198 km (123 mi). *Inclination*: 72.8000 deg. *Period*: 89.52 min.

1974 March 20 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 636** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1974-04-03 . *USAF Sat Cat*: 7225 . *COSPAR*: 1974-016A. *Apogee*: 302 km (187 mi). *Perigee*: 169 km (105 mi). *Inclination*: 65.0000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 April 1 - . *LV Family*: N1, R-7, N11, Molniya 8K78L.

- **Mishin records his final list of planned spacecraft.** - . *Related Persons*: Mishin. *Spacecraft*: , MKBS.

  MOK-1 stages.
  Booster R-7M - Payload to sun-synchronous ~ 12 tons. It will deliver the following to the MKBS:
  1) MTKK Space Shuttle - manned version for delivery and return of the crew of astronauts on the MKBS.
  2) MTKK Space Shuttle - cargo version.
  3) SM Special Module - a non-returnable, autonomous and dockable with the MKBS (all-weather reconnaissance)
  4) MSK - the inter-satellite ship - automatic and manned. Launch vehicle - N-11
  Payload = 18 tons (23 tons)
  MKBS-1 in sun-synchronous orbit.
  (Mishin Diaries 3-184)

1974 April 3 - . 07:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 638** - . *Payload*: Soyuz ASTP s/n 71-EPSA. *Mass*: 6,570 kg (14,480 lb). *Nation*: Russia. *Agency*: MOM. *Program*: ASTP. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-TM. *Duration*: 9.89 days. *Decay Date*: 1974-04-13 . *USAF Sat Cat*: 7234 . *COSPAR*: 1974-018A. *Apogee*: 309

km (192 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.8000 deg. *Period*: 89.40 min.

Unmanned Soyuz test flight. Recovered April 13, 1974 5:05 GMT. Soyuz ASTP Test.
Maneuver Summary:
190km X 309km orbit to 190km X 266km orbit. Delta V: 12 m/s
190km X 266km orbit to 240km X 300km orbit. Delta V: 23 m/s
240km X 300km orbit to 258km X 274km orbit. Delta V: 12 m/s
Total Delta V: 47 m/s.
Officially: Investigation of the upper atmosphere and outer space.

1974 April 4 - . 08:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 639** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 11.00 days. *Decay Date*: 1974-04-15 . *USAF Sat Cat*: 7240 . *COSPAR*: 1974-019A. *Apogee*: 226 km (140 mi). *Perigee*: 206 km (128 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 April 11 - . 12:23 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 640** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1974-04-23 . *USAF Sat Cat*: 7245 . *COSPAR*: 1974-021A. *Apogee*: 225 km (139 mi). *Perigee*: 201 km (124 mi). *Inclination*: 81.3000 deg. *Period*: 88.80 min. Area survey photo reconnaissance satellite; returned film capsule; separated capsule (?)..

1974 April 12 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4MK** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. High resolution photo reconnaissance mission..

1974 April 20 - . 20:53 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-27** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1983-11-17 . *USAF Sat Cat*: 7260 . *COSPAR*: 1974-023A. *Apogee*: 39,752 km (24,700 mi). *Perigee*: 606 km (376 mi). *Inclination*: 63.0000 deg. *Period*: 717.80

min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1974 April 24 - . 11:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-17** - . *Payload*: Meteor M no. 17. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 7274 . *COSPAR*: 1974-025A. *Apogee*: 879 km (546 mi). *Perigee*: 855 km (531 mi). *Inclination*: 81.2000 deg. *Period*: 102.30 min. Acquisition of meteorological information needed for use by the weather service. .

1974 April 26 - . 14:23 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-09** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *USAF Sat Cat*: 7276 . *COSPAR*: 1974-026A. *Apogee*: 35,168 km (21,852 mi). *Perigee*: 1,309 km (813 mi). *Inclination*: 64.4000 deg. *Period*: 640.60 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1974 April 29 - . 13:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 649** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1974-05-11 . *USAF Sat Cat*: 7280 . *COSPAR*: 1974-027A. *Apogee*: 299 km (185 mi). *Perigee*: 181 km (112 mi). *Inclination*: 62.8000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 May 15 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 652** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 8.00 days. *Decay Date*: 1974-05-23 . *USAF Sat Cat*: 7292 . *COSPAR*: 1974-030A. *Apogee*: 343 km (213 mi). *Perigee*: 173 km (107

mi). *Inclination*: 51.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 May 15 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 653** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1974-05-27 . *USAF Sat Cat*: 7293 . *COSPAR*: 1974-031A. *Apogee*: 287 km (178 mi). *Perigee*: 192 km (119 mi). *Inclination*: 62.8000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule..

1974 May 23 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC43/pad?. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: A problem in separation of the second and third stages of resulted in radio contact being lost with the spacecraft at T+439.6 sec. This automatically triggered the destruct charge in the Yantar OSA Descent Module, destroying the spacecraft and booster.. *Failed Stage*: 3.

- **Yantar-2K failure.** - . *Payload*: Yantar-2K s/n 1. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. First test launch of Yantar second generation reconnaissance spacecraft..

1974 May 27 - . 07:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Cosmos 656** - . *Payload*: Soyuz 7K-T(A9) s/n 61. *Mass*: 6,675 kg (14,715 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Almaz. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T/A9. *Duration*: 2.01 days. *Decay Date*: 1974-05-29 . *USAF Sat Cat*: 7313 . *COSPAR*: 1974-036A. *Apogee*: 364 km (226 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 90.00 min. Unmanned test flight of the Soyuz 7K-T(A9) Soyuz variant designed for docking with the military Almaz space station. Recovered May 29, 1974 7:50 GMT..

1974 May 30 - . 12:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 657** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1974-06-13 . *USAF Sat Cat*: 7317 . *COSPAR*: 1974-038A. *Apogee*: 296 km (183 mi). *Perigee*: 177 km (109 mi). *Inclination*: 62.8000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 June 6 - . 06:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 658** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1974-06-18 . *USAF Sat Cat*: 7328 . *COSPAR*: 1974-041A. *Apogee*: 286 km (177 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule..

1974 June 13 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 659** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1974-06-26 . *USAF Sat Cat*: 7334 . *COSPAR*: 1974-043A. *Apogee*: 329 km (204 mi). *Perigee*: 153 km (95 mi). *Inclination*: 62.8000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 June 29 - . 12:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511M.

- **Cosmos 664** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1974-07-11 . *USAF Sat Cat*: 7351 . *COSPAR*: 1974-049A. *Apogee*: 341 km (211 mi). *Perigee*: 205 km (127 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Military topography satellite; returned film capsule; separated science capsule..

1974 June 29 - . 15:59 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 665** - . *Payload*: Oko #3. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 1990-07-06 . *USAF Sat Cat*: 7352 . *COSPAR*: 1974-050A. *Apogee*: 39,653 km (24,639 mi). *Perigee*: 298 km (185 mi). *Inclination*: 61.8000 deg. *Period*: 709.60 min. Covered Oko constellation plane 2 - 315 degree longitude of ascending node..

1974 July 3 - . 18:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 14** - . *Call Sign*: Berkut (Golden Eagle). *Crew*: Artyukhin, Popovich. *Backup Crew*: Demin, Sarafanov. *Support Crew*: Rozhdestvensky, Volynov, Zholobov,

Zudov. *Payload*: Soyuz 7K-T(A9) s/n 62. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Artyukhin, Demin, Popovich, Rozhdestvensky, Sarafanov, Volynov, Zholobov, Zudov. *Agency*: MOM. *Program*: Almaz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 14. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T/A9. *Duration*: 15.73 days. *Decay Date*: 1974-07-19 . *USAF Sat Cat*: 7361 . *COSPAR*: 1974-051A. *Apogee*: 217 km (134 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 88.60 min.

On 4 July Soyuz 14 docked with the Salyut 3 space station after 15 revolutions of the earth. The planned experimental program included manned military reconnaissance of the earth's surface, assessing the fundamental value of such observations, and some supplemental medico-biological research. After the crew's return research continued in the development of the on-board systems and the principles of remote control of such a station.

1974 July 9 - . 14:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-18** - . *Payload*: Meteor-Priroda no. 1. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-Priroda. *USAF Sat Cat*: 7363 . *COSPAR*: 1974-052A. *Apogee*: 909 km (564 mi). *Perigee*: 883 km (548 mi). *Inclination*: 81.2000 deg. *Period*: 102.90 min. Conducted experimental work in studying the natural resources of the earth. Also tested plasma engine.

1974 July 12 - . 12:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 666** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1974-07-25 . *USAF Sat Cat*: 7367 . *COSPAR*: 1974-053A. *Apogee*: 328 km (203 mi). *Perigee*: 181 km (112 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 July 23 - . 01:23 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-10** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *USAF Sat Cat*: 7376 . *COSPAR*: 1974-056A. *Apogee*: 38,868 km (24,151 mi). *Perigee*: 1,501 km (932 mi). *Inclination*: 64.5000 deg. *Period*: 718.10 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central

television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1974 July 25 - . 07:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 667** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4M. *Duration*: 13.00 days. *Decay Date*: 1974-08-07 . *USAF Sat Cat*: 7383 . *COSPAR*: 1974-057A. *Apogee*: 320 km (190 mi). *Perigee*: 176 km (109 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 July 26 - . 07:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 669** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1974-08-08 . *USAF Sat Cat*: 7389 . *COSPAR*: 1974-059A. *Apogee*: 229 km (142 mi). *Perigee*: 207 km (128 mi). *Inclination*: 81.3000 deg. *Period*: 88.80 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..
- **Nauka Cosmos 669** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1974-08-11 . *USAF Sat Cat*: 7404 . *COSPAR*: 1974-059G. *Apogee*: 221 km (137 mi). *Perigee*: 198 km (123 mi). *Inclination*: 81.3000 deg. *Period*: 88.69 min.

1974 August 6 - . 00:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 670** - . *Payload*: Soyuz 7K-S s/n 1L. *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-S. *Duration*: 2.99 days. *Decay Date*: 1974-08-09 . *USAF Sat Cat*: 7405 . *COSPAR*: 1974-061A. *Apogee*: 294 km (182 mi). *Perigee*: 211 km (131 mi). *Inclination*: 50.6000 deg. *Period*: 89.50 min. Unmanned Soyuz 7K-S test flight. Recovered August 8, 1974 23:59 GMT..

1974 August 7 - . 12:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 671** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1974-08-20 . *USAF Sat Cat*: 7409 . *COSPAR*: 1974-062A. *Apogee*: 304 km (188 mi). *Perigee*: 168 km (104

mi). *Inclination*: 62.8000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 August 12 - . 06:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 672** - . *Payload*: Soyuz ASTP s/n 72-EPSA. *Mass*: 6,570 kg (14,480 lb). *Nation*: Russia. *Agency*: MOM. *Program*: ASTP. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-TM. *Duration*: 5.94 days. *Decay Date*: 1974-08-18 . *USAF Sat Cat*: 7413 . *COSPAR*: 1974-064A. *Apogee*: 226 km (140 mi). *Perigee*: 222 km (137 mi). *Inclination*: 51.7000 deg. *Period*: 88.90 min.

  ASTP precursor. Recovered August 18, 1974 5:02 GMT. Soyuz ASTP test.
  Maneuver Summary:
  195km X 305km orbit to 195km X 221km orbit. Delta V: 24 m/s
  195km X 221km orbit to 223km X 223km orbit. Delta V: 8 m/s
  231km X 231km orbit to 231km X 231km orbit. Delta V: 1 m/s
  223km X 223km orbit to 231km X 231km orbit. Delta V: 4 m/s
  231km X 231km orbit to 227km X 237km orbit. Delta V: 2 m/s
  Total Delta V: 39 m/s.
  Officially: Investigation of the upper atmosphere and outer space.

1974 August 16 - . 03:41 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 673** - . *Payload*: Tselina-D no. 6. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1991-06-01 . *USAF Sat Cat*: 7417 . *COSPAR*: 1974-066A. *Apogee*: 416 km (258 mi). *Perigee*: 399 km (247 mi). *Inclination*: 81.2000 deg. *Period*: 92.70 min.

1974 August 26 - . 19:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 15** - . *Call Sign*: Duna (Danube). *Crew*: Demin, Sarafanov. *Backup Crew*: Volynov, Zholobov. *Support Crew*: Rozhdestvensky, Zudov. *Payload*: Soyuz 7K-T(A9) s/n 63. *Mass*: 6,760 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Demin, Rozhdestvensky, Sarafanov, Volynov, Zholobov, Zudov. *Agency*: MOM. *Program*: Almaz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T/A9. *Duration*: 2.01 days. *Decay Date*: 1974-08-28 . *USAF Sat Cat*: 7421 . *COSPAR*: 1974-067A. *Apogee*: 236 km (146 mi). *Perigee*: 173 km (107 mi). *Inclination*: 51.6000 deg. *Period*: 88.50 min.

  Soyuz 15 was to conduct the second phase of manned operations aboard the Salyut 3 military space station, but the Igla rendezvous system failed and no docking was made. The two day flight could only be characterised as '... research in manoeuvring

and docking with the OPS in various modes, and development of methods for evacuation and landing from space complex in new conditions....'

As Chelomei had complained, Soyuz had no reserves or backup systems for repeated manual docking attempts and had to be recovered after a two-day flight. The state commission found that the Igla docking system of the Soyuz needed serious modification. This could not be completed before Salyut 3 decayed. Therefore the planned Soyuz 16 spacecraft became excess to the program (it was later flown as Soyuz 20 to a civilian Salyut station, even though over its two year rated storage life).

Officially: Conduct of joint experiments with the Salyut-3 orbital scientific station.

1974 August 29 - . 07:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 674** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 9.00 days. *Decay Date*: 1974-09-07 . *USAF Sat Cat*: 7423 . *COSPAR*: 1974-068A. *Apogee*: 323 km (200 mi). *Perigee*: 175 km (108 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 August 30 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-2M** - . *Payload*: Zenit-2M. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. Area survey photo reconnaissance satellite..

- **Nauka** - . *Payload*: FEU-170 No. 3L. *Nation*: Russia. *Agency*: RVSN. *Spacecraft*: Nauka.

1974 September 20 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 685** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1974-10-02 . *USAF Sat Cat*: 7445 . *COSPAR*: 1974-073A. *Apogee*: 281 km (174 mi). *Perigee*: 209 km (129 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule..

1974 October 18 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 688** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1974-10-30 . *USAF Sat Cat*: 7473 . *COSPAR*: 1974-078A. *Apogee*: 349 km (216 mi). *Perigee*: 179 km (111 mi). *Inclination*: 62.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 October 22 - . 18:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 690** - . *Payload*: Bion no. 2. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 20.50 days. *Decay Date*: 1974-11-12 . *USAF Sat Cat*: 7478 . *COSPAR*: 1974-080A. *Apogee*: 364 km (226 mi). *Perigee*: 215 km (133 mi). *Inclination*: 62.8000 deg. *Period*: 90.30 min. Biological research. Investigation of the upper atmosphere and outer space. .

1974 October 24 - . 12:39 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-28** - . *Payload*: Molniya-1 s/n 26. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1985-12-29 . *USAF Sat Cat*: 7480 . *COSPAR*: 1974-081A. *Apogee*: 40,633 km (25,248 mi). *Perigee*: 607 km (377 mi). *Inclination*: 62.8000 deg. *Period*: 735.80 min. Decay date suspect Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1974 October 25 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 691** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1974-11-06 . *USAF Sat Cat*: 7483 . *COSPAR*: 1974-082A. *Apogee*: 317 km (196 mi). *Perigee*: 187 km (116 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 October 28 - . 10:17 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-19** - . *Payload*: Meteor M no. 19. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 7490 . *COSPAR*: 1974-083A.

Apogee: 882 km (548 mi). *Perigee*: 842 km (523 mi). *Inclination*: 81.2000 deg. *Period*: 102.20 min. Acquisition of meteorological information needed for use by the weather service. .

1974 November 1 - . 14:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 692** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1974-11-13 . *USAF Sat Cat*: 7502 . *COSPAR*: 1974-087A. *Apogee*: 295 km (183 mi). *Perigee*: 197 km (122 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule. Second successful test of SpK small film return capsule planned for Yantar. SpK capsule FEU-170 No. 4L successfully recovered..

- **Cosmos 692 Nauka** - . *Payload*: FEU-170 s/n 4L. *Nation*: Russia. *Agency*: RVSN. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Nauka. *COSPAR*: 1974-087xx.

1974 November 4 - . 10:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511M.

- **Cosmos 693** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1974-11-16 . *USAF Sat Cat*: 7509 . *COSPAR*: 1974-088A. *Apogee*: 243 km (150 mi). *Perigee*: 219 km (136 mi). *Inclination*: 81.3000 deg. *Period*: 89.10 min. Military topography satellite; returned film capsule; separated science capsule..

1974 November 16 - . 11:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 694** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1974-11-29 . *USAF Sat Cat*: 7533 . *COSPAR*: 1974-090A. *Apogee*: 336 km (208 mi). *Perigee*: 172 km (106 mi). *Inclination*: 72.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1974 November 21 - . 10:33 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-01** - . *Payload*: Molniya-3 s/n 11. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay*

Date: 1986-05-15 . *USAF Sat Cat*: 7540 . *COSPAR*: 1974-092A. *Apogee*: 40,095 km (24,913 mi). *Perigee*: 250 km (150 mi). *Inclination*: 64.1000 deg. *Period*: 717.60 min. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network. .

1974 November 27 - . 11:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 696** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1974-12-09 . *USAF Sat Cat*: 7551 . *COSPAR*: 1974-095A. *Apogee*: 321 km (199 mi). *Perigee*: 205 km (127 mi). *Inclination*: 72.9000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite; returned film capsule..

1974 December 2 - . 09:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 16** - . *Call Sign*: Buran (Snowstorm). *Crew*: Filipchenko, Rukavishnikov. *Backup Crew*: Andreyev, Dzhanibekov. *Support Crew*: Ivanchenkov, Romanenko. *Payload*: Soyuz ASTP s/n 73-EPSA. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Andreyev, Dzhanibekov, Filipchenko, Ivanchenkov, Romanenko, Rukavishnikov. *Agency*: MOM. *Program*: ASTP. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-TM. *Duration*: 5.93 days. *Decay Date*: 1974-12-08 . *USAF Sat Cat*: 7561 . *COSPAR*: 1974-096A. *Apogee*: 291 km (180 mi). *Perigee*: 184 km (114 mi). *Inclination*: 51.8000 deg. *Period*: 89.20 min.

  ASTP Manned Test Flight. Check-out of the Soyuz space craft's on-board systems which had been modernized to meet the requirements of the 1975 joint flight in accordance with the programme of the Soviet-United States experiment; conduct of scientific and technical investigations.

1974 December 13 - . 13:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 697** - . *Payload*: Yantar-2K s/n 2. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 12.00 days. *Decay Date*: 1974-12-25 . *USAF Sat Cat*: 7571 . *COSPAR*: 1974-098A. *Apogee*: 392 km (243 mi). *Perigee*: 174 km (108 mi). *Inclination*: 62.8000 deg. *Period*: 90.20 min.

  Yantar second generation reconnaissance spacecraft. After failure of the first Yantar-2K launch, a review board recommended modifications to the Soyuz U launch vehicle. This second Yantar still used the Sokol control system from the Zenit

and lacked the SpK small film recovery capsules. As planned, after 12 days, the main descent capsule was successfully recovered with its film.

1974 December 17 - . 11:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-20** - . *Payload*: Meteor M no. 20. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 7574 . *COSPAR*: 1974-099A. *Apogee*: 868 km (539 mi). *Perigee*: 846 km (525 mi). *Inclination*: 81.2000 deg. *Period*: 102.10 min. Acquisition of meteorological information needed for use by the weather service. .

1974 December 21 - . 02:19 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-11** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1988-07-07 . *USAF Sat Cat*: 7583 . *COSPAR*: 1974-102A. *Apogee*: 40,065 km (24,895 mi). *Perigee*: 305 km (189 mi). *Inclination*: 61.9000 deg. *Period*: 718.10 min. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network. .

1974 December 27 - . 09:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 701** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-01-09 . *USAF Sat Cat*: 7596 . *COSPAR*: 1974-106A. *Apogee*: 319 km (198 mi). *Perigee*: 205 km (127 mi). *Inclination*: 71.4000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 January 10 - . 21:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 17** - . *Call Sign*: Zenit (Zenith). *Crew*: Grechko, Gubarev. *Backup Crew*: Lazarev, Makarov. *Support Crew*: Klimuk, Sevastyanov. *Payload*: Soyuz 7K-T s/n 38. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Grechko, Gubarev, Klimuk, Lazarev, Makarov, Sevastyanov. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 17. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 29.56 days. *Decay Date*: 1975-02-09 . *USAF Sat Cat*: 7604 . *COSPAR*: 1975-001A. *Apogee*: 249 km (154 mi). *Perigee*: 185 km (114

mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min. Manned two crew. Docked with Salyut 4. Joint experiments with the Salyut scientific orbital station..

1975 January 17 - . 09:07 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 702** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-01-29 . *USAF Sat Cat*: 7606 . *COSPAR*: 1975-002A. *Apogee*: 313 km (194 mi). *Perigee*: 205 km (127 mi). *Inclination*: 71.3000 deg. *Period*: 89.70 min. Area survey photo reconnaissance satellite; returned film capsule..

1975 January 23 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 704** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1975-02-06 . *USAF Sat Cat*: 7617 . *COSPAR*: 1975-005A. *Apogee*: 305 km (189 mi). *Perigee*: 205 km (127 mi). *Inclination*: 72.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 January 30 - . 15:02 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 706** - . *Payload*: Oko #4. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 7625 . *COSPAR*: 1975-007A. *Apogee*: 35,365 km (21,974 mi). *Perigee*: 4,977 km (3,092 mi). *Inclination*: 67.8000 deg. *Period*: 717.60 min. Covered Oko constellation planes 7/8 - 182 degree longitude of ascending node..

1975 February 6 - . 04:49 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-12** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1985-07-04 . *USAF Sat Cat*: 7641 . *COSPAR*: 1975-009A. *Apogee*: 40,746 km (25,318 mi). *Perigee*: 653 km (405 mi). *Inclination*: 62.8000 deg. *Period*: 738.70 min. Decay date suspect Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network. .

1975 February 12 - . 14:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch*

Vehicle: Voskhod 11A57.

- **Cosmos 709** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-02-25 . *USAF Sat Cat*: 7664 . *COSPAR*: 1975-013A. *Apogee*: 310 km (190 mi). *Perigee*: 181 km (112 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 February 26 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 710** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1975-03-12 . *USAF Sat Cat*: 7675 . *COSPAR*: 1975-015A. *Apogee*: 335 km (208 mi). *Perigee*: 176 km (109 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 March 12 - . 08:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 719** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-03-25 . *USAF Sat Cat*: 7691 . *COSPAR*: 1975-018A. *Apogee*: 307 km (190 mi). *Perigee*: 175 km (108 mi). *Inclination*: 65.0000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 March 21 - . 06:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 720** - . *Payload*: Zenit-4MT Mod. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 11.00 days. *Decay Date*: 1975-04-01 . *USAF Sat Cat*: 7696 . *COSPAR*: 1975-019A. *Apogee*: 273 km (169 mi). *Perigee*: 212 km (131 mi). *Inclination*: 62.8000 deg. *Period*: 89.30 min. Military topography satellite; returned film capsule..

1975 March 26 - . 08:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 721** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-04-07 .

USAF Sat Cat: 7705 . *COSPAR*: 1975-020A. *Apogee*: 228 km (141 mi). *Perigee*: 208 km (129 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 721** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1975-04-10 . *USAF Sat Cat*: 7721 . *COSPAR*: 1975-020F. *Apogee*: 215 km (133 mi). *Perigee*: 194 km (120 mi). *Inclination*: 81.3000 deg. *Period*: 88.59 min.

1975 March 27 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 722** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-04-09 . *USAF Sat Cat*: 7709 . *COSPAR*: 1975-021A. *Apogee*: 337 km (209 mi). *Perigee*: 204 km (126 mi). *Inclination*: 71.4000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 April 1 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-21** - . *Payload*: Meteor M no. 21. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 7714 . *COSPAR*: 1975-023A. *Apogee*: 884 km (549 mi). *Perigee*: 853 km (530 mi). *Inclination*: 81.2000 deg. *Period*: 102.30 min. Acquisition of meteorological information needed for use by the weather service. .

1975 April 5 - . 11:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511. *FAILURE*: During second-third stage separation third stage failed to separate from second stage but still ignited.. *Failed Stage*: 3.

- **Soyuz 18-1** - . *Call Sign*: Ural (Urals). *Crew*: Lazarev, Makarov. *Backup Crew*: Klimuk, Sevastyanov. *Payload*: Soyuz 7K-T s/n 39. *Mass*: 6,830 kg (15,050 lb). *Nation*: Russia. *Related Persons*: Klimuk, Lazarev, Makarov, Sevastyanov. *Agency*: RVSN. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 18-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 0.0149 days. *Decay Date*: 1975-04-05 . *Apogee*: 192 km (119 mi).

  Carried Oleg Makarov, Vasili Lazarev for rendezvous with Salyut 4; but during second-third stage seperation third stage failed to separate from second stage but still ignited. The crew demanded that the abort procedures be implemented but ground control could not see the launch vehicle gyrations in their telemetry. Soyuz finally was separated from by ground control command at 192 km, and following a

20.6+ G reentry, the capsule landed in the Altai mountains, tumbled down a mountainside, and snagged in some bushes just short of a precipice. The crew was worried that they may have landed in China and would face internment, but after an hour sitting in the cold next to the capsule, they were discovered by locals speaking Russian. Total flight duration was 1574 km and flight time 21 minutes 27 seconds. Lazarev suffered internal injuries from the high-G reentry and tumble down the mountain side and never flew again. Both cosmonauts were denied their 3000 ruble spaceflight bonus pay and had to apeal all the way to Brezhnev before being paid.

1975 April 14 - . 17:53 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-02** - . *Payload*: Molniya-3 s/n 12. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1988-11-29 . *USAF Sat Cat*: 7738 . *COSPAR*: 1975-029A. *Apogee*: 39,323 km (24,434 mi). *Perigee*: 174 km (108 mi). *Inclination*: 61.9000 deg. *Period*: 700.50 min. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network. .

1975 April 16 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 727** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1975-04-28 . *USAF Sat Cat*: 7742 . *COSPAR*: 1975-030A. *Apogee*: 334 km (207 mi). *Perigee*: 172 km (106 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 April 18 - . 10:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 728** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 11.00 days. *Decay Date*: 1975-04-29 . *USAF Sat Cat*: 7745 . *COSPAR*: 1975-031A. *Apogee*: 311 km (193 mi). *Perigee*: 209 km (129 mi). *Inclination*: 72.8000 deg. *Period*: 89.70 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 728** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1975-05-16 . *USAF Sat Cat*: 7779 . *COSPAR*: 1975-031G. *Apogee*: 313 km (194 mi). *Perigee*: 199 km (123 mi). *Inclination*: 72.8000 deg. *Period*: 89.63 min.

1975 April 24 - . 08:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 730** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1975-05-06 . *USAF Sat Cat*: 7770 . *COSPAR*: 1975-035A. *Apogee*: 234 km (145 mi). *Perigee*: 210 km (130 mi). *Inclination*: 81.3000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 April 29 - . 10:24 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-29** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *USAF Sat Cat*: 7780 . *COSPAR*: 1975-036A. *Apogee*: 38,379 km (23,847 mi). *Perigee*: 1,983 km (1,232 mi). *Inclination*: 63.8000 deg. *Period*: 717.90 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1975 May 21 - . 06:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 731** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-06-02 . *USAF Sat Cat*: 7810 . *COSPAR*: 1975-041A. *Apogee*: 296 km (183 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 731** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1975-06-19 . *USAF Sat Cat*: 7885 . *COSPAR*: 1975-041H. *Apogee*: 286 km (177 mi). *Perigee*: 199 km (123 mi). *Inclination*: 64.9000 deg. *Period*: 89.35 min.

1975 May 24 - . 14:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 18** - . *Call Sign*: Kavkas (Caucasus). *Crew*: Klimuk, Sevastyanov. *Backup Crew*: Kovalyonok, Ponomaryov. *Payload*: Soyuz 7K-T s/n 40. *Mass*: 6,825 kg (15,046 lb). *Nation*: Russia. *Related Persons*: Klimuk, Kovalyonok, Ponomaryov, Sevastyanov. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 18. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T.

Duration: 62.97 days. *Decay Date*: 1975-07-26 . *USAF Sat Cat*: 7818 . *COSPAR*: 1975-044A. *Apogee*: 230 km (140 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.7000 deg. *Period*: 88.60 min. Manned two crew. Docked with Salyut 4. Joint experiments with the Salyut scientific orbital station. The crew remained aloft aboard the station during the Apollo-Soyuz Test Project joint flight..

1975 May 28 - . 07:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 740** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-06-10 . *USAF Sat Cat*: 7821 . *COSPAR*: 1975-046A. *Apogee*: 327 km (203 mi). *Perigee*: 173 km (107 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 May 30 - . 06:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 741** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-06-11 . *USAF Sat Cat*: 7877 . *COSPAR*: 1975-047A. *Apogee*: 231 km (143 mi). *Perigee*: 210 km (130 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min.

  Zenit-2M (area survey photo reconnaissance) satellite used for earth resources studies as part of 'Gektor-Priroda' project. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1975 June 3 - . 13:21 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 742** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1975-06-15 . *USAF Sat Cat*: 7900 . *COSPAR*: 1975-048A. *Apogee*: 355 km (220 mi). *Perigee*: 178 km (110 mi). *Inclination*: 62.9000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 June 5 - . *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz 11A511U2 authorised.** - . *Nation*: Russia. Central Committee of the Communist Party and Council of Soviet Ministers Decree 178 'On development of the 11A511U2 launch vehicle' was issued..

1975 June 5 - . 01:38 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-30** - . *Payload*: Molniya-1 s/n 24. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1987-08-12 . *USAF Sat Cat*: 7903 . *COSPAR*: 1975-049A. *Apogee*: 38,307 km (23,802 mi). *Perigee*: 121 km (75 mi). *Inclination*: 63.4000 deg. *Period*: 679.10 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

- **SRET 2** - . *Payload*: SRET 2 (MAS 2). *Mass*: 30 kg (66 lb). *Nation*: France. *Agency*: CNES. *Class*: Technology. *Type*: Navigation technology satellite. *Spacecraft*: SRET. *Decay Date*: 1988-07-10 . *USAF Sat Cat*: 7910 . *COSPAR*: 1975-049B. *Apogee*: 40,825 km (25,367 mi). *Perigee*: 513 km (318 mi). *Inclination*: 62.8000 deg. *Period*: 737.80 min.

  SRET 2 technological research and study satellite. Launched from Soviet Union with a Soviet launch vehicle with the Molniya satellite. Mass 30 kg. Study of the behaviour of a passive cryogenic radiation system, study of the aging of thermal casings and pl astic films.

1975 June 12 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 743** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-06-25 . *USAF Sat Cat*: 7925 . *COSPAR*: 1975-053A. *Apogee*: 331 km (205 mi). *Perigee*: 181 km (112 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 June 20 - . 06:54 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 744** - . *Payload*: Tselina-D no. 7. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1991-10-12 . *USAF Sat Cat*: 7968 . *COSPAR*: 1975-056A. *Apogee*: 380 km (230 mi). *Perigee*: 367 km (228 mi). *Inclination*: 81.2000 deg. *Period*: 92.00 min.

1975 June 25 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 746** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-07-08 . *USAF Sat Cat*: 7985 . *COSPAR*: 1975-059A. *Apogee*: 325 km (201 mi). *Perigee*: 180 km (110 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 June 27 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 747** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-07-09 . *USAF Sat Cat*: 7990 . *COSPAR*: 1975-060A. *Apogee*: 280 km (170 mi). *Perigee*: 204 km (126 mi). *Inclination*: 62.8000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 747** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1975-07-17 . *USAF Sat Cat*: 8013 . *COSPAR*: 1975-060F. *Apogee*: 281 km (174 mi). *Perigee*: 188 km (116 mi). *Inclination*: 62.8000 deg. *Period*: 89.19 min.

1975 July 3 - . 13:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 748** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-07-16 . *USAF Sat Cat*: 8006 . *COSPAR*: 1975-061A. *Apogee*: 303 km (188 mi). *Perigee*: 190 km (110 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 July 8 - . 05:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-13** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *USAF Sat Cat*: 8015 . *COSPAR*: 1975-063A. *Apogee*: 38,492 km (23,917 mi). *Perigee*: 1,887 km (1,172 mi). *Inclination*: 63.9000 deg. *Period*: 718.30 min. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network. .

1975 July 11 - . 04:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 2-01** - . *Payload*: Meteor-2 no. 1. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-2. *USAF Sat Cat*: 8026 . *COSPAR*: 1975-064A. *Apogee*: 876 km (544 mi). *Perigee*: 844 km (524 mi). *Inclination*: 81.3000 deg. *Period*: 102.20 min. Acquisition of meteorological information needed for use by the weather service. .

1975 July 15 - . 12:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 19 (ASTP)** - . *Call Sign*: Soyuz (Union). *Crew*: Kubasov, Leonov. *Backup Crew*: Filipchenko, Rukavishnikov. *Support Crew*: Andreyev, Dzhanibekov, Ivanchenkov, Romanenko. *Payload*: Soyuz ASTP s/n 75 (EPSA). *Mass*: 6,790 kg (14,960 lb). *Nation*: Russia. *Related Persons*: Andreyev, Dzhanibekov, Filipchenko, Ivanchenkov, Kubasov, Leonov, Romanenko, Rukavishnikov. *Agency*: MOM. *Program*: ASTP. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Apollo (ASTP), Soyuz 19 (ASTP). *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-TM. *Duration*: 5.94 days. *Decay Date*: 1975-07-21 . *USAF Sat Cat*: 8030 . *COSPAR*: 1975-065A. *Apogee*: 220 km (130 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.8000 deg. *Period*: 88.50 min.

  Soyuz 19 initial orbital parameters were 220.8 by 185.07 kilometres, at the desired inclination of 51.80, while the period of the first orbit was 88.6 minutes. On 17 July the two spacecraft docked. The crew members rotated between the two spacecraft and conducted various mainly ceremonial activities. Leonov was on the American side for 5 hours, 43 minutes, while Kubasov spent 4:57 in the command and docking modules.

  After being docked for nearly 44 hours, Apollo and Soyuz parted for the first time and were station-keeping at a range of 50 meters. The Apollo crew placed its craft between Soyuz and the sun so that the diameter of the service module formed a disk which blocked out the sun. After this experiment Apollo moved towards Soyuz for the second docking.

  Three hours later Apollo and Soyuz undocked for the second and final time. The spacecraft moved to a 40 m station-keeping distance so that an ultraviolet absorption experiment could be performed. With all the joint flight activities completed, the ships went on their separate ways.

1975 July 23 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 751** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-08-04 . *USAF Sat Cat*: 8040 . *COSPAR*: 1975-068A. *Apogee*: 313 km (194 mi). *Perigee*: 197

km (122 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule..

1975 July 31 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 753** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-08-13 . *USAF Sat Cat*: 8059 . *COSPAR*: 1975-071A. *Apogee*: 330 km (200 mi). *Perigee*: 181 km (112 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 August 13 - . 07:21 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 754** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-08-26 . *USAF Sat Cat*: 8069 . *COSPAR*: 1975-073A. *Apogee*: 326 km (202 mi). *Perigee*: 204 km (126 mi). *Inclination*: 71.4000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 August 22 - . 02:11 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 756** - . *Payload*: Tselina-D no. 8. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1992-11-05 . *USAF Sat Cat*: 8127 . *COSPAR*: 1975-076A. *Apogee*: 403 km (250 mi). *Perigee*: 394 km (244 mi). *Inclination*: 81.2000 deg. *Period*: 92.50 min.

1975 August 27 - . 14:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 757** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-09-09 . *USAF Sat Cat*: 8147 . *COSPAR*: 1975-078A. *Apogee*: 316 km (196 mi). *Perigee*: 182 km (113 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 September 2 - . 13:09 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-31** - . *Payload*: Molniya-1. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1. *Decay Date*: 1985-11-19 . *USAF Sat Cat*: 8187 . *COSPAR*: 1975-079A. *Apogee*: 40,598 km (25,226 mi). *Perigee*: 633 km (393 mi). *Inclination*: 62.9000 deg. *Period*: 735.60 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1975 September 5 - . 14:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 758** - . *Payload*: Yantar-2K s/n 3. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 1.00 days. *Decay Date*: 1975-09-25 . *USAF Sat Cat*: 8191 . *COSPAR*: 1975-080A. *Apogee*: 326 km (202 mi). *Perigee*: 174 km (108 mi). *Inclination*: 67.1000 deg. *Period*: 89.50 min.

  Third Yantar-2K second generation reconnaissance flight, the first with the new Kondor attitude control system. This system experienced problems and failed on the second day of flight. The spacecraft's destruct package was activated by ground command and the spacecraft was destroyed on 6 September 1975 in its second day of flight.

1975 September 9 - . 00:19 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-14** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *USAF Sat Cat*: 8195 . *COSPAR*: 1975-081A. *Apogee*: 38,534 km (23,943 mi). *Perigee*: 1,840 km (1,140 mi). *Inclination*: 64.0000 deg. *Period*: 718.20 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1975 September 12 - . 05:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 759** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 11.00 days. *Decay Date*: 1975-09-23 . *USAF Sat Cat*: 8275 . *COSPAR*: 1975-084A. *Apogee*: 276 km (171 mi). *Perigee*: 231 km (143 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. Military topography satellite;

returned film capsule; separated science capsule..

1975 September 16 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 760** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1975-09-30 . *USAF Sat Cat*: 8281 . *COSPAR*: 1975-085A. *Apogee*: 335 km (208 mi). *Perigee*: 174 km (108 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 September 18 - . 00:12 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-22** - . *Payload*: Meteor M no. 22. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 8293 . *COSPAR*: 1975-087A. *Apogee*: 909 km (564 mi). *Perigee*: 800 km (490 mi). *Inclination*: 81.3000 deg. *Period*: 102.00 min. Acquisition of meteorological information needed for use by the weather service. .

1975 September 23 - . 10:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 769** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-10-05 . *USAF Sat Cat*: 8322 . *COSPAR*: 1975-088A. *Apogee*: 307 km (190 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.8000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule. Third successful test of SpK small film return capsule planned for Yantar. SpK capsule FEU-170-13 No. 5L successfully recovered..

- **Cosmos 769 Nauka** - . *Payload*: FEU-170-13 s/n 5L. *Nation*: Russia. *Agency*: RVSN. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Nauka. *COSPAR*: 1975-088xx.

1975 September 25 - . 09:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 771** - . *Payload*: Zenit-4MKT no. 1. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1975-10-08 . *USAF Sat Cat*: 8327 . *COSPAR*: 1975-090A.

Apogee: 219 km (136 mi). *Perigee*: 203 km (126 mi). *Inclination*: 81.3000 deg. *Period*: 88.70 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1975 September 29 - . 04:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 772** - . *Payload*: Soyuz 7K-S s/n 2L. *Mass*: 6,750 kg (14,880 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-S. *Duration*: 3.99 days. *Decay Date*: 1975-10-02 . *USAF Sat Cat*: 8338 . *COSPAR*: 1975-093A. *Apogee*: 245 km (152 mi). *Perigee*: 154 km (95 mi). *Inclination*: 51.8000 deg. *Period*: 88.40 min.

  Unmanned military Soyuz 7K-S test flight. Recovered October 3, 1975 4:10 GMT. Unsuccessful mission. Transmitted only on 166 MHz frequency, at none of the other usual Soyuz wavelengths.
  Maneuver Summary:
  193 km X 270 km orbit to 195 km X 300 km orbit. Delta V: 8 m/s
  196 km X 300 km orbit to 196 km X 328 km orbit. Delta V: 8 m/s
  Total Delta V: 16 m/s

1975 October 1 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 774** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1975-10-15 . *USAF Sat Cat*: 8345 . *COSPAR*: 1975-095A. *Apogee*: 315 km (195 mi). *Perigee*: 204 km (126 mi). *Inclination*: 71.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 October 17 - . 14:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 776** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-10-29 . *USAF Sat Cat*: 8369 . *COSPAR*: 1975-101A. *Apogee*: 288 km (178 mi). *Perigee*: 200 km (120 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 776** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1975-11-01 . *USAF Sat Cat*: 8412 . *COSPAR*: 1975-101D. *Apogee*: 272 km (169 mi). *Perigee*: 194 km (120 mi). *Inclination*: 62.8000 deg. *Period*: 89.16 min.

1975 November 4 - . 15:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 779** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1975-11-18 . *USAF Sat Cat*: 8420 . *COSPAR*: 1975-104A. *Apogee*: 341 km (211 mi). *Perigee*: 182 km (113 mi). *Inclination*: 62.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 November 14 - . 19:14 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-03** - . *Payload*: Molniya-3 s/n 13. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 8425 . *COSPAR*: 1975-105A. *Apogee*: 38,527 km (23,939 mi). *Perigee*: 1,823 km (1,132 mi). *Inclination*: 63.9000 deg. *Period*: 717.70 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1975 November 17 - . 14:36 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 20** - . *Payload*: Soyuz 7K-T(A9) s/n 64. *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T/A9. *Duration*: 90.49 days. *Decay Date*: 1976-02-16 . *USAF Sat Cat*: 8430 . *COSPAR*: 1975-106A. *Apogee*: 251 km (155 mi). *Perigee*: 184 km (114 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Unmanned long duration test of the Soyuz transport vehicle; docked with Salyut 4. Recovered February 16, 1976 2:24 GMT. Comprehensive checking of improved on-board systems of the space craft under various flight conditions. Carried a biological payload. Living organisms were exposed to three months in space.

1975 November 21 - . 09:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 780** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-12-03 . *USAF Sat Cat*: 8442 . *COSPAR*: 1975-108A. *Apogee*: 278 km (172 mi). *Perigee*: 201

km (124 mi). *Inclination*: 65.0000 deg. *Period*: 89.30 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 780** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1975-12-11 . *USAF Sat Cat*: 8460 . *COSPAR*: 1975-108D. *Apogee*: 268 km (166 mi). *Perigee*: 197 km (122 mi). *Inclination*: 65.0000 deg. *Period*: 89.15 min.

1975 November 25 - . 17:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 782** - . *Payload*: Bion no. 3. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 19.50 days. *Decay Date*: 1975-12-15 . *USAF Sat Cat*: 8450 . *COSPAR*: 1975-110A. *Apogee*: 384 km (238 mi). *Perigee*: 218 km (135 mi). *Inclination*: 62.8000 deg. *Period*: 90.50 min.

  Biological research. Continued investigation of the effects of space flight on living organisms. Capsule recovered 52 deg 17 min N, 64 deg 11 min E. The Cosmos 782 mission marked the first time that the United States participated in the Soviet Cosmos Program. Scientists from France, Czechoslovakia, Hungary, Poland, Romania, the U.S. and the U.S.S.R. participated in these investigations. *Additional Details*: here....

1975 December 3 - . 10:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 784** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1975-12-15 . *USAF Sat Cat*: 8463 . *COSPAR*: 1975-113A. *Apogee*: 231 km (143 mi). *Perigee*: 215 km (133 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 784** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1975-12-21 . *USAF Sat Cat*: 8485 . *COSPAR*: 1975-113G. *Apogee*: 217 km (134 mi). *Perigee*: 204 km (126 mi). *Inclination*: 81.3000 deg. *Period*: 88.71 min.

1975 December 16 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 786** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1975-12-29 . *USAF Sat Cat*: 8489 . *COSPAR*: 1975-120A. *Apogee*: 325 km (201 mi). *Perigee*: 184 km (114

mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1975 December 17 - . 11:06 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-15** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1987-03-07 . *USAF Sat Cat*: 8492 . *COSPAR*: 1975-121A. *Apogee*: 24,113 km (14,983 mi). *Perigee*: 103 km (64 mi). *Inclination*: 62.8000 deg. *Period*: 416.90 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1975 December 22 - . 02:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Prognoz 4** - . *Payload*: SO-M s/n 504. *Mass*: 905 kg (1,995 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *Decay Date*: 1977-12-31 . *USAF Sat Cat*: 8510 . *COSPAR*: 1975-122A. *Apogee*: 199,000 km (123,000 mi). *Perigee*: 634 km (393 mi). *Inclination*: 65.0000 deg. *Period*: 5,740.00 min.

  Investigation of the corpuscular and electromagnetic radiation of the sun and of solar plasma fluxes, study of the magnetic fields in circumterrestrial space in order to determine the effects of solar activity on the interplanetary medium and in the magne tosphere of the earth.

1975 December 25 - . 19:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-23** - . *Payload*: Meteor M no. 23. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 8519 . *COSPAR*: 1975-124A. *Apogee*: 868 km (539 mi). *Perigee*: 850 km (520 mi). *Inclination*: 81.2000 deg. *Period*: 102.10 min. Acquisition of meteorological information needed for use by the weather service. .

1975 December 27 - . 10:22 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-04** - . *Payload*: Molniya-3 no. s/n 15. *Mass*: 1,600 kg (3,500 lb). *Nation*:

Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1986-08-12 . *USAF Sat Cat*: 8521 . *COSPAR*: 1975-125A. *Apogee*: 40,708 km (25,294 mi). *Perigee*: 452 km (280 mi). *Inclination*: 62.8000 deg. *Period*: 733.80 min.

Decay date suspect Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1976 January 7 - . 15:35 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 788** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-01-20 . *USAF Sat Cat*: 8551 . *COSPAR*: 1976-002A. *Apogee*: 321 km (199 mi). *Perigee*: 183 km (113 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 January 22 - . 11:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-32** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 8601 . *COSPAR*: 1976-006A. *Apogee*: 38,210 km (23,740 mi). *Perigee*: 2,247 km (1,396 mi). *Inclination*: 63.6000 deg. *Period*: 719.80 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1976 January 29 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 799** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1976-02-10 . *USAF Sat Cat*: 8616 . *COSPAR*: 1976-009A. *Apogee*: 306 km (190 mi). *Perigee*: 205 km (127 mi). *Inclination*: 71.4000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule..

1976 February 11 - . 08:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 802** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1976-02-25 . *USAF Sat Cat*: 8681 . *COSPAR*: 1976-013A. *Apogee*: 334 km (207 mi). *Perigee*: 172 km (106 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 February 20 - . 14:01 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 805** - . *Payload*: Yantar-2K s/n 4. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 20.00 days. *Decay Date*: 1976-03-11 . *USAF Sat Cat*: 8699 . *COSPAR*: 1976-018A. *Apogee*: 351 km (218 mi). *Perigee*: 171 km (106 mi). *Inclination*: 67.1000 deg. *Period*: 89.70 min.

  Fourth Yantar-2K second generation reconnaissance flight and the first with two SpK small film recovery capsules. First flight of the completely equipped satellite. The main reentry capsule and its film cargo were returned successfully. Both SpK capsules successfully separated from the Yantar in the course of the flight, but neither was recovered. The parachutes of the first did not deploy and the capsule crashed into the ground. The solid motor of the second capsule did not fire as programmed and the capsule did not deorbit at the expected time.

1976 March 10 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 806** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-03-23 . *USAF Sat Cat*: 8737 . *COSPAR*: 1976-020A. *Apogee*: 328 km (203 mi). *Perigee*: 188 km (116 mi). *Inclination*: 71.4000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 March 11 - . 19:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-33** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1990-10-10 . *USAF Sat Cat*: 8741 . *COSPAR*: 1976-021A. *Apogee*: 37,773 km (23,471 mi). *Perigee*: 151 km (93 mi). *Inclination*: 62.6000 deg. *Period*: 669.10 min.

Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme). Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T.

1976 March 16 - . 17:22 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 808** - . *Payload*: Tselina-D no. 9. *Mass*: 3,000 kg (6,600 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1993-11-20 . *USAF Sat Cat*: 8754 . *COSPAR*: 1976-024A. *Apogee*: 370 km (220 mi). *Perigee*: 363 km (225 mi). *Inclination*: 81.2000 deg. *Period*: 91.90 min.

1976 March 18 - . 09:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 809** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1976-03-30 . *USAF Sat Cat*: 8758 . *COSPAR*: 1976-025A. *Apogee*: 300 km (180 mi). *Perigee*: 205 km (127 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule..

1976 March 19 - . 19:31 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-34** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1985-05-14 . *USAF Sat Cat*: 8762 . *COSPAR*: 1976-026A. *Apogee*: 39,722 km (24,682 mi). *Perigee*: 617 km (383 mi). *Inclination*: 62.7000 deg. *Period*: 717.40 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1976 March 26 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 810** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok.

Spacecraft: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-04-08 . *USAF Sat Cat*: 8772 . *COSPAR*: 1976-028A. *Apogee*: 338 km (210 mi). *Perigee*: 181 km (112 mi). *Inclination*: 62.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 March 31 - . 12:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511M.

- **Cosmos 811** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1976-04-12 . *USAF Sat Cat*: 8781 . *COSPAR*: 1976-030A. *Apogee*: 338 km (210 mi). *Perigee*: 206 km (128 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Military topography satellite; returned film capsule; also performed mapping, geodesy, earth resources; deployed capsule..

1976 April 7 - . 13:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-24** - . *Payload*: Meteor M s/n 37. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 8799 . *COSPAR*: 1976-032A. *Apogee*: 881 km (547 mi). *Perigee*: 832 km (516 mi). *Inclination*: 81.3000 deg. *Period*: 102.10 min. Acquisition of meteorological information needed for use by the weather service. .

1976 April 9 - . 08:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 813** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1976-04-21 . *USAF Sat Cat*: 8801 . *COSPAR*: 1976-033A. *Apogee*: 236 km (146 mi). *Perigee*: 209 km (129 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min. Area survey photo reconnaissance satellite; returned film capsule..

1976 April 28 - . 09:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 815** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-05-11 . *USAF Sat Cat*: 8811 . *COSPAR*: 1976-036A. *Apogee*: 231 km (143 mi). *Perigee*: 218 km (135 mi). *Inclination*: 81.3000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 May 5 - . 07:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 817** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-05-18 . *USAF Sat Cat*: 8823 . *COSPAR*: 1976-040A. *Apogee*: 324 km (201 mi). *Perigee*: 173 km (107 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 May 12 - . 17:57 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-05** - . *Payload*: Molniya-3 s/n 16. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1990-04-14 . *USAF Sat Cat*: 8833 . *COSPAR*: 1976-041A. *Apogee*: 37,589 km (23,356 mi). *Perigee*: 93 km (57 mi). *Inclination*: 62.1000 deg. *Period*: 664.30 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1976 May 15 - . 13:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-25** - . *Payload*: Meteor-Priroda s/n 2-1. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-Priroda. *USAF Sat Cat*: 8845 . *COSPAR*: 1976-043A. *Apogee*: 884 km (549 mi). *Perigee*: 829 km (515 mi). *Inclination*: 81.3000 deg. *Period*: 102.10 min. Continuation of experimental work in studying the natural resources of the earth..

1976 May 20 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 819** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 11.00 days. *Decay Date*: 1976-06-01 . *USAF Sat Cat*: 8853 . *COSPAR*: 1976-045A. *Apogee*: 293 km (182 mi). *Perigee*: 207 km (128 mi). *Inclination*: 64.9000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule..

1976 May 21 - . 07:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3.

LV Family: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 820** - . *Payload*: Zenit-4MKT no. 2. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 12.00 days. *Decay Date*: 1976-06-02 . *USAF Sat Cat*: 8856 . *COSPAR*: 1976-046A. *Apogee*: 217 km (134 mi). *Perigee*: 209 km (129 mi). *Inclination*: 81.4000 deg. *Period*: 88.80 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1976 May 26 - . 09:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 821** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-06-08 . *USAF Sat Cat*: 8862 . *COSPAR*: 1976-048A. *Apogee*: 314 km (195 mi). *Perigee*: 204 km (126 mi). *Inclination*: 72.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 June 8 - . 07:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 824** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-06-21 . *USAF Sat Cat*: 8877 . *COSPAR*: 1976-052A. *Apogee*: 325 km (201 mi). *Perigee*: 204 km (126 mi). *Inclination*: 71.4000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 June 16 - . 13:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 833** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-06-29 . *USAF Sat Cat*: 8898 . *COSPAR*: 1976-055A. *Apogee*: 316 km (196 mi). *Perigee*: 180 km (110 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 June 24 - . 07:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 834** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1976-07-06 . *USAF Sat Cat*: 8914 . *COSPAR*: 1976-058A. *Apogee*: 237 km (147 mi). *Perigee*: 216 km (134 mi). *Inclination*: 81.4000 deg. *Period*: 89.10 min. Area survey photo reconnaissance satellite; returned film capsule..

1976 June 29 - . 07:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Voskhod 11A57.

- **Cosmos 835** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-07-12 . *USAF Sat Cat*: 8922 . *COSPAR*: 1976-060A. *Apogee*: 317 km (196 mi). *Perigee*: 174 km (108 mi). *Inclination*: 65.0000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 July 1 - . 08:06 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: Fourth stage failure.. *Failed Stage*: U.

- **Cosmos 837** - . *Payload*: Molniya-2 s/n 27. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1983-11-18 . *USAF Sat Cat*: 8927 . *COSPAR*: 1976-062A. *Apogee*: 936 km (581 mi). *Perigee*: 438 km (272 mi). *Inclination*: 62.8000 deg. *Period*: 98.50 min. Failed Molniya..

1976 July 6 - . 12:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 21** - . *Call Sign*: Baikal (Baikal - lake in Siberia). *Crew*: Volynov, Zholobov. *Backup Crew*: Rozhdestvensky, Zudov. *Support Crew*: Berezovoi, Glazkov, Gorbatko, Lisun. *Payload*: Soyuz 7K-T(A9) s/n 41. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Berezovoi, Glazkov, Gorbatko, Lisun, Rozhdestvensky, Volynov, Zholobov, Zudov. *Agency*: MOM. *Program*: Almaz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 21. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T/A9. *Duration*: 49.27 days. *Decay Date*: 1976-08-24 . *USAF Sat Cat*: 8934 . *COSPAR*: 1976-064A. *Apogee*: 274 km (170 mi). *Perigee*: 246 km (152 mi). *Inclination*: 51.6000 deg. *Period*: 89.70 min.

  Soyuz 21 with Volynov and Zholobov aboard hard-docked with the station on 6 July 1976 after failure of the Igla system at the last stage of rendezvous. Towards the end of the two month mission an early return to earth was requested due to the poor condition of flight engineer Zholobov (who was suffering from space sickness and psychological problems).

1976 July 14 - . 09:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 840** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1976-07-26 . *USAF Sat Cat*: 9019 . *COSPAR*: 1976-068A. *Apogee*: 319 km (198 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.9000 deg. *Period*: 89.70 min. Area survey photo reconnaissance satellite; returned film capsule..

1976 July 22 - . 15:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 844** - . *Payload*: Yantar-2K s/n 5. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 3.00 days. *Decay Date*: 1976-08-30 . *USAF Sat Cat*: 9046 . *COSPAR*: 1976-072A. *Apogee*: 353 km (219 mi). *Perigee*: 172 km (106 mi). *Inclination*: 67.2000 deg. *Period*: 89.80 min. Fifth Yantar second generation reconnaissance test flight. One of the solar panels would not unfold. Ground control activiated the destruct package and the spacecraft was destroyed on 25 July..

1976 July 23 - . 15:49 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-35** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1987-05-29 . *USAF Sat Cat*: 9049 . *COSPAR*: 1976-074A. *Apogee*: 38,911 km (24,178 mi). *Perigee*: 483 km (300 mi). *Inclination*: 62.9000 deg. *Period*: 698.40 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1976 August 4 - . 13:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 847** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-08-17 . *USAF Sat Cat*: 9214 . *COSPAR*: 1976-079A. *Apogee*: 321 km (199 mi). *Perigee*: 181 km (112 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance

satellite; returned film capsule; maneuverable..

1976 August 12 - . 13:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 848** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1976-08-25 . *USAF Sat Cat*: 9280 . *COSPAR*: 1976-082A. *Apogee*: 303 km (188 mi). *Perigee*: 206 km (128 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 848** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1976-09-01 . *USAF Sat Cat*: 9374 . *COSPAR*: 1976-082D. *Apogee*: 280 km (170 mi). *Perigee*: 199 km (123 mi). *Inclination*: 62.8000 deg. *Period*: 89.29 min.

1976 August 27 - . 14:35 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 851** - . *Payload*: Tselina-D no. 10. *Mass*: 3,000 kg (6,600 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1989-08-05 . *USAF Sat Cat*: 9389 . *COSPAR*: 1976-085A. *Apogee*: 313 km (194 mi). *Perigee*: 300 km (180 mi). *Inclination*: 81.2000 deg. *Period*: 90.70 min.

1976 August 28 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 852** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-09-10 . *USAF Sat Cat*: 9391 . *COSPAR*: 1976-086A. *Apogee*: 332 km (206 mi). *Perigee*: 173 km (107 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 September 1 - . 03:23 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: Fourth stage failure.. *Failed Stage*: U.

- **Cosmos 853** - . *Payload*: Molniya-2 s/n 26. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1976-12-31 . *USAF Sat Cat*: 9398 . *COSPAR*: 1976-088A. *Apogee*: 461 km (286 mi). *Perigee*: 243 km (150 mi). *Inclination*: 62.8000 deg. *Period*: 91.60 min. Failed

Molniya..

1976 September 3 - . 09:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 854** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-09-16 . *USAF Sat Cat*: 9405 . *COSPAR*: 1976-090A. *Apogee*: 308 km (191 mi). *Perigee*: 167 km (103 mi). *Inclination*: 81.4000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 September 15 - . 09:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 22** - . *Call Sign*: Yastreb (Hawk). *Crew*: Aksyonov, Bykovsky. *Backup Crew*: Malyshev, Strekalov. *Support Crew*: Andreyev, Popov. *Payload*: Soyuz ASTP s/n 74 modified with MF6 camera. *Mass*: 6,510 kg (14,350 lb). *Nation*: Russia. *Related Persons*: Aksyonov, Andreyev, Bykovsky, Malyshev, Popov, Strekalov. *Agency*: MOM. *Program*: ASTP. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 22. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-MF6. *Duration*: 7.91 days. *Decay Date*: 1976-09-23 . *USAF Sat Cat*: 9421 . *COSPAR*: 1976-093A. *Apogee*: 296 km (183 mi). *Perigee*: 185 km (114 mi). *Inclination*: 64.8000 deg. *Period*: 89.30 min.

  Surplus Soyuz ASTP spacecraft modified with a multi-spectral camera manufactured by Carl Zeiss-Jena in place of the universal docking apparatus. Eight days were spent photographing the earth. Tested and perfected scientific-technical methods and devices for studying the geological characteristics of the earth's surface from outer space for economic purposes.

1976 September 21 - . 11:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 855** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1976-10-03 . *USAF Sat Cat*: 9433 . *COSPAR*: 1976-095A. *Apogee*: 321 km (199 mi). *Perigee*: 221 km (137 mi). *Inclination*: 72.9000 deg. *Period*: 89.90 min. Military topography satellite; returned film capsule; also performed mapping, geodesy, earth resources; deployed capsule..

1976 September 22 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 856** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1976-10-05 . *USAF Sat Cat*: 9435 . *COSPAR*: 1976-096A. *Apogee*: 300 km (180 mi). *Perigee*: 203 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 856** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1976-10-16 . *USAF Sat Cat*: 9448 . *COSPAR*: 1976-096E. *Apogee*: 290 km (180 mi). *Perigee*: 199 km (123 mi). *Inclination*: 65.0000 deg. *Period*: 89.39 min.

1976 September 24 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 857** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1976-10-07 . *USAF Sat Cat*: 9439 . *COSPAR*: 1976-097A. *Apogee*: 331 km (205 mi). *Perigee*: 177 km (109 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 October 4 - . 11:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Launch vehicle destroyed at T+95 seconds.. *Failed Stage*: 0.

- **Zenit-4MKT no. 3** - . *Payload*: Zenit-4MKT no. 3. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1976 October 10 - . 09:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 859** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 11.00 days. *Decay Date*: 1976-10-21 . *USAF Sat Cat*: 9471 . *COSPAR*: 1976-099A. *Apogee*: 337 km (209 mi). *Perigee*: 173 km (107 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable; also performed earth resources tasks..

1976 October 14 - . 17:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz 11A511.

- **Soyuz 23** - . *Call Sign*: Radon (Radon). *Crew*: Rozhdestvensky, Zudov. *Backup Crew*: Glazkov, Gorbatko. *Support Crew*: Berezovoi, Lisun. *Payload*: Soyuz 7K-T(A9) s/n 65. *Mass*: 6,760 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Berezovoi, Glazkov, Gorbatko, Lisun, Rozhdestvensky, Zudov. *Agency*: MOM. *Program*: Almaz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 23. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T/A9. *Duration*: 2.00 days. *Decay Date*: 1976-10-16 . *USAF Sat Cat*: 9477 . *COSPAR*: 1976-100A. *Apogee*: 269 km (167 mi). *Perigee*: 239 km (148 mi). *Inclination*: 51.6000 deg. *Period*: 89.50 min.

  The Soyuz 23 ferry spacecraft suffered a docking system failure. Sensors indicated an incorrect lateral velocity, causing unnecessary firing of the thrusters during rendezvous. The automatic system was turned off, but no fuel remained for a manual docking by the crew.

1976 October 15 - . 22:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-26** - . *Payload*: Meteor M no. 26. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 9481 . *COSPAR*: 1976-102A. *Apogee*: 887 km (551 mi). *Perigee*: 836 km (519 mi). *Inclination*: 81.3000 deg. *Period*: 102.20 min. Acquisition of meteorological information needed for use by the weather service. .

1976 October 22 - . 09:12 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 862** - . *Payload*: Oko #5. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 9495 . *COSPAR*: 1976-105A. *Apogee*: 36,759 km (22,840 mi). *Perigee*: 3,620 km (2,240 mi). *Inclination*: 68.3000 deg. *Period*: 718.30 min. Covered Oko constellation plane 5 - 86 degree longitude of ascending node..

1976 October 25 - . 14:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 863** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 11.00 days. *Decay Date*: 1976-11-05 . *USAF Sat Cat*: 9499 . *COSPAR*: 1976-106A. *Apogee*: 348 km (216 mi). *Perigee*: 178 km (110 mi). *Inclination*: 62.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 November 1 - . 11:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 865** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1976-11-13 . *USAF Sat Cat*: 9515 . *COSPAR*: 1976-109A. *Apogee*: 326 km (202 mi). *Perigee*: 203 km (126 mi). *Inclination*: 72.9000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 865** - . *Payload*: MKA?. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1977-02-10 . *USAF Sat Cat*: 9525 . *COSPAR*: 1976-109G. *Apogee*: 431 km (267 mi). *Perigee*: 214 km (132 mi). *Inclination*: 72.8000 deg. *Period*: 90.98 min.

1976 November 11 - . 10:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 866** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1976-11-23 . *USAF Sat Cat*: 9532 . *COSPAR*: 1976-110A. *Apogee*: 287 km (178 mi). *Perigee*: 180 km (110 mi). *Inclination*: 65.0000 deg. *Period*: 89.20 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 November 23 - . 16:27 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 867** - . *Payload*: Zenit-6 no. 1. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 12.00 days. *Decay Date*: 1976-12-06 . *USAF Sat Cat*: 9552 . *COSPAR*: 1976-111A. *Apogee*: 402 km (249 mi). *Perigee*: 250 km (150 mi). *Inclination*: 62.8000 deg. *Period*: 91.10 min. Photo surveillance; returned film capsule..

1976 November 25 - . 03:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Prognoz 5** - . *Payload*: SO-M s/n 505. *Mass*: 930 kg (2,050 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *Decay Date*: 1979-07-12 . *USAF Sat Cat*: 9557 . *COSPAR*: 1976-112A. *Apogee*: 198,560 km (123,370 mi). *Perigee*: 777 km (482 mi). *Inclination*: 65.2000 deg. *Period*: 5,728.00 min.

  Investigation of the corpuscular and electromagnetic radiation of the sun and of solar plasma fluxes, study of the magnetic fields in circumterrestrial space in order to determine the effects of solar activity on the interplanetary medium and in the magne tosphere of the earth.

1976 November 29 - . 16:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 869** - . *Payload*: Soyuz 7K-S s/n 3L. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-S. *Duration*: 17.77 days. *Decay Date*: 1976-12-17 . *USAF Sat Cat*: 9564 . *COSPAR*: 1976-114A. *Apogee*: 289 km (179 mi). *Perigee*: 209 km (129 mi). *Inclination*: 51.7000 deg. *Period*: 89.40 min.

  Unmanned military Soyuz 7K-S test flight. Recovered December 17, 1976 10:31 GMT. Transmitted only on 20.008 MHz and 166 MHz frequencies, at none of the other usual Soyuz wavelengths.
  Maneuver Summary:
  196 km X 290 km orbit to 187 km X 335 km orbit. Delta V: 15 m/s
  187 km X 335 km orbit to 259 km X 335 km orbit. Delta V: 21 m/s
  259 km X 335 km orbit to 260 km X 345 km orbit. Delta V: 2 m/s
  260 km X 345 km orbit to 265 km X 368 km orbit. Delta V: 7 m/s
  265 km X 368 km orbit to 267 km X 391 km orbit. Delta V: 6 m/s
  267 km X 391 km orbit to 300 km X 310 km orbit. Delta V: 32 m/s
  Total Delta V: 83 m/s

1976 December 2 - . 02:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-16** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *Decay Date*: 1991-02-21 . *USAF Sat Cat*: 9574 . *COSPAR*: 1976-116A. *Apogee*: 36,437 km (22,640 mi). *Perigee*: 85 km (52 mi). *Inclination*: 62.0000 deg. *Period*: 641.50 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1976 December 9 - . 10:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 879** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1976-12-22 . *USAF Sat Cat*: 9599 . *COSPAR*: 1976-119A. *Apogee*: 225 km (139 mi). *Perigee*: 213 km (132 mi). *Inclination*: 81.4000 deg. *Period*: 88.90 min. Area survey photo reconnaissance satellite; returned film capsule..

1976 December 17 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 884** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 12.00 days. *Decay Date*: 1976-12-29 . *USAF Sat Cat*: 9614 . *COSPAR*: 1976-123A. *Apogee*: 345 km (214 mi). *Perigee*: 169 km (105 mi). *Inclination*: 65.1000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1976 December 28 - . 06:38 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-06** - . *Payload*: Molniya-3 s/n 17. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1990-02-06 . *USAF Sat Cat*: 9635 . *COSPAR*: 1976-127A. *Apogee*: 13,594 km (8,446 mi). *Perigee*: 426 km (264 mi). *Inclination*: 59.5000 deg. *Period*: 257.00 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1977 January 6 - . 09:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 888** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1977-01-19 . *USAF Sat Cat*: 9658 . *COSPAR*: 1977-001A. *Apogee*: 325 km (201 mi). *Perigee*: 170 km (100 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 January 6 - . 23:17 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 2-02** - . *Payload*: Meteor-2 no. 2. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-2. *USAF Sat Cat*: 9661 . *COSPAR*: 1977-002A. *Apogee*: 893 km (554 mi). *Perigee*: 876 km (544 mi). *Inclination*: 81.3000 deg. *Period*: 102.70 min. Acquisition of meteorological information needed for use by the weather service..

1977 January 20 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 889** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1977-02-01 . *USAF Sat Cat*: 9735 . *COSPAR*: 1977-003A. *Apogee*: 329 km (204 mi). *Perigee*: 202 km (125 mi). *Inclination*: 71.4000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite; returned film capsule..

1977 February 7 - . 16:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 24** - . *Call Sign*: Terek (Terek - river in the Caucasus). *Crew*: Glazkov, Gorbatko. *Backup Crew*: Berezovoi, Lisun. *Support Crew*: Kozelsky, Preobrazhensky. *Payload*: Soyuz 7K-T(A9) s/n 66. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Berezovoi, Glazkov, Gorbatko, Kozelsky, Lisun, Preobrazhensky. *Agency*: MOM. *Program*: Almaz. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 24. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T/A9. *Duration*: 17.73 days. *Decay Date*: 1977-02-25 . *USAF Sat Cat*: 9804 . *COSPAR*: 1977-008A. *Apogee*: 264 km (164 mi). *Perigee*: 226 km (140 mi). *Inclination*: 51.6000 deg. *Period*: 89.30 min.

  Soyuz 24 docked with Salyut 5 and brought repair equipment and equipment for a change of cabin atmosphere. This special apparatus was designed to allow the entire station to be vented through the EVA airlock. Because of this the planned EVA was cancelled. However analysis after arrival showed no toxins in the air. The crew changed the cabin air anyway, then returned to earth. The mission, although a short 18 days, was characterised as a busy and successful mission, accomplishing nearly as much as the earlier Soyuz 21's 50 day mission.

1977 February 9 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 892** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1977-02-22 . *USAF Sat Cat*: 9812 . *COSPAR*: 1977-009A. *Apogee*: 427 km (265 mi). *Perigee*: 159 km (98 mi). *Inclination*: 72.9000 deg. *Period*: 90.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 February 11 - . 14:57 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 2-17** - . *Payload*: Molniya-2. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. *USAF*

Sat Cat: 9829 . *COSPAR*: 1977-010A. *Apogee*: 38,214 km (23,745 mi). *Perigee*: 2,176 km (1,352 mi). *Inclination*: 63.3000 deg. *Period*: 718.50 min.

Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1977 February 22 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4MK** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Decay Date*: 1977-03-30 . High resolution photo reconnaissance mission..

1977 February 26 - . 21:18 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 895** - . *Payload*: Tselina-D no. 11. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1992-03-22 . *USAF Sat Cat*: 9853 . *COSPAR*: 1977-015A. *Apogee*: 442 km (274 mi). *Perigee*: 433 km (269 mi). *Inclination*: 81.2000 deg. *Period*: 93.30 min.

1977 March 3 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 896** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 13.00 days. *Decay Date*: 1977-03-16 . *USAF Sat Cat*: 9857 . *COSPAR*: 1977-016A. *Apogee*: 206 km (128 mi). *Perigee*: 202 km (125 mi). *Inclination*: 72.9000 deg. *Period*: 88.60 min. Photo surveillance; returned film capsule; maneuverable..

1977 March 10 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 897** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1977-03-23 . *USAF Sat Cat*: 9860 . *COSPAR*: 1977-017A. *Apogee*: 340 km (210 mi). *Perigee*: 171 km (106 mi). *Inclination*: 72.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 March 17 - . 08:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 898** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1977-03-30 . *USAF Sat Cat*: 9871 . *COSPAR*: 1977-020A. *Apogee*: 230 km (140 mi). *Perigee*: 216 km (134 mi). *Inclination*: 81.4000 deg. *Period*: 89.00 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 898** - . *Payload*: Nauka?. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1977-04-03 . *USAF Sat Cat*: 9887 . *COSPAR*: 1977-020D. *Apogee*: 219 km (136 mi). *Perigee*: 208 km (129 mi). *Inclination*: 81.3000 deg. *Period*: 88.77 min.

1977 March 24 - . 11:51 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-36** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 9880 . *COSPAR*: 1977-021A. *Apogee*: 38,042 km (23,638 mi). *Perigee*: 2,288 km (1,421 mi). *Inclination*: 63.7000 deg. *Period*: 717.30 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme). Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T.

1977 April 5 - . 02:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-27** - . *Payload*: Meteor M no. 27. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor M 11F614. *USAF Sat Cat*: 9903 . *COSPAR*: 1977-024A. *Apogee*: 887 km (551 mi). *Perigee*: 844 km (524 mi). *Inclination*: 81.3000 deg. *Period*: 102.30 min. Acquisition of meteorological information needed for use by the weather service. .

1977 April 7 - . 08:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 902** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1977-04-20 . *USAF Sat*

Cat: 9908 . *COSPAR*: 1977-026A. *Apogee*: 279 km (173 mi). *Perigee*: 168 km (104 mi). *Inclination*: 81.4000 deg. *Period*: 89.00 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 April 11 - . 01:38 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 903** - . *Payload*: Oko #6. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2014-08-04 . *USAF Sat Cat*: 9911 . *COSPAR*: 1977-027A. *Apogee*: 35,796 km (22,242 mi). *Perigee*: 4,559 km (2,832 mi). *Inclination*: 67.4000 deg. *Period*: 717.80 min. Covered Oko constellation plane 7 - 163 degree longitude of ascending node..

1977 April 20 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 904** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 14.00 days. *Decay Date*: 1977-05-04 . *USAF Sat Cat*: 9930 . *COSPAR*: 1977-028A. *Apogee*: 328 km (203 mi). *Perigee*: 203 km (126 mi). *Inclination*: 71.4000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite; returned film capsule..

1977 April 26 - . 14:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 905** - . *Payload*: Yantar-2K s/n 6. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1977-05-26 . *USAF Sat Cat*: 9937 . *COSPAR*: 1977-030A. *Apogee*: 413 km (256 mi). *Perigee*: 170 km (100 mi). *Inclination*: 67.1000 deg. *Period*: 90.30 min.

  Sixth Yantar second generation reconnaissance test flight and first completely successful flight. Both small SpK film capsules successfully recovered during course of flight, as was the main OSA cabin with its camera, computer, and main film cannisters. First full duration Yantar flight.

1977 April 28 - . 09:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-07** - . *Payload*: Molniya-3 s/n 19. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 9941 . *COSPAR*: 1977-032A. *Apogee*: 38,201 km (23,736 mi). *Perigee*: 2,169

km (1,347 mi). *Inclination*: 63.5000 deg. *Period*: 718.10 min.

Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1977 May 5 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 907** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 11.00 days. *Decay Date*: 1977-05-16 . *USAF Sat Cat*: 9944 . *COSPAR*: 1977-033A. *Apogee*: 364 km (226 mi). *Perigee*: 181 km (112 mi). *Inclination*: 62.8000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 May 17 - . 10:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 908** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 14.00 days. *Decay Date*: 1977-05-31 . *USAF Sat Cat*: 10007 . *COSPAR*: 1977-035A. *Apogee*: 288 km (178 mi). *Perigee*: 174 km (108 mi). *Inclination*: 51.8000 deg. *Period*: 89.10 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 May 26 - . 07:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 912** - . *Payload*: Zenit-4MKT no. 4. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1977-06-08 . *USAF Sat Cat*: 10021 . *COSPAR*: 1977-040A. *Apogee*: 225 km (139 mi). *Perigee*: 217 km (134 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1977 May 31 - . 07:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 914** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1977-06-13 .

USAF Sat Cat: 10030 . *COSPAR*: 1977-043A. *Apogee*: 284 km (176 mi). *Perigee*: 202 km (125 mi). *Inclination*: 65.0000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 914** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1977-07-02 . *USAF Sat Cat*: 10046 . *COSPAR*: 1977-043E. *Apogee*: 291 km (180 mi). *Perigee*: 200 km (120 mi). *Inclination*: 65.0000 deg. *Period*: 89.41 min.

1977 June 8 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 915** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1977-06-21 . *USAF Sat Cat*: 10038 . *COSPAR*: 1977-045A. *Apogee*: 289 km (179 mi). *Perigee*: 173 km (107 mi). *Inclination*: 62.8000 deg. *Period*: 89.10 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 June 10 - . 08:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 916** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 11.00 days. *Decay Date*: 1977-06-21 . *USAF Sat Cat*: 10040 . *COSPAR*: 1977-046A. *Apogee*: 304 km (188 mi). *Perigee*: 255 km (158 mi). *Inclination*: 62.7000 deg. *Period*: 90.10 min. Military topography satellite; returned film capsule; also performed mapping, geodesy, earth resources; deployed capsule..

1977 June 16 - . 01:58 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 917** - . *Payload*: Oko #7. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 10059 . *COSPAR*: 1977-047A. *Apogee*: 36,143 km (22,458 mi). *Perigee*: 4,196 km (2,607 mi). *Inclination*: 67.6000 deg. *Period*: 717.50 min. Covered Oko constellation plane 9 - 245 degree longitude of ascending node..

1977 June 22 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 920** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MK. *Duration*: 13.00 days. *Decay Date*: 1977-07-05 . *USAF Sat*

Cat: 10086 . *COSPAR*: 1977-052A. *Apogee*: 342 km (212 mi). *Perigee*: 173 km (107 mi). *Inclination*: 65.0000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 June 24 - . 05:41 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-37** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1993-05-20 . *USAF Sat Cat*: 10092 . *COSPAR*: 1977-054A. *Apogee*: 4,564 km (2,835 mi). *Perigee*: 106 km (65 mi). *Inclination*: 62.6000 deg. *Period*: 134.90 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network. .

1977 June 29 - . 18:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-28** - . *Payload*: Meteor-Priroda s/n 2-2. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-Priroda. *Decay Date*: 1993-08-28 . *USAF Sat Cat*: 10113 . *COSPAR*: 1977-057A. *Apogee*: 338 km (210 mi). *Perigee*: 332 km (206 mi). *Inclination*: 97.4000 deg. *Period*: 91.20 min. Continuation of experimental work in studying the natural resources of the earth. Acquisition of meteorological information required for use in the operational weather service. .

1977 June 30 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 922** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1977-07-13 . *USAF Sat Cat*: 10115 . *COSPAR*: 1977-058A. *Apogee*: 283 km (175 mi). *Perigee*: 221 km (137 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule..

1977 July 7 - . 07:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 925** - . *Payload*: Tselina-D no. 12. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1993-04-29 . *USAF Sat Cat*: 10134 . *COSPAR*: 1977-061A. *Apogee*: 275 km (170 mi). *Perigee*: 269 km (167 mi). *Inclination*: 81.2000 deg. *Period*: 90.00 min.

1977 July 12 - . 09:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 927** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1977-07-25 . *USAF Sat Cat*: 10139 . *COSPAR*: 1977-063A. *Apogee*: 361 km (224 mi). *Perigee*: 153 km (95 mi). *Inclination*: 72.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 July 20 - . 04:44 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 931** - . *Payload*: Oko #8. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 10150 . *COSPAR*: 1977-068A. *Apogee*: 36,549 km (22,710 mi). *Perigee*: 3,770 km (2,340 mi). *Inclination*: 66.5000 deg. *Period*: 717.10 min. Replaced Cosmos 665. Covered Oko constellation plane 2 - 323 degree longitude of ascending node..

1977 July 20 - . 07:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 932** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1977-08-02 . *USAF Sat Cat*: 10153 . *COSPAR*: 1977-069A. *Apogee*: 358 km (222 mi). *Perigee*: 150 km (90 mi). *Inclination*: 65.0000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 July 27 - . 18:07 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 934** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 13.00 days. *Decay Date*: 1977-08-09 . *USAF Sat Cat*: 10164 . *COSPAR*: 1977-072A. *Apogee*: 255 km (158 mi). *Perigee*: 231 km (143 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. Photo surveillance; returned film capsule; maneuverable..

1977 July 29 - . 08:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 935** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok.

Spacecraft: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1977-08-11 . *USAF Sat Cat*: 10168 . *COSPAR*: 1977-073A. *Apogee*: 251 km (155 mi). *Perigee*: 217 km (134 mi). *Inclination*: 81.3000 deg. *Period*: 89.20 min. Area survey photo reconnaissance satellite; returned film capsule..

1977 August 3 - . 14:01 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 936** - . *Payload*: Bion no. 4. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 18.60 days. *Decay Date*: 1977-08-22 . *USAF Sat Cat*: 10172 . *COSPAR*: 1977-074A. *Apogee*: 396 km (246 mi). *Perigee*: 219 km (136 mi). *Inclination*: 62.8000 deg. *Period*: 90.60 min.

  Biological research. Scientists from the U.S.S.R., the U.S., Czechoslovakia, France, Hungary, Poland, Romania, Bulgaria and the German Democratic Republic conducted experiments in physics and biology on the mission. The biosatellite was recovered at 51 deg 53 min N, 61 deg 30 min E, near Kustanay in Central Asia after remaining in orbit for 18.5 days. *Additional Details*: here....

1977 August 10 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-4MKM** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Decay Date*: 1977-08-30 . High resolution photo reconnaissance mission..

1977 August 24 - . 14:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 938** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1977-09-06 . *USAF Sat Cat*: 10281 . *COSPAR*: 1977-078A. *Apogee*: 340 km (210 mi). *Perigee*: 181 km (112 mi). *Inclination*: 62.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 August 27 - . 10:09 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 947** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1977-09-09 . *USAF Sat Cat*: 10299 . *COSPAR*: 1977-081A. *Apogee*: 321 km (199 mi). *Perigee*: 203

km (126 mi). *Inclination*: 72.9000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite; returned film capsule..

1977 August 30 - . 18:06 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-38** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1993-09-28 . *USAF Sat Cat*: 10315 . *COSPAR*: 1977-082A. *Apogee*: 38,159 km (23,710 mi). *Perigee*: 187 km (116 mi). *Inclination*: 62.6000 deg. *Period*: 677.50 min.

  Continued operation of the long-range telephone and telegraph radio-communication system; transmission of USSR central television programmes to stations in the Orbita network and international cooperation. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T.

1977 September 2 - . 09:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 948** - . *Payload*: Zenit-4MKT no. 5. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1977-09-15 . *USAF Sat Cat*: 10319 . *COSPAR*: 1977-083A. *Apogee*: 235 km (146 mi). *Perigee*: 217 km (134 mi). *Inclination*: 81.4000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1977 September 6 - . 17:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 949** - . *Payload*: Yantar-2K s/n 7. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1977-10-06 . *USAF Sat Cat*: 10326 . *COSPAR*: 1977-085A. *Apogee*: 325 km (201 mi). *Perigee*: 177 km (109 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min.

  Yantar-2K second generation reconnaissance state acceptance test flight. Completely successful and led to acceptance of Yantar-2K into Red Army service in 1978. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission.

1977 September 13 - . 15:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 950** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 14.00 days. *Decay Date*: 1977-09-27 . *USAF Sat Cat*: 10351 . *COSPAR*: 1977-086A. *Apogee*: 282 km (175 mi). *Perigee*: 205 km (127 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule..

1977 September 16 - . 14:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 953** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1977-09-29 . *USAF Sat Cat*: 10359 . *COSPAR*: 1977-089A. *Apogee*: 330 km (200 mi). *Perigee*: 180 km (110 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 September 20 - . 01:01 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 955** - . *Payload*: Tselina-D no. 13. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2000-09-07 . *USAF Sat Cat*: 10362 . *COSPAR*: 1977-091A. *Apogee*: 501 km (311 mi). *Perigee*: 493 km (306 mi). *Inclination*: 81.2000 deg. *Period*: 94.60 min.

1977 September 22 - . 00:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Prognoz 6** - . *Payload*: SO-M s/n 506. *Mass*: 910 kg (2,000 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *USAF Sat Cat*: 10370 . *COSPAR*: 1977-093A. *Apogee*: 172,867 km (107,414 mi). *Perigee*: 25,331 km (15,739 mi). *Inclination*: 88.3200 deg. *Period*: 5,681.95 min.

  Investigation of the corpuscular and electromagnetic radiation of the sun and of solar plasma fluxes, study of the magnetic fields in circumterrestrial space in order to determine the effects of solar activity on the interplanetary medium and in the magne tosphere of the earth.

1977 September 30 - . 09:46 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 957** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1977-10-13 . *USAF Sat*

Cat: 10385 . *COSPAR*: 1977-098A. *Apogee*: 361 km (224 mi). *Perigee*: 171 km (106 mi). *Inclination*: 65.0000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule.

1977 October 9 - . 02:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 25** - . *Call Sign*: Foton (Photon). *Crew*: Kovalyonok, Ryumin. *Backup Crew*: Ivanchenkov, Romanenko. *Payload*: Soyuz 7K-T s/n 42. *Mass*: 6,860 kg (15,120 lb). *Nation*: Russia. *Related Persons*: Ivanchenkov, Kovalyonok, Romanenko, Ryumin. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 25. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 2.03 days. *Decay Date*: 1977-10-11 . *USAF Sat Cat*: 10401 . *COSPAR*: 1977-099A. *Apogee*: 240 km (140 mi). *Perigee*: 194 km (120 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min. Manned two crew. Unsuccessful mission. Failed to dock with Salyut 6..

1977 October 11 - . 15:14 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 958** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 13.00 days. *Decay Date*: 1977-10-24 . *USAF Sat Cat*: 10403 . *COSPAR*: 1977-100A. *Apogee*: 351 km (218 mi). *Perigee*: 257 km (159 mi). *Inclination*: 62.8000 deg. *Period*: 90.60 min. Photo surveillance; returned film capsule..

1977 October 28 - . 01:37 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-08** - . *Payload*: Molniya-3 s/n 18. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 10455 . *COSPAR*: 1977-105A. *Apogee*: 38,508 km (23,927 mi). *Perigee*: 1,840 km (1,140 mi). *Inclination*: 63.7000 deg. *Period*: 717.70 min. Continued operation of the long-range telephone and telegraph radio-communication system; transmission of USSR central television programmes to stations in the Orbita network and international cooperation. .

1977 December 4 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 964** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1977-12-17 . *USAF Sat Cat*: 10498 . *COSPAR*: 1977-110A. *Apogee*: 362 km (224 mi). *Perigee*: 171 km (106

mi). *Inclination*: 72.9000 deg. *Period*: 89.90 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 December 10 - . 01:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 26** - . *Call Sign*: Taimyr (Taimyr - Russian peninsula). *Crew*: Grechko, Romanenko. *Backup Crew*: Ivanchenkov, Kovalyonok. *Payload*: Soyuz 7K-T s/n 43. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Grechko, Ivanchenkov, Kovalyonok, Romanenko. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 26. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 37.42 days. *Decay Date*: 1978-01-16 . *USAF Sat Cat*: 10506 . *COSPAR*: 1977-113A. *Apogee*: 235 km (146 mi). *Perigee*: 205 km (127 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min. Manned two crew. Docked with Salyut 6. Carried Yuri Romanenko, Georgi Grechko to Salyut 6; returned crew of Soyuz 27 to Earth. Conduct of joint experiments with the Salyut-6 scientific station..

1977 December 12 - . 09:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 966** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 12.00 days. *Decay Date*: 1977-12-24 . *USAF Sat Cat*: 10510 . *COSPAR*: 1977-115A. *Apogee*: 296 km (183 mi). *Perigee*: 204 km (126 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 966** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1978-01-07 . *USAF Sat Cat*: 10538 . *COSPAR*: 1977-115D. *Apogee*: 276 km (171 mi). *Perigee*: 198 km (123 mi). *Inclination*: 65.0000 deg. *Period*: 89.24 min.

1977 December 14 - . 09:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 2-03** - . *Payload*: Meteor-2 no. 3. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-2. *USAF Sat Cat*: 10514 . *COSPAR*: 1977-117A. *Apogee*: 874 km (543 mi). *Perigee*: 847 km (526 mi). *Inclination*: 81.2000 deg. *Period*: 102.20 min. Acquisition of meteorological information needed for use by the weather service..

1977 December 20 - . 15:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 969** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 14.00 days. *Decay Date*: 1978-01-03 . *USAF Sat Cat*: 10527 . *COSPAR*: 1977-120A. *Apogee*: 317 km (196 mi). *Perigee*: 180 km (110 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1977 December 27 - . 09:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 973** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-01-09 . *USAF Sat Cat*: 10540 . *COSPAR*: 1977-124A. *Apogee*: 325 km (201 mi). *Perigee*: 203 km (126 mi). *Inclination*: 71.5000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..

- **Nauka Cosmos 973** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1978-01-25 . *USAF Sat Cat*: 10558 . *COSPAR*: 1977-124D. *Apogee*: 312 km (193 mi). *Perigee*: 198 km (123 mi). *Inclination*: 71.4000 deg. *Period*: 89.61 min.

1978 January 6 - . 15:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 974** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-01-19 . *USAF Sat Cat*: 10554 . *COSPAR*: 1978-001A. *Apogee*: 334 km (207 mi). *Perigee*: 178 km (110 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 January 10 - . 12:26 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 27** - . *Call Sign*: Pamir (Pamir mountains). *Crew*: Dzhanibekov, Makarov. *Backup Crew*: Ivanchenkov, Kovalyonok. *Payload*: Soyuz 7K-T s/n 44. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Dzhanibekov, Ivanchenkov, Kovalyonok, Makarov. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 26, Soyuz 27. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 64.95 days. *Decay Date*: 1978-03-16 . *USAF Sat Cat*: 10560 . *COSPAR*: 1978-003A. *Apogee*: 237 km (147 mi). *Perigee*: 190 km (110 mi). *Inclination*: 51.7000 deg. *Period*: 88.70 min. Manned two crew. Carried Oleg Makarov, Vladimir Dzhanibekov to Salyut 6; returned crew of Soyuz 26 to Earth. Docked with Salyut 6..

1978 January 10 - . 13:23 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 975** - . *Payload*: Tselina-D no. 14. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2001-09-19 . *USAF Sat Cat*: 10561 . *COSPAR*: 1978-004A. *Apogee*: 522 km (324 mi). *Perigee*: 513 km (318 mi). *Inclination*: 81.2000 deg. *Period*: 95.00 min.

1978 January 13 - . 15:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 984** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-01-26 . *USAF Sat Cat*: 10592 . *COSPAR*: 1978-006A. *Apogee*: 291 km (180 mi). *Perigee*: 206 km (128 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule..

1978 January 20 - . 08:24 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 1** - . *Payload*: Progress s/n 102. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz 26. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 18.73 days. *Completed Operations Date*: 1978-02-08 02:00:20 . *Decay Date*: 1978-02-08 02:00:20 . *USAF Sat Cat*: 10603 . *COSPAR*: 1978-008A. *Apogee*: 256 km (159 mi). *Perigee*: 173 km (107 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  Unmanned supply vessel to Salyut 6. Delivery of fuel, consumable materials and equipment to the Salyut 6 station. Docked with Salyut 6 on 22 Jan 1978 10:12:14 GMT. Undocked on 6 Feb 1978 05:54:00 GMT. Destroyed in reentry on 8 Feb 1978 02:00:00 GMT. Total free-flight time 3.91 days. Total docked time 14.82 days.

1978 January 24 - . 06:51 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-09** - . *Payload*: Molniya-3 s/n 20. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1990-04-24 . *USAF Sat Cat*: 10605 . *COSPAR*: 1978-009A. *Apogee*: 36,195 km (22,490 mi). *Perigee*: 85 km (52 mi). *Inclination*: 63.3000 deg. *Period*: 636.80 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central

television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1978 January 24 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 986** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 14.00 days. *Decay Date*: 1978-02-07 . *USAF Sat Cat*: 10607 . *COSPAR*: 1978-010A. *Apogee*: 318 km (197 mi). *Perigee*: 172 km (106 mi). *Inclination*: 65.0000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 January 31 - . 14:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 987** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 14.00 days. *Decay Date*: 1978-02-14 . *USAF Sat Cat*: 10639 . *COSPAR*: 1978-013A. *Apogee*: 322 km (200 mi). *Perigee*: 189 km (117 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 February 8 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 988** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1978-02-20 . *USAF Sat Cat*: 10666 . *COSPAR*: 1978-015A. *Apogee*: 335 km (208 mi). *Perigee*: 201 km (124 mi). *Inclination*: 72.8000 deg. *Period*: 89.90 min. Military topography satellite; returned film capsule; maneuverable; also performed mapping, geodesy, earth resources tasks..

1978 February 14 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 989** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 14.00 days. *Decay Date*: 1978-02-28 . *USAF Sat Cat*: 10672 . *COSPAR*: 1978-017A. *Apogee*: 318 km (197 mi). *Perigee*: 169 km (105 mi). *Inclination*: 65.1000 deg. *Period*: 89.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 March 2 - . 15:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1.

LV Family: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 28** - . *Call Sign*: Zenit (Zenith). *Crew*: Gubarev, Remek. *Backup Crew*: Pelczak, Rukavishnikov. *Payload*: Soyuz 7K-T s/n 45. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Gubarev, Pelczak, Remek, Rukavishnikov. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 26, Soyuz 28. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 7.93 days. *Decay Date*: 1978-03-10 . *USAF Sat Cat*: 10694 . *COSPAR*: 1978-023A. *Apogee*: 246 km (152 mi). *Perigee*: 192 km (119 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Manned two crew. Docked with Salyut 6. Delivery to the Salyut-6 station of the first international 'Intercosmos' team consisting of A.A. Gubarev (USSR) and V. Remek (Czechoslovak Socialist Republic) to carry out scientific research and experiments jointly developed by Soviet a nd Czechoslovak specialists.

1978 March 2 - . 22:07 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-39** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1992-03-09 . *USAF Sat Cat*: 10696 . *COSPAR*: 1978-024A. *Apogee*: 39,957 km (24,828 mi). *Perigee*: 401 km (249 mi). *Inclination*: 62.0000 deg. *Period*: 717.90 min. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network. .

1978 March 4 - . 07:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 992** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-03-17 . *USAF Sat Cat*: 10699 . *COSPAR*: 1978-025A. *Apogee*: 323 km (200 mi). *Perigee*: 203 km (126 mi). *Inclination*: 71.3000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite; returned film capsule..

1978 March 10 - . 10:42 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 993** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-03-23 . *USAF Sat Cat*: 10725 . *COSPAR*: 1978-027A. *Apogee*: 325 km (201 mi). *Perigee*: 190 km (110 mi). *Inclination*: 72.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 March 17 - . 10:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 995** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-03-30 . *USAF Sat Cat*: 10735 . *COSPAR*: 1978-030A. *Apogee*: 227 km (141 mi). *Perigee*: 209 km (129 mi). *Inclination*: 81.3000 deg. *Period*: 88.80 min. Area survey photo reconnaissance satellite; returned film capsule..

1978 March 30 - . 07:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 999** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-04-12 . *USAF Sat Cat*: 10773 . *COSPAR*: 1978-033A. *Apogee*: 352 km (218 mi). *Perigee*: 174 km (108 mi). *Inclination*: 71.4000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 April 4 - . 15:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1001** - . *Payload*: Soyuz T s/n 4L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 10.87 days. *Decay Date*: 1978-04-15 . *USAF Sat Cat*: 10783 . *COSPAR*: 1978-036A. *Apogee*: 228 km (141 mi). *Perigee*: 199 km (123 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  Manned precursor. Recovered April 15, 1978 12:02 GMT. Unsuccessful mission. Soyuz T test -failure.
  Maneuver Summary:
  202 km X 231 km orbit to 195 km X 291 km orbit. Delta V: 19 m/s
  195 km X 291 km orbit to 306 km X 322 km orbit. Delta V: 40 m/s
  306 km X 322 km orbit to 308 km X 318 km orbit. Delta V: 1 m/s
  Total Delta V: 60 m/s.
  Officially: Investigation of the upper atmosphere and outer space.

1978 April 6 - . 09:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1002** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-04-19 . *USAF Sat Cat*: 10785 . *COSPAR*: 1978-037A. *Apogee*: 283 km (175 mi). *Perigee*: 205

km (127 mi). *Inclination*: 65.1000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule..

1978 April 20 - . 15:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1003** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 14.00 days. *Decay Date*: 1978-05-04 . *USAF Sat Cat*: 10811 . *COSPAR*: 1978-040A. *Apogee*: 328 km (203 mi). *Perigee*: 178 km (110 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 May 5 - . 15:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1004** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-05-18 . *USAF Sat Cat*: 10846 . *COSPAR*: 1978-043A. *Apogee*: 290 km (180 mi). *Perigee*: 205 km (127 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. Area survey photo reconnaissance satellite; returned film capsule; separated science capsule..
- **Nauka Cosmos 1004** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1978-06-16 . *USAF Sat Cat*: 10852 . *COSPAR*: 1978-043G. *Apogee*: 414 km (257 mi). *Perigee*: 202 km (125 mi). *Inclination*: 62.8000 deg. *Period*: 90.68 min.

1978 May 12 - . 04:07 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1005** - . *Payload*: Tselina-D no. 15. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2000-06-15 . *USAF Sat Cat*: 10860 . *COSPAR*: 1978-045A. *Apogee*: 494 km (306 mi). *Perigee*: 485 km (301 mi). *Inclination*: 81.2000 deg. *Period*: 94.40 min.

1978 May 16 - . 10:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1007** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-05-29 . *USAF Sat Cat*: 10895 . *COSPAR*: 1978-048A. *Apogee*: 350 km (210 mi). *Perigee*: 168 km (104 mi). *Inclination*: 72.8000 deg. *Period*: 89.70 min. High resolution photo

reconnaissance satellite; returned film capsule; maneuverable; also performed earth resources tasks..

1978 May 23 - . 07:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1010** - . *Payload*: Zenit-4MKT no. 6. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1978-06-05 . *USAF Sat Cat*: 10915 . *COSPAR*: 1978-052A. *Apogee*: 230 km (140 mi). *Perigee*: 217 km (134 mi). *Inclination*: 81.4000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1978 May 25 - . 14:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1012** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-06-07 . *USAF Sat Cat*: 10919 . *COSPAR*: 1978-054A. *Apogee*: 265 km (164 mi). *Perigee*: 202 km (125 mi). *Inclination*: 62.8000 deg. *Period*: 89.20 min. Area survey photo reconnaissance satellite; returned film capsule..

1978 June 2 - . 12:12 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-40** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 10925 . *COSPAR*: 1978-055A. *Apogee*: 38,729 km (24,065 mi). *Perigee*: 1,627 km (1,010 mi). *Inclination*: 63.9000 deg. *Period*: 717.80 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of a system of long range telephone-telegraph radiocommunication, and transmission of USSR Central Television programmes to the stations of the Orbita network..

1978 June 10 - . 08:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1021** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-06-23 . *USAF Sat Cat*: 10939 . *COSPAR*: 1978-057A. *Apogee*: 313 km (194 mi). *Perigee*: 173 km (107 mi). *Inclination*: 65.0000 deg. *Period*: 89.40 min. High resolution photo

reconnaissance satellite; returned film capsule; maneuverable..

1978 June 12 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1022** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-06-25 . *USAF Sat Cat*: 10944 . *COSPAR*: 1978-059A. *Apogee*: 344 km (213 mi). *Perigee*: 171 km (106 mi). *Inclination*: 72.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 June 15 - . 20:16 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 29** - . *Call Sign*: Foton (Photon). *Crew*: Ivanchenkov, Kovalyonok. *Backup Crew*: Lyakhov, Ryumin. *Payload*: Soyuz 7K-T s/n 46. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Ivanchenkov, Kovalyonok, Lyakhov, Ryumin. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 29. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 79.64 days. *Decay Date*: 1978-09-03 . *USAF Sat Cat*: 10952 . *COSPAR*: 1978-061A. *Apogee*: 248 km (154 mi). *Perigee*: 193 km (119 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min. Manned two crew. Docked with Salyut 6. Placed on board the Salyut-6 station a crew consisting of V.V. Kovalenko and A.S. Ivanchenkov to conduct scientific and technological investigations and experiments..

1978 June 27 - . 15:27 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 30** - . *Call Sign*: Kavkas (Caucasus). *Crew*: Hermaszewski, Klimuk. *Backup Crew*: Jankowski, Kubasov. *Payload*: Soyuz 7K-T(A9) s/n 67. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Hermaszewski, Jankowski, Klimuk, Kubasov. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 29, Soyuz 30. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T/A9. *Duration*: 7.92 days. *Decay Date*: 1978-07-05 . *USAF Sat Cat*: 10968 . *COSPAR*: 1978-065A. *Apogee*: 244 km (151 mi). *Perigee*: 194 km (120 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min. Manned two crew. Docked with Salyut 6. Placed on board the Salyut-6 station, under the Intercosmos programme, a second, international, crew consisting of P.I. Klimuk (USSR) and M. Hermaszewski (Poland) to conduct scientific investigations and experiments..

1978 June 28 - . 02:59 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1024** - . *Payload*: Oko #9. *Mass*: 2,030 kg (4,470 lb). *Nation*: Russia.

Agency: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 10970 . *COSPAR*: 1978-066A. *Apogee*: 35,365 km (21,974 mi). *Perigee*: 4,984 km (3,096 mi). *Inclination*: 67.3000 deg. *Period*: 717.70 min. Replaced Cosmos 931. Covered Oko constellation plane 2 - 323 degree longitude of ascending node..

1978 July 2 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1026** - . *Payload*: Energia s/n 2. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Energia satellite. *Duration*: 4.00 days. *Decay Date*: 1978-07-06 . *USAF Sat Cat*: 10977 . *COSPAR*: 1978-069A. *Apogee*: 247 km (153 mi). *Perigee*: 212 km (131 mi). *Inclination*: 51.7000 deg. *Period*: 89.00 min. Investigation of primary cosmic radiation and meteoritic particles in near-earth outer space..

1978 July 7 - . 11:26 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 2** - . *Payload*: Progress s/n 101. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz 29. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 27.59 days. *Completed Operations Date*: 1978-08-04 01:30:51 . *Decay Date*: 1978-08-04 01:30:51 . *USAF Sat Cat*: 10979 . *COSPAR*: 1978-070A. *Apogee*: 307 km (190 mi). *Perigee*: 248 km (154 mi). *Inclination*: 51.6000 deg. *Period*: 90.00 min.

  Unmanned supply vessel to Salyut 6. Delivery of fuel, consumable materials and equipment to the Salyut 6 station. Docked with Salyut 6 on 9 Jul 1978 12:58:59 GMT. Undocked on 2 Aug 1978 04:57:44 GMT. Destroyed in reentry on 4 Aug 1978 01:31:07 GMT. Total free-flight time 3.92 days. Total docked time 23.67 days.

1978 July 14 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-41** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1992-02-08 . *USAF Sat Cat*: 10984 . *COSPAR*: 1978-072A. *Apogee*: 38,306 km (23,802 mi). *Perigee*: 260 km (160 mi). *Inclination*: 61.8000 deg. *Period*: 681.90 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1978 August 5 - . 15:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1028** - . *Payload*: Yantar-2K s/n 14. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1978-09-04 . *USAF Sat Cat*: 10995 . *COSPAR*: 1978-076A. *Apogee*: 247 km (153 mi). *Perigee*: 170 km (100 mi). *Inclination*: 67.1000 deg. *Period*: 88.70 min. Successful full duration flight. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1978 August 7 - . 22:31 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 3** - . *Payload*: Progress s/n 103. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz 29. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 15.76 days. *Completed Operations Date*: 1978-08-24 16:44:38 . *Decay Date*: 1978-08-24 16:44:38 . *USAF Sat Cat*: 10999 . *COSPAR*: 1978-077A. *Apogee*: 232 km (144 mi). *Perigee*: 190 km (110 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  Unmanned supply vessel to Salyut 6. Delivery of fuel, consumable materials and equipment to the Salyut 6 station. Docked with Salyut 6 on 9 Aug 1978 23:59:30 GMT. Undocked on 21 Aug 1978 15:42:50 GMT. Destroyed in reentry on 23 Aug 1978 16:45:00 GMT. Total free-flight time 4.10 days. Total docked time 11.66 days.

1978 August 22 - . 23:47 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-42** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2015-08-11 . *USAF Sat Cat*: 11007 . *COSPAR*: 1978-080A. *Apogee*: 34,374 km (21,358 mi). *Perigee*: 1,181 km (733 mi). *Inclination*: 63.8000 deg. *Period*: 622.70 min. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network. .

1978 August 26 - . 14:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 31** - . *Call Sign*: Yastreb (Hawk). *Crew*: Bykovsky, Jaehn. *Backup Crew*: Gorbatko, Koellner. *Payload*: Soyuz 7K-T s/n 47. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Bykovsky, Gorbatko, Jaehn, Koellner. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 29, Soyuz 31. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 67.84 days. *Decay Date*: 1978-11-02 . *USAF Sat Cat*: 11010 . *COSPAR*: 1978-081A. *Apogee*: 243

km (150 mi). *Perigee*: 193 km (119 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min. Manned two crew. Docked with Salyut 6. Delivered to the Salyut-6 station the third international 'Intercosmos' crew consisting of V F Bykovsky (USSR) and S Jaehn (German Democratic Republic) to carry out scientific research and experiments..

1978 August 29 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1029** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 10.00 days. *Decay Date*: 1978-09-08 . *USAF Sat Cat*: 11012 . *COSPAR*: 1978-082A. *Apogee*: 316 km (196 mi). *Perigee*: 194 km (120 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 September 6 - . 03:04 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1030** - . *Payload*: Oko #10. *Mass*: 2,030 kg (4,470 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2004-08-17 . *USAF Sat Cat*: 11015 . *COSPAR*: 1978-083A. *Apogee*: 36,185 km (22,484 mi). *Perigee*: 4,131 km (2,566 mi). *Inclination*: 66.2000 deg. *Period*: 717.00 min. Covered Oko constellation plane 4 - 39 degree longitude of ascending node..

1978 September 9 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1031** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-09-22 . *USAF Sat Cat*: 11022 . *COSPAR*: 1978-085A. *Apogee*: 329 km (204 mi). *Perigee*: 182 km (113 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 September 19 - . 08:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1032** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-10-02 . *USAF Sat Cat*: 11029 . *COSPAR*: 1978-088A. *Apogee*: 226 km (140 mi). *Perigee*: 215 km (133 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min. Area survey photo reconnaissance satellite; returned film capsule; separated capsule..

- **Nauka Cosmos 1032** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1978-10-03 . *USAF Sat Cat*: 11038 . *COSPAR*: 1978-088D. *Apogee*: 187 km (116 mi). *Perigee*: 171 km (106 mi). *Inclination*: 81.3000 deg. *Period*: 88.07 min.

1978 October 3 - . 11:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1033** - . *Payload*: Zenit-4MKT no. 7. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1978-10-16 . *USAF Sat Cat*: 11039 . *COSPAR*: 1978-089A. *Apogee*: 231 km (143 mi). *Perigee*: 212 km (131 mi). *Inclination*: 81.4000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1978 October 3 - . 23:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 4** - . *Payload*: Progress s/n 105. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz 29. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 22.72 days. *Completed Operations Date*: 1978-10-27 16:27:43 . *Decay Date*: 1978-10-27 16:27:43 . *USAF Sat Cat*: 11040 . *COSPAR*: 1978-090A. *Apogee*: 247 km (153 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.7000 deg. *Period*: 88.80 min.

  Unmanned supply vessel to Salyut 6. Delivery of fuel, consumable materials and equipment to the Salyut 6 station. Docked with Salyut 6 on 6 Oct 1978 01:00:15 GMT. Undocked on 24 Oct 1978 13:01:52 GMT. Destroyed in reentry on 26 Oct 1978 16:28:13 GMT. Total free-flight time 4.22 days. Total docked time 18.50 days.

1978 October 6 - . 15:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1042** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-10-19 . *USAF Sat Cat*: 11052 . *COSPAR*: 1978-092A. *Apogee*: 299 km (185 mi). *Perigee*: 179 km (111 mi). *Inclination*: 62.8000 deg. *Period*: 89.30 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 October 10 - . 19:44 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1043** - . *Payload*: Tselina-D no. 17. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1998-02-27 . *USAF Sat Cat*: 11055 . *COSPAR*: 1978-094A. *Apogee*: 433 km (269 mi). *Perigee*: 425 km (264 mi). *Inclination*: 81.2000 deg. *Period*: 93.20 min.

1978 October 13 - . 05:19 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-10** - . *Payload*: Molniya-3 s/n 22. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 11057 . *COSPAR*: 1978-095A. *Apogee*: 33,590 km (20,870 mi). *Perigee*: 1,560 km (960 mi). *Inclination*: 63.8000 deg. *Period*: 614.90 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1978 October 17 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1044** - . *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-10-30 . *USAF Sat Cat*: 11065 . *COSPAR*: 1978-097A. *Apogee*: 295 km (183 mi). *Perigee*: 203 km (126 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule..

1978 October 30 - . 05:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Prognoz 7** - . *Payload*: SO-M s/n 507. *Mass*: 950 kg (2,090 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *Decay Date*: 1980-09-22 . *USAF Sat Cat*: 11088 . *COSPAR*: 1978-101A. *Apogee*: 202,627 km (125,906 mi). *Perigee*: 472 km (293 mi). *Inclination*: 64.9000 deg. *Period*: 5,881.10 min.

  Magnetospheric investigations. Investigation of the corpuscular and electromagnetic radiation of the sun, of solar plasma fluxes and of the magnetic fields in circumterrestrial space in order to determine the effects of solar activity on the interplanetary medium and the magnetosphere of the earth; investigation of galactic ultraviolet rays, X-rays and gamma rays. In addition to Soviet apparatus, carried scientific apparatus produced in the USSR, the Czechoslovak Socialist Republic, France, the Hungarian People's Republic and Sweden.

1978 November 1 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1046** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1978-11-13 . *USAF Sat Cat*: 11098 . *COSPAR*: 1978-102A. *Apogee*: 324 km (201 mi). *Perigee*: 202 km (125 mi). *Inclination*: 72.9000 deg. *Period*: 89.80 min. Military topography satellite; returned film capsule; also performed mapping, geodesy, earth resources tasks; deployed capsule..

1978 November 15 - . 11:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1047** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-11-28 . *USAF Sat Cat*: 11108 . *COSPAR*: 1978-104A. *Apogee*: 354 km (219 mi). *Perigee*: 171 km (106 mi). *Inclination*: 72.9000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 November 21 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1049** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-12-04 . *USAF Sat Cat*: 11118 . *COSPAR*: 1978-107A. *Apogee*: 338 km (210 mi). *Perigee*: 169 km (105 mi). *Inclination*: 72.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 November 28 - . 16:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1050** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1978-12-12 . *USAF Sat Cat*: 11121 . *COSPAR*: 1978-108A. *Apogee*: 341 km (211 mi). *Perigee*: 194 km (120 mi). *Inclination*: 62.8000 deg. *Period*: 89.80 min. Photo surveillance; returned film capsule; maneuverable..

1978 December 7 - . 15:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1059** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1978-12-20 . *USAF Sat Cat*: 11137 . *COSPAR*: 1978-110A. *Apogee*: 338 km (210 mi). *Perigee*: 180 km (110 mi). *Inclination*: 62.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 December 8 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1060** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-12-21 . *USAF Sat Cat*: 11139 . *COSPAR*: 1978-111A. *Apogee*: 291 km (180 mi). *Perigee*: 216 km (134 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule..

1978 December 14 - . 15:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1061** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1978-12-27 . *USAF Sat Cat*: 11148 . *COSPAR*: 1978-114A. *Apogee*: 310 km (190 mi). *Perigee*: 203 km (126 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. Area survey photo reconnaissance satellite; returned film capsule; deployed capsule..

- **Nauka Cosmos 1061** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1979-01-04 . *USAF Sat Cat*: 11167 . *COSPAR*: 1978-114C. *Apogee*: 296 km (183 mi). *Perigee*: 197 km (122 mi). *Inclination*: 62.8000 deg. *Period*: 89.43 min.

1978 December 19 - . 01:35 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1063** - . *Payload*: Tselina-D no. 18. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2001-11-25 . *USAF Sat Cat*: 11155 . *COSPAR*: 1978-117A. *Apogee*: 524 km (325 mi). *Perigee*: 518 km (321 mi). *Inclination*: 81.2000 deg. *Period*: 95.10 min.

1978 December 23 - . 08:39 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1066** - . *Payload*: Astrofizika s/n 1. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Astronomy. *Type*: X-ray astronomy satellite.

Spacecraft Bus: Meteor. *Spacecraft*: Astrofizika. *USAF Sat Cat*: 11165 . *COSPAR*: 1978-121A. *Apogee*: 890 km (550 mi). *Perigee*: 819 km (508 mi). *Inclination*: 81.2000 deg. *Period*: 102.00 min. Probable failure. Investigation of the upper atmosphere and outer space. .

1978 December 26 - . 15:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1068** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1979-01-08 . *USAF Sat Cat*: 11169 . *COSPAR*: 1978-123A. *Apogee*: 389 km (241 mi). *Perigee*: 191 km (118 mi). *Inclination*: 62.8000 deg. *Period*: 90.40 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1978 December 28 - . 16:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1069** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 13.00 days. *Decay Date*: 1979-01-10 . *USAF Sat Cat*: 11173 . *COSPAR*: 1978-124A. *Apogee*: 289 km (179 mi). *Perigee*: 254 km (157 mi). *Inclination*: 62.9000 deg. *Period*: 89.90 min. Military topography satellite; returned film capsule; also performed mapping, geodesy, earth resources tasks; separated capsule..

1979 January 11 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1070** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 9.00 days. *Decay Date*: 1979-01-20 . *USAF Sat Cat*: 11229 . *COSPAR*: 1979-001A. *Apogee*: 293 km (182 mi). *Perigee*: 205 km (127 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. Area survey photo reconnaissance satellite; returned film capsule..
- **Nauka Cosmos 1070** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1979-01-27 . *USAF Sat Cat*: 11245 . *COSPAR*: 1979-001F. *Apogee*: 280 km (170 mi). *Perigee*: 199 km (123 mi). *Inclination*: 62.8000 deg. *Period*: 89.29 min.

1979 January 13 - . 15:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1071** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1979-01-26 . *USAF Sat Cat*: 11233 . *COSPAR*: 1979-002A. *Apogee*: 339 km (210 mi). *Perigee*: 179 km (111 mi). *Inclination*: 62.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1979 January 18 - . 15:42 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-11** - . *Payload*: Molniya-3 s/n 23. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1998-12-02 . *USAF Sat Cat*: 11240 . *COSPAR*: 1979-004A. *Apogee*: 39,973 km (24,838 mi). *Perigee*: 370 km (220 mi). *Inclination*: 63.0000 deg. *Period*: 717.60 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1979 January 25 - . 05:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-29** - . *Payload*: Meteor-Priroda s/n 2-3. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-Priroda. *USAF Sat Cat*: 11251 . *COSPAR*: 1979-005A. *Apogee*: 596 km (370 mi). *Perigee*: 546 km (339 mi). *Inclination*: 97.8000 deg. *Period*: 96.10 min.

  Obtaining information needed for research into the natural resources of the earth and the development of methods for remote sensing of the underlying surface, and obtaining meteorological information. In addition to Soviet apparatus, carried scientific ap paratus from the German Democratic Republic.

1979 January 30 - . 15:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1073** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 29.00 days. *Decay Date*: 1979-02-12 . *USAF Sat Cat*: 11255 . *COSPAR*: 1979-006A. *Apogee*: 328 km (203 mi). *Perigee*: 182 km (113 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1979 January 31 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1074** - . *Payload*: Soyuz T s/n 5L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 60.04 days. *Decay Date*: 1979-04-01 . *USAF Sat Cat*: 11259 . *COSPAR*: 1979-008A. *Apogee*: 238 km (147 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Manned precursor. Recovered April 1, 1979 10:09 GMT. Soyuz T Test.
  Maneuver Summary:
  197 km X 240 km orbit to 255 km X 297 km orbit. Delta V: 33 m/s
  255 km X 297 km orbit to 264 km X 306 km orbit. Delta V: 4 m/s
  264 km X 306 km orbit to 309 km X 321 km orbit. Delta V: 17 m/s
  309 km X 321 km orbit to 279 km X 357 km orbit. Delta V: 18 m/s
  279 km X 357 km orbit to 352 km X 402 km orbit. Delta V: 32 m/s
  352 km X 402 km orbit to 363 km X 384 km orbit. Delta V: 8 m/s
  Total Delta V: 112 m/s
  Officially: Investigation of the upper atmosphere and outer space.

1979 February 13 - . 21:41 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1077** - . *Payload*: Tselina-D no. 19. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2000-06-26 . *USAF Sat Cat*: 11268 . *COSPAR*: 1979-012A. *Apogee*: 491 km (305 mi). *Perigee*: 485 km (301 mi). *Inclination*: 81.2000 deg. *Period*: 94.40 min.

1979 February 16 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-2M** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. Area survey photo reconnaissance satellite..

- **Nauka** - . *Nation*: Russia. *Agency*: RVSN. *Spacecraft*: Nauka.

1979 February 22 - . 12:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1078** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 8.00 days. *Decay Date*: 1979-03-02 . *USAF Sat Cat*: 11276 . *COSPAR*: 1979-016A. *Apogee*: 280 km (170 mi). *Perigee*: 168 km (104 mi). *Inclination*: 72.9000 deg. *Period*: 89.00 min. High resolution photo

reconnaissance satellite; returned film capsule; maneuverable..

1979 February 25 - . 11:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 32** - . *Call Sign*: Proton (Proton). *Crew*: Lyakhov, Ryumin. *Backup Crew*: Lebedev, Popov. *Payload*: Soyuz 7K-T s/n 48. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Lebedev, Lyakhov, Popov, Ryumin. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 32. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 110.18 days. *Decay Date*: 1979-06-13 . *USAF Sat Cat*: 11281 . *COSPAR*: 1979-018A. *Apogee*: 256 km (159 mi). *Perigee*: 193 km (119 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min. Manned two crew. Docked with Salyut 6. Transported a team consisting of V A Lyakhov and V V Ryumin to the Salyut-6 space station to conduct scientific investigations and experiments and repair work. Recovered June 15, 1979 16:18 GMT. Returned unmanned..

1979 February 27 - . 15:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1079** - . *Payload*: Yantar-2K s/n 15. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 12.00 days. *Decay Date*: 1979-03-11 . *USAF Sat Cat*: 11283 . *COSPAR*: 1979-019A. *Apogee*: 337 km (209 mi). *Perigee*: 174 km (108 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. Area survey photo reconnaissance. Spacecraft depressurization led to malfunction of spacecraft. Deorbited after 12 days..

1979 March 1 - . 18:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 2-04** - . *Payload*: Meteor-2 no. 4. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-2. *USAF Sat Cat*: 11288 . *COSPAR*: 1979-021A. *Apogee*: 872 km (541 mi). *Perigee*: 839 km (521 mi). *Inclination*: 81.2000 deg. *Period*: 102.00 min. Acquisition of meteorological information required for use in the operational weather service with the aid of advanced equipment..

1979 March 12 - . 05:47 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 5** - . *Payload*: Progress s/n 104. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz 32. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 23.77 days. *Completed Operations Date*: 1979-04-05 00:09:54 . *Decay Date*:

1979-04-05 00:09:54 . *USAF Sat Cat*: 11292 . *COSPAR*: 1979-022A. *Apogee*: 256 km (159 mi). *Perigee*: 183 km (113 mi). *Inclination*: 51.7000 deg. *Period*: 88.80 min.

Unmanned supply vessel to Salyut 6. Delivery of fuel, consumable materials and equipment to the Salyut 6 station. Docked with Salyut 6 on 14 Mar 1979 07:19:21 GMT. Undocked on 3 Apr 1979 16:10:00 GMT. Destroyed in reentry on 5 Apr 1979 00:10:22 GMT. Total free-flight time 3.40 days. Total docked time 20.37 days.

1979 March 14 - . 10:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1080** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 14.00 days. *Decay Date*: 1979-03-28 . *USAF Sat Cat*: 11294 . *COSPAR*: 1979-023A. *Apogee*: 294 km (182 mi). *Perigee*: 169 km (105 mi). *Inclination*: 72.9000 deg. *Period*: 89.10 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1979 March 31 - . 10:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1090** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1979-04-13 . *USAF Sat Cat*: 11313 . *COSPAR*: 1979-027A. *Apogee*: 320 km (190 mi). *Perigee*: 217 km (134 mi). *Inclination*: 72.8000 deg. *Period*: 89.80 min. Area survey photo reconnaissance satellite; returned film capsule..

1979 April 10 - . 17:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 33** - . *Call Sign*: Saturn (Saturn). *Crew*: Ivanov, Georgi, Rukavishnikov. *Backup Crew*: Aleksandrov, Aleksandr, Romanenko. *Payload*: Soyuz 7K-T s/n 49. *Mass*: 6,860 kg (15,120 lb). *Nation*: Russia. *Related Persons*: Aleksandrov, Aleksandr, Ivanov, Georgi, Romanenko, Rukavishnikov. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 32, Soyuz 33. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 1.96 days. *Decay Date*: 1979-04-12 . *USAF Sat Cat*: 11324 . *COSPAR*: 1979-029A. *Apogee*: 261 km (162 mi). *Perigee*: 194 km (120 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min. Manned two crew. Flight under the Intercosmos programme of an international team consisting of N N Rukavishnikov (USSR) and G I Ivanov (Bulgaria). Unsuccessful mission. Failed to rendezvous with Salyut 6..

1979 April 12 - . 00:28 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-43** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1989-12-09 . *USAF Sat Cat*: 11328 . *COSPAR*: 1979-031A. *Apogee*: 39,936 km (24,815 mi). *Perigee*: 199 km (123 mi). *Inclination*: 64.0000 deg. *Period*: 713.40 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1979 April 14 - . 05:27 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1093** - . *Payload*: Tselina-D no. 20. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2000-03-23 . *USAF Sat Cat*: 11331 . *COSPAR*: 1979-032A. *Apogee*: 487 km (302 mi). *Perigee*: 474 km (294 mi). *Inclination*: 81.2000 deg. *Period*: 94.20 min.

1979 April 20 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1095** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1979-05-04 . *USAF Sat Cat*: 11335 . *COSPAR*: 1979-034A. *Apogee*: 379 km (235 mi). *Perigee*: 199 km (123 mi). *Inclination*: 72.8000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1979 April 27 - . 17:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1097** - . *Payload*: Yantar-4K1 s/n 1. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 30.00 days. *Decay Date*: 1979-05-27 . *USAF Sat Cat*: 11348 . *COSPAR*: 1979-037A. *Apogee*: 331 km (205 mi). *Perigee*: 173 km (107 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. First flight test of Yantar-4K1 satellite. Returned as planned after 30 days. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1979 May 13 - . 04:17 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 6** - . *Payload*: Progress s/n 106. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics

spacecraft. *Flight*: Soyuz 32. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 27.61 days. *Completed Operations Date*: 1979-06-09 18:52:36 . *Decay Date*: 1979-06-09 18:52:36 . *USAF Sat Cat*: 11356 . *COSPAR*: 1979-039A. *Apogee*: 247 km (153 mi). *Perigee*: 190 km (110 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

Unmanned supply vessel to Salyut 6. Delivery of fuel, consumable materials and equipment to the Salyut 6 station. Docked with Salyut 6 on 15 May 1979 06:19:22 GMT. Undocked on 8 Jun 1979 07:59:41 GMT. Destroyed in reentry on 9 Jun 1979 18:52:46 GMT. Total free-flight time 3.54 days. Total docked time 24.07 days.

1979 May 15 - . 11:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1098** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1979-05-28 . *USAF Sat Cat*: 11358 . *COSPAR*: 1979-040A. *Apogee*: 354 km (219 mi). *Perigee*: 170 km (100 mi). *Inclination*: 72.9000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable; also performed earth resources tasks..

1979 May 17 - . 07:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1099** - . *Payload*: Zenit-4MKT no. 8. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1979-05-30 . *USAF Sat Cat*: 11360 . *COSPAR*: 1979-041A. *Apogee*: 247 km (153 mi). *Perigee*: 215 km (133 mi). *Inclination*: 81.4000 deg. *Period*: 89.10 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1979 May 25 - . 07:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1102** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1979-06-07 . *USAF Sat Cat*: 11368 . *COSPAR*: 1979-043A. *Apogee*: 260 km (160 mi). *Perigee*: 212 km (131 mi). *Inclination*: 81.3000 deg. *Period*: 89.20 min.

  Zenit-2M area survey photo reconnaissance satellite used for earth resources studies as part of 'Gektor-Priroda' project. Nauka subsatellite 32KS jettisoned into independent orbit in the course of the mission. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR

and international cooperation.

- **Nauka Cosmos 1102** - . *Payload*: Nauka. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1979-07-13 . *USAF Sat Cat*: 11390 . *COSPAR*: 1979-043D. *Apogee*: 180 km (110 mi). *Perigee*: 162 km (100 mi). *Inclination*: 81.3000 deg. *Period*: 87.91 min.

1979 May 31 - . 16:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1103** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1979-06-14 . *USAF Sat Cat*: 11376 . *COSPAR*: 1979-045A. *Apogee*: 375 km (233 mi). *Perigee*: 257 km (159 mi). *Inclination*: 62.8000 deg. *Period*: 90.80 min. Photo surveillance; returned film capsule..

1979 June 5 - . 23:28 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-12** - . *Payload*: Molniya-3 s/n 21. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1992-09-26 . *USAF Sat Cat*: 11384 . *COSPAR*: 1979-048A. *Apogee*: 19,362 km (12,030 mi). *Perigee*: 126 km (78 mi). *Inclination*: 63.0000 deg. *Period*: 339.60 min. Continued operation of the long-range telephone and telegraph radio-communication system; transmission of USSR central television programmes to stations in the Orbita network and international cooperation. .

1979 June 6 - . 18:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 34** - . *Call Sign*: Proton (Proton). *Payload*: Soyuz 7K-T s/n 50. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 32. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 73.76 days. *Decay Date*: 1979-08-19 . *USAF Sat Cat*: 11387 . *COSPAR*: 1979-049A. *Apogee*: 254 km (157 mi). *Perigee*: 192 km (119 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min.

  Docked with Salyut 6. Launched unmanned to provide return vehicle for Soyuz 32 crew of Lyakhov/Ryumin after Soyuz 33 primary propulsion system failure. Checked the operation of the spacecraft propulsion unit; transportated the crew of the Salyut-6 station back to earth.

1979 June 8 - . 07:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1.

LV Family: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1105** - . *Payload*: Zenit-4MKT no. 9. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1979-06-21 . *USAF Sat Cat*: 11394 . *COSPAR*: 1979-052A. *Apogee*: 254 km (157 mi). *Perigee*: 212 km (131 mi). *Inclination*: 81.4000 deg. *Period*: 89.20 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1979 June 12 - . 07:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1106** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1979-06-25 . *USAF Sat Cat*: 11399 . *COSPAR*: 1979-054A. *Apogee*: 237 km (147 mi). *Perigee*: 216 km (134 mi). *Inclination*: 81.4000 deg. *Period*: 89.10 min.

  Zenit-2M area survey photo reconnaissance satellite used for earth resources studies as part of 'Gektor-Priroda' project. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

- **Nauka Cosmos 1106** - . *Payload*: Nauka?. *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Nauka. *Decay Date*: 1979-06-30 . *USAF Sat Cat*: 11415 . *COSPAR*: 1979-054D. *Apogee*: 204 km (126 mi). *Perigee*: 197 km (122 mi). *Inclination*: 81.3000 deg. *Period*: 88.50 min.

1979 June 15 - . 10:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1107** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1979-06-29 . *USAF Sat Cat*: 11404 . *COSPAR*: 1979-055A. *Apogee*: 301 km (187 mi). *Perigee*: 198 km (123 mi). *Inclination*: 72.9000 deg. *Period*: 89.50 min. Photo surveillance; returned film capsule; maneuverable..

1979 June 22 - . 07:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1108** - . *Payload*: Zenit-4MKT no. 10. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*:

13.00 days. *Decay Date*: 1979-07-05 . *USAF Sat Cat*: 11413 . *COSPAR*: 1979-056A. *Apogee*: 245 km (152 mi). *Perigee*: 214 km (132 mi). *Inclination*: 81.3000 deg. *Period*: 89.10 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1979 June 27 - . 18:11 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1109** - . *Payload*: Oko #11. *Mass*: 2,030 kg (4,470 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 11417 . *COSPAR*: 1979-058A. *Apogee*: 36,998 km (22,989 mi). *Perigee*: 3,228 km (2,005 mi). *Inclination*: 68.2000 deg. *Period*: 715.20 min. Covered Oko constellation plane 9 - 237 degree longitude of ascending node..

1979 June 28 - . 09:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 7** - . *Payload*: Progress s/n 107. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz 32. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 21.69 days. *Completed Operations Date*: 1979-07-20 01:57:19 . *Decay Date*: 1979-07-20 01:57:19 . *USAF Sat Cat*: 11421 . *COSPAR*: 1979-059A. *Apogee*: 251 km (155 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Unmanned supply vessel to Salyut 6. Delivery of fuel, consumable materials and equipment to the Salyut 6 station. Docked with Salyut 6 on 30 Jun 1979 11:18:22 GMT. Undocked on 18 Jul 1979 03:49:55 GMT. Destroyed in reentry on 20 Jul 1979 01:57:30 GMT. Total free-flight time 4.0 days. Total docked time 17.69 days.

- **KRT-10** - . *Payload*: KRT-10. *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Flight*: Soyuz 32. *Spacecraft*: KRT-10. *Decay Date*: 1979-08-26 . *USAF Sat Cat*: 11493 . *COSPAR*: 1977-097BD. *Apogee*: 385 km (239 mi). *Perigee*: 359 km (223 mi). *Inclination*: 51.6000 deg. *Period*: 91.99 min. 10 m diameter radio telescope. Attached to Salyut 6 docking hatch and deployed after separation of Progress from Mir..

1979 June 29 - . 16:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1111** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 15.00 days. *Decay Date*: 1979-07-14 . *USAF Sat Cat*: 11429 . *COSPAR*: 1979-061A. *Apogee*: 354 km (219 mi). *Perigee*: 255 km (158 mi). *Inclination*: 62.8000 deg. *Period*: 90.60 min. Photo surveillance; returned film capsule..

1979 July 10 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1113** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1979-07-23 . *USAF Sat Cat*: 11447 . *COSPAR*: 1979-064A. *Apogee*: 330 km (200 mi). *Perigee*: 173 km (107 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1979 July 13 - . 08:25 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1115** - . *Payload*: Zenit-4MKT no. 11. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1979-07-26 . *USAF Sat Cat*: 11451 . *COSPAR*: 1979-066A. *Apogee*: 235 km (146 mi). *Perigee*: 217 km (134 mi). *Inclination*: 81.4000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1979 July 20 - . 11:58 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1116** - . *Payload*: Tselina-D no. 21. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1993-03-11 . *USAF Sat Cat*: 11457 . *COSPAR*: 1979-067A. *Apogee*: 408 km (253 mi). *Perigee*: 396 km (246 mi). *Inclination*: 81.2000 deg. *Period*: 92.60 min.

1979 July 25 - . 15:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1117** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1979-08-07 . *USAF Sat Cat*: 11463 . *COSPAR*: 1979-068A. *Apogee*: 325 km (201 mi). *Perigee*: 177 km (109 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1979 July 27 - . 07:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1118** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1979-08-09 . *USAF Sat Cat*: 11465 . *COSPAR*: 1979-069A. *Apogee*: 237 km (147 mi). *Perigee*: 210 km (130 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min.

Zenit-2M area survey photo reconnaissance satellite used for earth resources studies as part of 'Gektor-Priroda' project. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1979 July 31 - . 03:56 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-44** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 11474 . *COSPAR*: 1979-070A. *Apogee*: 39,806 km (24,734 mi). *Perigee*: 550 km (340 mi). *Inclination*: 63.3000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network. .

1979 August 3 - . 10:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1119** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1979-08-15 . *USAF Sat Cat*: 11478 . *COSPAR*: 1979-071A. *Apogee*: 245 km (152 mi). *Perigee*: 213 km (132 mi). *Inclination*: 81.4000 deg. *Period*: 89.00 min. Military topography satellite; returned film capsule; separated capsule..

1979 August 11 - . 09:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1120** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1979-08-24 . *USAF Sat Cat*: 11485 . *COSPAR*: 1979-073A. *Apogee*: 362 km (224 mi). *Perigee*: 170 km (100 mi). *Inclination*: 70.6000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1979 August 14 - . 15:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1121** - . *Payload*: Yantar-2K s/n 929. *Mass*: 6,600 kg (14,500 lb). *Nation*:

Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1979-09-13 . *USAF Sat Cat*: 11487 . *COSPAR*: 1979-074A. *Apogee*: 348 km (216 mi). *Perigee*: 171 km (106 mi). *Inclination*: 67.2000 deg. *Period*: 89.70 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1979 August 17 - . 07:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1122** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-2M satellite. *Duration*: 13.00 days. *Decay Date*: 1979-08-30 . *USAF Sat Cat*: 11491 . *COSPAR*: 1979-075A. *Apogee*: 227 km (141 mi). *Perigee*: 208 km (129 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min.

  Zenit-2M area survey photo reconnaissance satellite used for earth resources studies as part of 'Gektor-Priroda' project. Nauka subsatellite 31KS jettisoned into independent orbit in the course of the mission. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

- **Cosmos 1122 Nauka** - . *Nation*: Russia. *Agency*: RVSN. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Nauka. *COSPAR*: 1979-075xx.

1979 August 21 - . 11:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1123** - . *Payload*: Zenit-4MKT no. 12. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1979-09-03 . *USAF Sat Cat*: 11496 . *COSPAR*: 1979-076A. *Apogee*: 236 km (146 mi). *Perigee*: 211 km (131 mi). *Inclination*: 81.3000 deg. *Period*: 88.90 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1979 August 28 - . 00:17 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1124** - . *Payload*: Oko #12. *Mass*: 2,030 kg (4,470 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 11509 . *COSPAR*: 1979-077A. *Apogee*: 35,403 km (21,998 mi). *Perigee*: 4,913 km (3,052 mi). *Inclination*: 67.3000 deg. *Period*: 717.00 min. Replaced Cosmos 1030. Covered Oko constellation plane 4 - 36 degree longitude of ascending node..

1979 August 31 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1126** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1979-09-14 . *USAF Sat Cat*: 11515 . *COSPAR*: 1979-079A. *Apogee*: 391 km (242 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.8000 deg. *Period*: 90.40 min. Photo surveillance; returned film capsule..

1979 September 5 - . 10:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1127** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 13.00 days. *Decay Date*: 1979-09-18 . *USAF Sat Cat*: 11520 . *COSPAR*: 1979-080A. *Apogee*: 268 km (166 mi). *Perigee*: 210 km (130 mi). *Inclination*: 81.3000 deg. *Period*: 89.30 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1979 September 14 - . 15:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1128** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1979-09-27 . *USAF Sat Cat*: 11529 . *COSPAR*: 1979-081A. *Apogee*: 328 km (203 mi). *Perigee*: 173 km (107 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1979 September 25 - . 15:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1129** - . *Payload*: Bion no. 5. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 18.50 days. *Decay Date*: 1979-10-14 . *USAF Sat Cat*: 11536 . *COSPAR*: 1979-083A. *Apogee*: 376 km (233 mi). *Perigee*: 213 km (132 mi). *Inclination*: 62.8000 deg. *Period*: 90.40 min.

  Biological experiments; embryo development, radiation medicine. Biosatellite for the continued investigation of the effects of space flight on living organisms. Capsule

recovered 52 deg 17 min N, 65 deg 30 min E. Cosmos 1129 satellite carried biological and radiation physics experiment packages from Czechoslovakia, France, Hungary, Poland, Romania, the German Democratic Republic, the U.S. and the U.S.S.R. *Additional Details*: here....

1979 September 28 - . 12:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1138** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1979-10-12 . *USAF Sat Cat*: 11548 . *COSPAR*: 1979-085A. *Apogee*: 373 km (231 mi). *Perigee*: 199 km (123 mi). *Inclination*: 72.9000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1979 October 5 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1139** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 13.00 days. *Decay Date*: 1979-10-18 . *USAF Sat Cat*: 11564 . *COSPAR*: 1979-088A. *Apogee*: 329 km (204 mi). *Perigee*: 199 km (123 mi). *Inclination*: 72.8000 deg. *Period*: 89.80 min. Military topography satellite; returned film capsule; also performed mapping, geodesy, earth resources tasks; separated capsule..

1979 October 12 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC43/pad?. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-6** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RVSN. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *COSPAR*: F791012A. Photo surveillance mission..

1979 October 20 - . 07:03 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-45** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1994-02-18 . *USAF Sat Cat*: 11589 . *COSPAR*: 1979-091A. *Apogee*: 39,615 km (24,615 mi). *Perigee*: 93 km (57 mi). *Inclination*: 61.7000 deg. *Period*: 704.70 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1979 October 22 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1142** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 13.00 days. *Decay Date*: 1979-11-04 . *USAF Sat Cat*: 11592 . *COSPAR*: 1979-092A. *Apogee*: 382 km (237 mi). *Perigee*: 198 km (123 mi). *Inclination*: 72.9000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1979 October 26 - . 18:12 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1143** - . *Payload*: Tselina-D no. 22. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2002-02-17 . *USAF Sat Cat*: 11600 . *COSPAR*: 1979-093A. *Apogee*: 533 km (331 mi). *Perigee*: 524 km (325 mi). *Inclination*: 81.3000 deg. *Period*: 95.20 min.

1979 October 31 - . 09:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 2-05** - . *Payload*: Meteor-2 no. 5. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-2. *USAF Sat Cat*: 11605 . *COSPAR*: 1979-095A. *Apogee*: 881 km (547 mi). *Perigee*: 862 km (535 mi). *Inclination*: 81.2000 deg. *Period*: 102.40 min. Acquisition of meteorological information required for use in the operational weather service with the aid of advanced equipment. .

1979 November 2 - . 16:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1144** - . *Payload*: Yantar-2K s/n 939. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 32.00 days. *Decay Date*: 1979-12-04 . *USAF Sat Cat*: 11611 . *COSPAR*: 1979-097A. *Apogee*: 337 km (209 mi). *Perigee*: 158 km (98 mi). *Inclination*: 67.2000 deg. *Period*: 89.40 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1979 November 27 - . 09:55 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1145** - . *Payload*: Tselina-D no. 23. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals

intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2000-06-16 . *USAF Sat Cat*: 11629 . *COSPAR*: 1979-099A. *Apogee*: 495 km (307 mi). *Perigee*: 484 km (300 mi). *Inclination*: 81.2000 deg. *Period*: 94.40 min.

1979 December 12 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1147** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1979-12-26 . *USAF Sat Cat*: 11638 . *COSPAR*: 1979-102A. *Apogee*: 377 km (234 mi). *Perigee*: 192 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1979 December 16 - . 12:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-1** - . *Payload*: Soyuz T s/n 6L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 100.38 days. *Decay Date*: 1980-03-25 . *USAF Sat Cat*: 11640 . *COSPAR*: 1979-103A. *Apogee*: 252 km (156 mi). *Perigee*: 213 km (132 mi). *Inclination*: 51.6000 deg. *Period*: 89.20 min.

  New generation Soyuz capsule; unmanned flight to Salyut 6. Docked with Salyut 6. Recovered March 25, 1980 21:47 GMT. Unmanned test of Soyuz T design. Officially: Complex experimental testing of new on-board systems and assemblies under various flight conditions and operation in conjunction with the Salyut-6 orbital station.

1979 December 28 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1148** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1980-01-10 . *USAF Sat Cat*: 11649 . *COSPAR*: 1979-106A. *Apogee*: 340 km (210 mi). *Perigee*: 170 km (100 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1980 January 9 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1149** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-01-23 . *USAF Sat*

Cat: 11652 . *COSPAR*: 1980-001A. *Apogee*: 384 km (238 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1980 January 11 - . 12:28 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-46** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1992-10-22 . *USAF Sat Cat*: 11662 . *COSPAR*: 1980-002A. *Apogee*: 28,891 km (17,952 mi). *Perigee*: 103 km (64 mi). *Inclination*: 63.2000 deg. *Period*: 500.30 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1980 January 24 - . 15:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1152** - . *Payload*: Yantar-2K s/n 928. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 13.00 days. *Decay Date*: 1980-02-06 . *USAF Sat Cat*: 11678 . *COSPAR*: 1980-006A. *Apogee*: 341 km (211 mi). *Perigee*: 169 km (105 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. Area survey photo reconnaissance. Mission terminated early for unknown reasons (normally 30 day duration)..

1980 January 30 - . 12:51 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1154** - . *Payload*: Tselina-D no. 24. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2002-11-05 . *USAF Sat Cat*: 11682 . *COSPAR*: 1980-008A. *Apogee*: 545 km (338 mi). *Perigee*: 540 km (330 mi). *Inclination*: 81.2000 deg. *Period*: 95.50 min.

1980 February 7 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1155** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-02-21 . *USAF Sat Cat*: 11685 . *COSPAR*: 1980-009A. *Apogee*: 393 km (244 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.8000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1980 February 12 - . 00:53 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: Fourth stage failure.. *Failed Stage*: U.

- **Cosmos 1164** - . *Payload*: Oko #13. *Mass*: 1,890 kg (4,160 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 1980-02-12 . *USAF Sat Cat*: 11700 . *COSPAR*: 1980-013A. *Apogee*: 40,856 km (25,386 mi). *Perigee*: 434 km (269 mi). *Inclination*: 62.8000 deg. *Period*: 736.80 min. Left in parking orbit. Decay date suspect Investigation of the upper atmosphere and outer space. Was intended to cover Oko constellation plane 9 - 241 degree longitude of ascending node..

1980 February 21 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1165** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1980-03-05 . *USAF Sat Cat*: 11713 . *COSPAR*: 1980-017A. *Apogee*: 350 km (210 mi). *Perigee*: 170 km (100 mi). *Inclination*: 72.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance satellite; returned film capsule.

1980 March 4 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1166** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-03-18 . *USAF Sat Cat*: 11722 . *COSPAR*: 1980-020A. *Apogee*: 371 km (230 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.8000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1980 March 18 - . 16:01 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M. *FAILURE*: Booster exploded on pad during servicing. Severe pad damage, 48 people killed. Cause found to be change in solder with tin to that with lead in H2O2 filters, causing decomposition and explosion.. *Failed Stage*: 0.

- **Tselina-D** - . *Nation*: Russia. *Agency*: RVSN. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 1980-03-18 . *COSPAR*: F800318A.

  This was the worst disaster since the Nedelin Catastrophe on 24 October 1964. A commission of military officers and chief designers reviewed the incident and requested changes to equipment and procedures, especially as regarded liquid

oxygen handling. Another source reports that the explosion occurred during the fuelling of the Block E upper stage, and was due to hydrogen peroxide being present in a lox line filter and a confusion between fuel and lox lines. This error had always been possible, but had never happened in the 20 years of use of the booster before the explosion. The launch pad was badly damaged and not put back into service until April 1983.

1980 March 27 - . 18:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 8** - . *Payload*: Progress s/n 108. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 29.50 days. *Completed Operations Date*: 1980-04-26 06:54:00 . *Decay Date*: 1980-04-26 06:54:00 . *USAF Sat Cat*: 11743 . *COSPAR*: 1980-024A. *Apogee*: 250 km (150 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min.

  Unmanned supply vessel for Salyut 6. Delivery of various cargoes to the Salyut-6 orbital station. Docked with Salyut 6 on 29 Mar 1980 20:01:00 GMT. Undocked on 25 Apr 1980 08:04:00 GMT. Destroyed in reentry on 26 Apr 1980 06:54:00 GMT. Total free-flight time 3.0 days. Total docked time 26.50 days.

1980 April 1 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1170** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 11.00 days. *Decay Date*: 1980-04-12 . *USAF Sat Cat*: 11747 . *COSPAR*: 1980-025A. *Apogee*: 379 km (235 mi). *Perigee*: 178 km (110 mi). *Inclination*: 70.4000 deg. *Period*: 90.10 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1980 April 9 - . 13:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 35** - . *Call Sign*: Dnepr (Dnieper). *Crew*: Popov, Ryumin. *Backup Crew*: Andreyev, Zudov. *Payload*: Soyuz 7K-T s/n 51. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Andreyev, Popov, Ryumin, Zudov. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 35. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 55.06 days. *Decay Date*: 1980-06-03 . *USAF Sat Cat*: 11753 . *COSPAR*: 1980-027A. *Apogee*: 247 km (153 mi). *Perigee*: 197 km (122 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min. Manned two crew. Docked with Salyut 6. Carried crew comprising L I Popov and V V Ryumin to the Salyut-6 station to carry out scientific and technical research and experiments..

1980 April 12 - . 20:18 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1172** - . *Payload*: Oko #14. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 1997-12-26 . *USAF Sat Cat*: 11758 . *COSPAR*: 1980-028A. *Apogee*: 38,809 km (24,114 mi). *Perigee*: 1,476 km (917 mi). *Inclination*: 64.7000 deg. *Period*: 716.40 min. Replaced Cosmos 1109. Covered Oko constellation plane 9 - 240 degree longitude of ascending node..

1980 April 17 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1173** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 11.00 days. *Decay Date*: 1980-04-28 . *USAF Sat Cat*: 11763 . *COSPAR*: 1980-029A. *Apogee*: 352 km (218 mi). *Perigee*: 174 km (108 mi). *Inclination*: 70.3000 deg. *Period*: 89.80 min. High resolution photo reconnaissance satellite; returned film capsule; maneuverable..

1980 April 18 - . 17:31 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: Fourth stage failure.. *Failed Stage*: U.

- **Cosmos 1175** - . *Payload*: Molniya-3 s/n 26. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1980-09-29 . *USAF Sat Cat*: 11769 . *COSPAR*: 1980-031C. *Apogee*: 458 km (284 mi). *Perigee*: 251 km (155 mi). *Inclination*: 62.8000 deg. *Period*: 91.60 min. Probable failed early warning. Investigation of the upper atmosphere and outer space..

1980 April 27 - . 06:24 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 9** - . *Payload*: Progress s/n 109. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz 35. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 24.76 days. *Completed Operations Date*: 1980-05-22 00:44:00 . *Decay Date*: 1980-05-22 00:44:00 . *USAF Sat Cat*: 11784 . *COSPAR*: 1980-033A. *Apogee*: 255 km (158 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.7000 deg. *Period*: 88.80 min.

  Unmanned supply vessel for Salyut 6. Delivery of various cargoes to the Salyut-6 orbital station. Docked with Salyut 6 on 29 Apr 1980 08:09:19 GMT. Undocked on 20 May 1980 18:51:00 GMT. Destroyed in reentry on 22 May 1980 00:44:00 GMT. Total free-flight time 3.32 days. Total docked time 21.45 days.

1980 April 29 - . 13:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1177** - . *Payload*: Yantar-4K1 s/n 2. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 44.00 days. *Decay Date*: 1980-06-12 . *USAF Sat Cat*: 11789 . *COSPAR*: 1980-035A. *Apogee*: 331 km (205 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.2000 deg. *Period*: 89.50 min. Second flight test of Yantar-4K1 satellite. Demonstrated full spacecraft design duration of 45 days. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1980 May 7 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1178** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 15.00 days. *Decay Date*: 1980-05-22 . *USAF Sat Cat*: 11793 . *COSPAR*: 1980-036A. *Apogee*: 386 km (239 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1980 May 15 - . 05:35 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1180** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 11.00 days. *Decay Date*: 1980-05-26 . *USAF Sat Cat*: 11798 . *COSPAR*: 1980-038A. *Apogee*: 279 km (173 mi). *Perigee*: 245 km (152 mi). *Inclination*: 62.8000 deg. *Period*: 89.80 min. Military topography satellite; returned film capsule; also performed mapping, geodesy, earth resources tasks; separated capsule..

1980 May 23 - . 07:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1182** - . *Payload*: Zenit-4MKT no. 13. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1980-06-05 . *USAF Sat Cat*: 11808 . *COSPAR*: 1980-040A. *Apogee*: 251 km (155 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.3000 deg. *Period*: 89.10 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1980 May 26 - . 18:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 36** - . *Call Sign*: Orion (Orion). *Crew*: Farkas, Kubasov. *Backup Crew*: Dzhanibekov, Magyari. *Payload*: Soyuz 7K-T s/n 52. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Dzhanibekov, Farkas, Kubasov, Magyari. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 35, Soyuz 36. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 65.87 days. *Decay Date*: 1980-07-31 . *USAF Sat Cat*: 11811 . *COSPAR*: 1980-041A. *Apogee*: 263 km (163 mi). *Perigee*: 190 km (110 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min. Transported the fifth international crew under the INTERCOSMOS programme, comprising V N Kubasov (USSR) and B Farkas (Hungary) to the Salyut-6 station to carry out scientific research and experiments..

1980 May 28 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1183** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-06-11 . *USAF Sat Cat*: 11816 . *COSPAR*: 1980-042A. *Apogee*: 384 km (238 mi). *Perigee*: 196 km (121 mi). *Inclination*: 72.8000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1980 June 4 - . 07:34 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1184** - . *Payload*: Tselina-D no. 25. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2002-04-29 . *USAF Sat Cat*: 11821 . *COSPAR*: 1980-044A. *Apogee*: 535 km (332 mi). *Perigee*: 532 km (330 mi). *Inclination*: 81.2000 deg. *Period*: 95.30 min.

1980 June 5 - . 14:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-2** - . *Call Sign*: Yupiter (Jupiter). *Crew*: Aksyonov, Malyshev. *Backup Crew*: Kizim, Makarov. *Payload*: Soyuz T s/n 7L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Aksyonov, Kizim, Makarov, Malyshev. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 35, Soyuz T-2. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 3.93 days. *Decay Date*: 1980-06-09 . *USAF Sat Cat*: 11825 . *COSPAR*: 1980-045A. *Apogee*: 232 km (144 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min. Test flight of new Soyuz T; docked with Salyut 6. Conducted testing and development of on-board systems in the improved Soyuz T series transport vehicle under piloted

conditions..

1980 June 6 - . 07:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1185** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1980-06-20 . *USAF Sat Cat*: 11827 . *COSPAR*: 1980-046A. *Apogee*: 277 km (172 mi). *Perigee*: 208 km (129 mi). *Inclination*: 82.3000 deg. *Period*: 89.30 min.

  High resolution photo surveillance; film capsule; maneuverable (?); also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1980 June 12 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1187** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-06-26 . *USAF Sat Cat*: 11837 . *COSPAR*: 1980-048A. *Apogee*: 294 km (182 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 89.40 min. Photo surveillance; returned film capsule; maneuverable..

1980 June 14 - . 20:52 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1188** - . *Payload*: Oko #15. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2013-05-24 . *USAF Sat Cat*: 11844 . *COSPAR*: 1980-050A. *Apogee*: 36,280 km (22,540 mi). *Perigee*: 4,103 km (2,549 mi). *Inclination*: 68.0000 deg. *Period*: 718.40 min. Replaced Cosmos 1024. Covered Oko constellation plane 2 - 319 degree longitude of ascending node..

1980 June 18 - . 06:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-30** - . *Payload*: Resurs-OE s/n 3-1. *Mass*: 3,475 kg (7,661 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Resurs-OE. *Duration*: 4,274.00 days. *Decay Date*: 1992-03-01 . *USAF Sat Cat*: 11848 . *COSPAR*: 1980-051A. *Apogee*: 457 km (283 mi). *Perigee*: 428 km (265 mi). *Inclination*: 97.7000 deg. *Period*: 93.40 min.

First flight of prototype for Resurs-O1 spacecraft. Also performed remote sensing tasks. Acquisition of information required for continued investigation of the natural resources of the earth; development of remote sensing methods for measuring the status of the earth's surface and the atmosphere beneath the satellite.

1980 June 21 - . 18:34 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-47** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1991-04-01 . *USAF Sat Cat*: 11856 . *COSPAR*: 1980-053A. *Apogee*: 24,508 km (15,228 mi). *Perigee*: 98 km (60 mi). *Inclination*: 63.6000 deg. *Period*: 423.50 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1980 June 26 - . 12:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1189** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-07-10 . *USAF Sat Cat*: 11863 . *COSPAR*: 1980-054A. *Apogee*: 305 km (189 mi). *Perigee*: 198 km (123 mi). *Inclination*: 72.9000 deg. *Period*: 89.60 min. Photo surveillance; returned film capsule; maneuverable..

1980 June 29 - . 04:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 10** - . *Payload*: Progress s/n 110. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz 35. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 19.88 days. *Completed Operations Date*: 1980-07-19 01:47:18 . *Decay Date*: 1980-07-19 01:47:18 . *USAF Sat Cat*: 11867 . *COSPAR*: 1980-055A. *Apogee*: 264 km (164 mi). *Perigee*: 183 km (113 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min.

  Unmanned supply vessel for Salyut 6. Delivery of various cargoes to the Salyut-6 orbital station. Docked with Salyut 6 on 1 Jul 1980 05:53:00 GMT. Undocked on 17 Jul 1980 22:21:00 GMT. Destroyed in reentry on 19 Jul 1980 01:47:00 GMT. Total free-flight time 3.19 days. Total docked time 16.69 days.

1980 July 2 - . 00:54 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1191** - . *Payload*: Oko #16. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 11871 . *COSPAR*: 1980-057A. *Apogee*: 34,907 km (21,690 mi). *Perigee*: 5,403 km (3,357 mi). *Inclination*: 67.5000 deg. *Period*: 716.90 min. Replaced Cosmos 1124. Covered Oko constellation plane 4 - 39 degree longitude of ascending node..

1980 July 9 - . 12:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1200** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-07-23 . *USAF Sat Cat*: 11884 . *COSPAR*: 1980-059A. *Apogee*: 298 km (185 mi). *Perigee*: 195 km (121 mi). *Inclination*: 72.9000 deg. *Period*: 89.40 min. Photo surveillance; returned film capsule; maneuverable..

1980 July 15 - . 07:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1201** - . *Payload*: Zenit-4MKT no. 14. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1980-07-28 . *USAF Sat Cat*: 11894 . *COSPAR*: 1980-061A. *Apogee*: 243 km (150 mi). *Perigee*: 213 km (132 mi). *Inclination*: 82.3000 deg. *Period*: 89.10 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1980 July 18 - . 10:37 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-13** - . *Payload*: Molniya-3 s/n 27. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 11896 . *COSPAR*: 1980-063A. *Apogee*: 38,990 km (24,220 mi). *Perigee*: 1,364 km (847 mi). *Inclination*: 63.1000 deg. *Period*: 717.80 min.

  Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1980 July 23 - . 18:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 37** - . *Call Sign*: Terek (Terek - river in the Caucasus). *Crew*: Gorbatko, Tuan. *Backup Crew*: Bykovsky, Liem. *Payload*: Soyuz 7K-T s/n 53. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Bykovsky, Gorbatko, Liem, Tuan. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 35, Soyuz 37. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 79.64 days. *Decay Date*: 1980-10-11 . *USAF Sat Cat*: 11905 . *COSPAR*: 1980-064A. *Apogee*: 273 km (169 mi). *Perigee*: 190 km (110 mi). *Inclination*: 51.5000 deg. *Period*: 89.10 min.

  Manned two crew. Transported to the Salyut-6 station the sixth international crew under the Intercosmos programme, comprising V V Gorbatko (USSR) and Pham Tuan (Viet Nam), to conduct scientific research and experiments. Returned crew of Soyuz 35 to Earth. Recovered October 11, 1980 9:50 GMT.

1980 July 24 - . 12:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1202** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-08-07 . *USAF Sat Cat*: 11907 . *COSPAR*: 1980-065A. *Apogee*: 307 km (190 mi). *Perigee*: 198 km (123 mi). *Inclination*: 72.9000 deg. *Period*: 89.60 min. Photo surveillance; returned film capsule; maneuverable..

1980 July 31 - . 07:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1203** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1980-08-14 . *USAF Sat Cat*: 11915 . *COSPAR*: 1980-066A. *Apogee*: 270 km (160 mi). *Perigee*: 213 km (132 mi). *Inclination*: 82.3000 deg. *Period*: 89.40 min.

  High resolution photo surveillance; film capsule; maneuverable (?); also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1980 August 12 - . 11:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1205** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-08-26 . *USAF Sat Cat*: 11924 . *COSPAR*: 1980-068A. *Apogee*: 302 km (187 mi). *Perigee*: 195 km (121 mi). *Inclination*: 72.8000 deg. *Period*: 89.50 min. Photo surveillance; returned film capsule; maneuverable..

1980 August 15 - . 05:34 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1206** - . *Payload*: Tselina-D no. 26. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2002-01-14 . *USAF Sat Cat*: 11932 . *COSPAR*: 1980-069A. *Apogee*: 531 km (329 mi). *Perigee*: 525 km (326 mi). *Inclination*: 81.2000 deg. *Period*: 95.20 min.

1980 August 22 - . 10:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1207** - . *Payload*: Zenit-4MKT no. 15. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1980-09-04 . *USAF Sat Cat*: 11938 . *COSPAR*: 1980-070A. *Apogee*: 256 km (159 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.3000 deg. *Period*: 89.20 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1980 August 26 - . 15:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1208** - . *Payload*: Yantar-2K s/n 927. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 29.00 days. *Decay Date*: 1980-09-24 . *USAF Sat Cat*: 11945 . *COSPAR*: 1980-071A. *Apogee*: 339 km (210 mi). *Perigee*: 173 km (107 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1980 September 3 - . 10:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1209** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1980-09-17 . *USAF Sat Cat*: 11950 . *COSPAR*: 1980-072A. *Apogee*: 267 km (165 mi). *Perigee*: 206 km (128 mi). *Inclination*: 82.3000 deg. *Period*: 89.20 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1980 September 9 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 2-06** - . *Payload*: Meteor-2 no. 6. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-2. *USAF Sat Cat*: 11962 . *COSPAR*: 1980-073A. *Apogee*: 886 km (550 mi). *Perigee*: 834 km (518 mi). *Inclination*: 81.2000 deg. *Period*: 102.10 min. Gathering meteorological information and data on penetrating radiation fluxes in circumterrestrial space. .

1980 September 18 - . 19:11 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 38** - . *Call Sign*: Taimyr (Taimyr - Russian peninsula). *Crew*: Romanenko, Tamayo Mendez. *Backup Crew*: Khrunov, Lopez Falcon. *Payload*: Soyuz 7K-T s/n 54. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Khrunov, Lopez Falcon, Romanenko, Tamayo Mendez. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 35, Soyuz 38. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 7.86 days. *Decay Date*: 1980-09-26 . *USAF Sat Cat*: 11977 . *COSPAR*: 1980-075A. *Apogee*: 257 km (159 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min. Manned two crew. Docked with Salyut 6. Transported to the Salyut-6 station the seventh international crew under the INTERCOSMOS programme, comprising Y V Romanenko (USSR) and A. Tomaio Mendez (Cuba), to conduct scientific research and experiments..

1980 September 19 - . 10:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1210** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-10-03 . *USAF Sat Cat*: 11980 . *COSPAR*: 1980-076A. *Apogee*: 239 km (148 mi). *Perigee*: 175 km (108 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min. Photo surveillance; returned film capsule; maneuverable..

1980 September 23 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1211** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 11.00 days. *Decay Date*: 1980-10-04 . *USAF Sat Cat*: 11982 . *COSPAR*: 1980-077A. *Apogee*: 236 km (146 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.4000 deg. *Period*: 89.00 min. Military topography satellite; returned film capsule; also performed mapping, geodesy, earth resources tasks; separated capsule..

1980 September 26 - . 10:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1212** - . *Payload*: Zenit-4MKT no. 16. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1980-10-09 . *USAF Sat Cat*: 11985 . *COSPAR*: 1980-078A. *Apogee*: 244 km (151 mi). *Perigee*: 205 km (127 mi). *Inclination*: 82.3000 deg. *Period*: 88.90 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1980 September 28 - . 15:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 11** - . *Payload*: Progress s/n 111. *Mass*: 7,014 kg (15,463 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz 35. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 73.95 days. *Completed Operations Date*: 1980-12-11 14:00:05 . *Decay Date*: 1980-12-11 14:00:05 . *USAF Sat Cat*: 11993 . *COSPAR*: 1980-079A. *Apogee*: 241 km (149 mi). *Perigee*: 188 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  Unmanned supply vessel for Salyut 6. Delivery of various cargoes to the Salyut-6 orbital station. Docked with Salyut 6 on 30 Sep 1980 17:03:00 GMT. Undocked on 9 Dec 1980 10:23:00 GMT. Destroyed in reentry on 11 Dec 1980 14:00:00 GMT. Total free-flight time 4.23 days. Total docked time 69.72 days.

1980 October 3 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1213** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-10-17 . *USAF Sat Cat*: 11997 . *COSPAR*: 1980-080A. *Apogee*: 313 km (194 mi). *Perigee*: 192 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 89.60 min. Photo surveillance; returned film capsule; maneuverable..

1980 October 10 - . 13:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1214** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKM. *Duration*: 13.00 days. *Decay Date*: 1980-10-23 . *USAF Sat Cat*: 12008 . *COSPAR*: 1980-082A. *Apogee*: 347 km (215 mi). *Perigee*: 170 km (100 mi). *Inclination*: 67.2000 deg. *Period*: 89.70 min. High resolution photo

reconnaissance satellite; returned film capsule; maneuverable..

1980 October 16 - . 12:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1216** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-10-30 . *USAF Sat Cat*: 12019 . *COSPAR*: 1980-084A. *Apogee*: 367 km (228 mi). *Perigee*: 189 km (117 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1980 October 24 - . 10:53 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1217** - . *Payload*: Oko #17. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 12032 . *COSPAR*: 1980-085A. *Apogee*: 38,306 km (23,802 mi). *Perigee*: 2,007 km (1,247 mi). *Inclination*: 67.0000 deg. *Period*: 716.90 min. Replaced Cosmos 1188. Covered Oko constellation plane 2 - 316 degree longitude of ascending node..

1980 October 30 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1218** - . *Payload*: Yantar-4K1 s/n 3. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 43.00 days. *Decay Date*: 1980-12-12 . *USAF Sat Cat*: 12039 . *COSPAR*: 1980-086A. *Apogee*: 285 km (177 mi). *Perigee*: 158 km (98 mi). *Inclination*: 64.9000 deg. *Period*: 88.90 min.

  Successful state acceptance test flight of Yantar-4K1 satellite. Led to Yantar-4K1 acceptance for Red Army service the following year. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission.

1980 October 31 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1219** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 13.00 days. *Decay Date*: 1980-11-13 . *USAF Sat Cat*: 12050 . *COSPAR*: 1980-088A. *Apogee*: 312 km (193 mi). *Perigee*: 189 km (117 mi). *Inclination*: 72.9000 deg. *Period*: 89.50 min. Photo surveillance; returned film capsule; maneuverable..

1980 November 12 - . 12:21 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1221** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-11-26 . *USAF Sat Cat*: 12058 . *COSPAR*: 1980-090A. *Apogee*: 399 km (247 mi). *Perigee*: 196 km (121 mi). *Inclination*: 72.9000 deg. *Period*: 90.50 min. Photo surveillance; returned film capsule..

1980 November 16 - . 04:18 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-48** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1995-11-18 . *USAF Sat Cat*: 12066 . *COSPAR*: 1980-092A. *Apogee*: 39,291 km (24,414 mi). *Perigee*: 870 km (540 mi). *Inclination*: 62.4000 deg. *Period*: 713.90 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1980 November 21 - . 11:53 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1222** - . *Payload*: Tselina-D no. 27. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2011-04-27 . *USAF Sat Cat*: 12071 . *COSPAR*: 1980-093A. *Apogee*: 561 km (348 mi). *Perigee*: 557 km (346 mi). *Inclination*: 81.2000 deg. *Period*: 95.90 min.

1980 November 27 - . 14:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-3** - . *Call Sign*: Mayak (Beacon). *Crew*: Kizim, Makarov, Strekalov. *Backup Crew*: Kovalyonok, Polyakov, Savinykh. *Payload*: Soyuz T s/n 8L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Kizim, Kovalyonok, Makarov, Polyakov, Savinykh, Strekalov. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 12.80 days. *Decay Date*: 1980-12-10 . *USAF Sat Cat*: 12077 . *COSPAR*: 1980-094A. *Apogee*: 260 km (160 mi). *Perigee*: 256 km (159 mi). *Inclination*: 51.6000 deg. *Period*: 89.70 min.

  Manned three crew. Docked with Salyut 6. Tested the improved transport ship of the 'SOYUZ T' series; transported to the Salyut-6 orbital station a crew consisting of L D

Kizim, O G Makarov and G M Strekalov to carry out repair and preventive work and scientific and technical investigation and experiments.

1980 November 27 - . 21:37 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1223** - . *Payload*: Oko #18. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 12078 . *COSPAR*: 1980-095A. *Apogee*: 34,854 km (21,657 mi). *Perigee*: 5,517 km (3,428 mi). *Inclination*: 68.3000 deg. *Period*: 718.10 min. Replaced Cosmos 903. Covered Oko constellation planes 7/8 - 177 degree longitude of ascending node..

1980 December 1 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1224** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1980-12-15 . *USAF Sat Cat*: 12084 . *COSPAR*: 1980-096A. *Apogee*: 374 km (232 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1980 December 16 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1227** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 12.00 days. *Decay Date*: 1980-12-28 . *USAF Sat Cat*: 12100 . *COSPAR*: 1980-101A. *Apogee*: 296 km (183 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.8000 deg. *Period*: 89.40 min. Photo surveillance; returned film capsule; maneuverable..

1980 December 25 - . 04:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Prognoz 8** - . *Payload*: SO-M s/n 508. *Mass*: 910 kg (2,000 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *Decay Date*: 1984-12-28 . *USAF Sat Cat*: 12116 . *COSPAR*: 1980-103A. *Apogee*: 197,364 km (122,636 mi). *Perigee*: 978 km (607 mi). *Inclination*: 65.8000 deg. *Period*: 5,687.80 min.

  Examined solar wind interaction with magnetosphere. Investigation of the corpuscular and electromagnetic radiation of the sun and of solar plasma fluxes, study of the magnetic fields in circumterrestrial space in order to determine the

effects of solar activity on the interplanetary medium and in the magne tosphere of the earth. In addition to Soviet apparatus, carried scientific apparatus produced in the USSR, the Czechoslovak Socialist Republic, the Polish People's Republic, and Sweden.

1980 December 26 - . 16:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1236** - . *Payload*: Yantar-2K s/n 941. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 26.00 days. *Decay Date*: 1981-01-21 . *USAF Sat Cat*: 12121 . *COSPAR*: 1980-105A. *Apogee*: 362 km (224 mi). *Perigee*: 168 km (104 mi). *Inclination*: 67.1000 deg. *Period*: 89.80 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 January 6 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1237** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-01-20 . *USAF Sat Cat*: 12130 . *COSPAR*: 1981-001A. *Apogee*: 382 km (237 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1981 January 9 - . 14:57 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-14** - . *Payload*: Molniya-3 s/n 25. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1999-07-03 . *USAF Sat Cat*: 12133 . *COSPAR*: 1981-002A. *Apogee*: 39,863 km (24,769 mi). *Perigee*: 487 km (302 mi). *Inclination*: 63.6000 deg. *Period*: 717.70 min.

  Replaced Molniya 3-10. Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1981 January 16 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1239** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 12.00 days. *Decay Date*: 1981-01-28 . *USAF Sat Cat*: 12140 . *COSPAR*: 1981-004A. *Apogee*: 231 km (143 mi). *Perigee*: 210 km (130 mi). *Inclination*: 82.3000 deg. *Period*: 88.90 min. Military topography satellite; returned film capsule; also performed mapping, geodesy..

1981 January 20 - . 11:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1240** - . *Payload*: Yantar-2K s/n 975. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 28.00 days. *Decay Date*: 1981-02-17 . *USAF Sat Cat*: 12143 . *COSPAR*: 1981-005A. *Apogee*: 359 km (223 mi). *Perigee*: 165 km (102 mi). *Inclination*: 64.9000 deg. *Period*: 89.80 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 January 24 - . 14:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 12** - . *Payload*: Progress s/n 113. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 55.11 days. *Completed Operations Date*: 1981-03-20 16:58:58 . *Decay Date*: 1981-03-20 16:58:58 . *USAF Sat Cat*: 12152 . *COSPAR*: 1981-007A. *Apogee*: 308 km (191 mi). *Perigee*: 247 km (153 mi). *Inclination*: 51.7000 deg. *Period*: 90.00 min.

  Unmanned supply vessel to Salyut 6. Delivery of various cargoes to the Salyut-6 orbital station. Docked with Salyut 6 on 26 Jan 1981 15:56:00 GMT. Undocked on 19 Mar 1981 18:14:00 GMT. Destroyed in reentry on 20 Mar 1981 16:59:00 GMT. Total free-flight time 3.02 days. Total docked time 52.10 days.

1981 January 27 - . 14:58 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1242** - . *Payload*: Tselina-D no. 28. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2014-05-08 . *USAF Sat Cat*: 12154 . *COSPAR*: 1981-008A. *Apogee*: 584 km (362 mi). *Perigee*: 568 km (352 mi). *Inclination*: 81.2000 deg. *Period*: 96.20 min.

1981 January 30 - . 16:27 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-49** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia.

Agency: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 12156 . *COSPAR*: 1981-009A. *Apogee*: 38,759 km (24,083 mi). *Perigee*: 1,571 km (976 mi). *Inclination*: 63.7000 deg. *Period*: 717.30 min. Replaced Molniya 1-41. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radiocommunications system in the USSR; transmission of television programmes to stations in the Orbita network..

1981 February 13 - . 11:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1245** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-02-27 . *USAF Sat Cat*: 12299 . *COSPAR*: 1981-014A. *Apogee*: 374 km (232 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1981 February 18 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1246** - . *Payload*: Yantar-1KFT no. 1. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 23.00 days. *Decay Date*: 1981-03-13 . *USAF Sat Cat*: 12301 . *COSPAR*: 1981-015A. *Apogee*: 263 km (163 mi). *Perigee*: 193 km (119 mi). *Inclination*: 64.9000 deg. *Period*: 89.10 min. Military topographic / cartographic satellite..

1981 February 19 - . 10:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1247** - . *Payload*: Oko #19. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 12303 . *COSPAR*: 1981-016A. *Apogee*: 35,529 km (22,076 mi). *Perigee*: 4,493 km (2,791 mi). *Inclination*: 67.2000 deg. *Period*: 711.10 min. Covered Oko constellation plane 5 - 77 degree longitude of ascending node. First space launch from LC16/2, which had been cannabalised in the 1960's to reconstruct LC31 at Baikonur after the on-pad explosion of the second Soyuz in December 1966..

1981 March 5 - . 15:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1248** - . *Payload*: Yantar-2K s/n 940. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*:

1981-04-04 . *USAF Sat Cat*: 12317 . *COSPAR*: 1981-020A. *Apogee*: 531 km (329 mi). *Perigee*: 112 km (69 mi). *Inclination*: 68.1000 deg. *Period*: 91.00 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 March 12 - . 19:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-4** - . *Call Sign*: Foton (Photon). *Crew*: Kovalyonok, Savinykh. *Backup Crew*: Andreyev, Zudov. *Payload*: Soyuz T s/n 10L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Andreyev, Kovalyonok, Savinykh, Zudov. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 74.73 days. *Decay Date*: 1981-05-26 . *USAF Sat Cat*: 12334 . *COSPAR*: 1981-023A. *Apogee*: 237 km (147 mi). *Perigee*: 201 km (124 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min. Manned two crew. Docked with Salyut 6. Transported to the Salyut-6 orbital station cosmonauts V V Kovalenok and V P Savinykh to carry out repairs and preventive maintenance and scientific and technical investigations and experiments..

1981 March 17 - . 08:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1259** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-03-31 . *USAF Sat Cat*: 12341 . *COSPAR*: 1981-026A. *Apogee*: 379 km (235 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.3000 deg. *Period*: 90.40 min. Photo surveillance; returned film capsule..

1981 March 22 - . 14:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 39** - . *Call Sign*: Pamir (Pamir mountains). *Crew*: Dzhanibekov, Gurragcha. *Backup Crew*: Ganzorig, Lyakhov. *Payload*: Soyuz 7K-T s/n 55. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Dzhanibekov, Ganzorig, Gurragcha, Lyakhov. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 39, Soyuz T-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 7.86 days. *Decay Date*: 1981-03-30 . *USAF Sat Cat*: 12366 . *COSPAR*: 1981-029A. *Apogee*: 249 km (154 mi). *Perigee*: 198 km (123 mi). *Inclination*: 51.8000 deg. *Period*: 88.90 min.

  Manned two crew. Docked with Salyut 6. Transported to the Salyut-6 orbital station the eighth international crew under the INTERCOSMOS programme, comprising V A Dzhanibekov (USSR) and Z. Gurragchi (Mongolian People's Republic) to conduct scientific investigations and experiments.

1981 March 24 - . 03:31 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-15** - . *Payload*: Molniya-3 s/n 24. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1992-10-19 . *USAF Sat Cat*: 12368 . *COSPAR*: 1981-030A. *Apogee*: 40,052 km (24,887 mi). *Perigee*: 201 km (124 mi). *Inclination*: 63.9000 deg. *Period*: 715.70 min.

  Replace Molniya 3-11. Continued operation of the long-range telephone and telegraph radio-communication system within the Soviet Union and transmission of USSR central television programmes to stations in the Orbita and participating international networks (international cooperation scheme).

1981 March 28 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Failure of launch vehicle.. *Failed Stage*: 2.

- **Yantar-2K s/n 979** - . *Payload*: Yantar-2K s/n 979. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: RVSN. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. Yantar Area survey photo reconnaissance spacecraft failed to achieve orbit..

1981 March 31 - . 09:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1261** - . *Payload*: Oko #20. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 12376 . *COSPAR*: 1981-031A. *Apogee*: 35,583 km (22,110 mi). *Perigee*: 4,742 km (2,946 mi). *Inclination*: 67.2000 deg. *Period*: 717.20 min. Covered Oko constellation plane 6 - 115 degree longitude of ascending node..

1981 April 7 - . 10:51 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1262** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-04-21 . *USAF Sat Cat*: 12385 . *COSPAR*: 1981-032A. *Apogee*: 372 km (231 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule; maneuverable..

1981 April 15 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1264** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-04-29 . *USAF Sat Cat*: 12400 . *COSPAR*: 1981-035A. *Apogee*: 382 km (237 mi). *Perigee*: 205 km (127 mi). *Inclination*: 70.4000 deg. *Period*: 90.40 min. Photo surveillance; returned film capsule..

1981 April 16 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1265** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 12.00 days. *Decay Date*: 1981-04-28 . *USAF Sat Cat*: 12402 . *COSPAR*: 1981-036A. *Apogee*: 267 km (165 mi). *Perigee*: 197 km (122 mi). *Inclination*: 72.9000 deg. *Period*: 89.20 min. Photo surveillance; returned film capsule; maneuverable..

1981 April 28 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1268** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-05-12 . *USAF Sat Cat*: 12423 . *COSPAR*: 1981-040A. *Apogee*: 366 km (227 mi). *Perigee*: 206 km (128 mi). *Inclination*: 70.4000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule; maneuverable..

1981 May 14 - . 17:16 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz 40** - . *Call Sign*: Dnepr (Dnieper). *Crew*: Popov, Prunariu. *Backup Crew*: Dediu, Romanenko. *Payload*: Soyuz 7K-T s/n 56. *Mass*: 6,800 kg (14,900 lb). *Nation*: Russia. *Related Persons*: Dediu, Popov, Prunariu, Romanenko. *Agency*: MOM. *Program*: Salyut 6. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz 40, Soyuz T-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz 7K-T. *Duration*: 7.86 days. *Decay Date*: 1981-05-22 . *USAF Sat Cat*: 12454 . *COSPAR*: 1981-042A. *Apogee*: 270 km (160 mi). *Perigee*: 192 km (119 mi). *Inclination*: 51.6000 deg. *Period*: 89.10 min. Manned two crew. Docked with Salyut 6. Transported to the Salyut-6 orbital station the ninth international crew under the INTERCOSMOS programme, comprising L I Popov (USSR), and D. Prunariu (Romania), to conduct scientific research and experiments..

1981 May 14 - . 21:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 2-07** - . *Payload*: Meteor-2 no. 7. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-2. *USAF Sat Cat*: 12456 . *COSPAR*: 1981-043A. *Apogee*: 888 km (551 mi). *Perigee*: 835 km (518 mi). *Inclination*: 81.3000 deg. *Period*: 102.20 min. Gathering meteorological information and data on penetrating radiation fluxes in circumterrestrial space..

1981 May 18 - . 11:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1270** - . *Payload*: Yantar-2K s/n 980. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1981-06-17 . *USAF Sat Cat*: 12461 . *COSPAR*: 1981-045A. *Apogee*: 345 km (214 mi). *Perigee*: 171 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 May 19 - . 03:49 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1271** - . *Payload*: Tselina-D no. 29. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2013-05-03 . *USAF Sat Cat*: 12464 . *COSPAR*: 1981-046A. *Apogee*: 582 km (361 mi). *Perigee*: 565 km (351 mi). *Inclination*: 81.2000 deg. *Period*: 96.20 min. Replaced Cosmos 1077..

1981 May 21 - . 09:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1272** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-06-04 . *USAF Sat Cat*: 12466 . *COSPAR*: 1981-047A. *Apogee*: 376 km (233 mi). *Perigee*: 206 km (128 mi). *Inclination*: 70.4000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1981 May 22 - . 07:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1273** - . *Payload*: Zenit-4MKT no. 17. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1981-06-04 . *USAF Sat Cat*: 12469 . *COSPAR*: 1981-048A. *Apogee*: 258 km (160 mi). *Perigee*: 205 km (127 mi). *Inclination*: 82.3000 deg.

Period: 89.10 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1981 June 3 - . 14:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1274** - . *Payload*: Yantar-2K s/n 942. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1981-07-03 . *USAF Sat Cat*: 12495 . *COSPAR*: 1981-052A. *Apogee*: 291 km (180 mi). *Perigee*: 144 km (89 mi). *Inclination*: 67.2000 deg. *Period*: 88.90 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 June 9 - . 03:33 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-16** - . *Payload*: Molniya-3 s/n 30. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1998-02-10 . *USAF Sat Cat*: 12512 . *COSPAR*: 1981-054A. *Apogee*: 40,027 km (24,871 mi). *Perigee*: 213 km (132 mi). *Inclination*: 63.2000 deg. *Period*: 715.50 min.

  Replaced Molniya 3-14. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation.

1981 June 16 - . 07:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1276** - . *Payload*: Zenit-4MKT no. 18. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1981-06-29 . *USAF Sat Cat*: 12517 . *COSPAR*: 1981-055A. *Apogee*: 233 km (144 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.4000 deg. *Period*: 88.90 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1981 June 17 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1277** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-07-01 . *USAF Sat Cat*: 12520 . *COSPAR*: 1981-056A. *Apogee*: 373 km (231 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.4000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1981 June 19 - . 19:37 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1278** - . *Payload*: Oko #21. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2000-09-02 . *USAF Sat Cat*: 12547 . *COSPAR*: 1981-058A. *Apogee*: 37,962 km (23,588 mi). *Perigee*: 2,452 km (1,523 mi). *Inclination*: 67.0000 deg. *Period*: 719.00 min. Covered Oko constellation plane 3 - 357 degree longitude of ascending node..

1981 June 24 - . 17:47 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-50** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1991-12-14 . *USAF Sat Cat*: 12556 . *COSPAR*: 1981-060A. *Apogee*: 39,708 km (24,673 mi). *Perigee*: 190 km (110 mi). *Inclination*: 63.9000 deg. *Period*: 708.60 min.

  Replaced Molniya 1-42. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network.

1981 July 1 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1279** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-07-15 . *USAF Sat Cat*: 12571 . *COSPAR*: 1981-062A. *Apogee*: 364 km (226 mi). *Perigee*: 206 km (128 mi). *Inclination*: 70.4000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule; maneuverable..

1981 July 2 - . 07:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1280** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM.

Program: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 13.00 days. *Decay Date*: 1981-07-15 . *USAF Sat Cat*: 12577 . *COSPAR*: 1981-063A. *Apogee*: 280 km (170 mi). *Perigee*: 206 km (128 mi). *Inclination*: 82.3000 deg. *Period*: 89.30 min.

High resolution photo surveillance; film capsule; maneuverable; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1981 July 7 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1281** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-07-21 . *USAF Sat Cat*: 12583 . *COSPAR*: 1981-064A. *Apogee*: 389 km (241 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 90.40 min. Photo surveillance; returned film capsule..

1981 July 10 - . 05:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 1-31** - . *Payload*: Meteor-Priroda. *Mass*: 3,800 kg (8,300 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-Priroda. *USAF Sat Cat*: 12585 . *COSPAR*: 1981-065A. *Apogee*: 612 km (380 mi). *Perigee*: 574 km (356 mi). *Inclination*: 97.9000 deg. *Period*: 96.50 min.

  Also performed earth resources tasks. Acquisition of information required for continued investigation of the natural resources of the earth; development of remote sensing methods for measuring the parameters of the atmosphere and the earth's surface beneath the satellite. Carried scientific i nstruments developed in the People's Republic of Bulgaria, as well as Soviet equipment. Objects 1595 and 1596 launched by a single rocket.

- **Iskra** - . *Payload*: RK-01. *Mass*: 28 kg (61 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft*: Iskra. *Decay Date*: 1990-04-16 . *USAF Sat Cat*: 19236 . *COSPAR*: 1981-065D. *Apogee*: 645 km (400 mi). *Perigee*: 618 km (384 mi). *Inclination*: 97.7000 deg. *Period*: 97.34 min. Conduct of scientific experiments to study diffusion and heat processes in weightlessness..

1981 July 15 - . 13:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1282** - . *Payload*: Yantar-2K s/n 951. *Mass*: 6,600 kg (14,500 lb). *Nation*:

Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1981-08-14 . *USAF Sat Cat*: 12588 . *COSPAR*: 1981-066A. *Apogee*: 332 km (206 mi). *Perigee*: 170 km (100 mi). *Inclination*: 64.9000 deg. *Period*: 89.50 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 July 17 - . 08:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1283** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-07-31 . *USAF Sat Cat*: 12598 . *COSPAR*: 1981-067A. *Apogee*: 242 km (150 mi). *Perigee*: 169 km (105 mi). *Inclination*: 82.4000 deg. *Period*: 88.60 min. Medium resolution photo surveillance; film capsule; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1981 July 29 - . 11:55 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1284** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-08-12 . *USAF Sat Cat*: 12614 . *COSPAR*: 1981-068A. *Apogee*: 237 km (147 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.70 min. Medium resolution photo surveillance; film capsule; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1981 August 4 - . 00:13 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1285** - . *Payload*: Oko #22. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 12627 . *COSPAR*: 1981-071A. *Apogee*: 36,086 km (22,422 mi). *Perigee*: 4,721 km (2,933 mi). *Inclination*: 67.2000 deg. *Period*: 727.00 min. Replaced Cosmos 1261. Covered Oko constellation plane 6 - 116 degree longitude of ascending node..

1981 August 7 - . 13:35 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Intercosmos 22** - . *Mass*: 1,500 kg (3,300 lb). *Nation*: Russia. *Agency*: MOM.

Program: Intercosmos. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: IK-B-1300. *Completed Operations Date*: 1983-08-10 . *USAF Sat Cat*: 12645 . *COSPAR*: 1981-075A. *Apogee*: 881 km (547 mi). *Perigee*: 789 km (490 mi). *Inclination*: 81.2000 deg. *Period*: 101.60 min.

Ionosphere and magnetosphere studies. Intercosmos-Bulgaria 1300. Comprehensive investigation of physical processes in the earth's ionosphere and magnetosphere. Carried scientific equipment developed and manufactured in the People's Republic of Bulgaria with the assistance of Soviet scientists .

1981 August 13 - . 16:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1296** - . *Payload*: Yantar-2K s/n 943. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 31.00 days. *Decay Date*: 1981-09-13 . *USAF Sat Cat*: 12687 . *COSPAR*: 1981-078A. *Apogee*: 354 km (219 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.70 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 August 18 - . 09:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1297** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 12.00 days. *Decay Date*: 1981-08-30 . *USAF Sat Cat*: 12716 . *COSPAR*: 1981-079A. *Apogee*: 360 km (220 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.8000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule; maneuverable..

1981 August 21 - . 10:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1298** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 42.00 days. *Decay Date*: 1981-10-02 . *USAF Sat Cat*: 12776 . *COSPAR*: 1981-080A. *Apogee*: 328 km (203 mi). *Perigee*: 170 km (100 mi). *Inclination*: 64.8000 deg. *Period*: 89.40 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 August 27 - . 10:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1301** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1981-09-10 . *USAF Sat Cat*: 12788 . *COSPAR*: 1981-083A. *Apogee*: 258 km (160 mi). *Perigee*: 212 km (131 mi). *Inclination*: 82.3000 deg. *Period*: 89.20 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1981 September 4 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1303** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-09-18 . *USAF Sat Cat*: 12801 . *COSPAR*: 1981-086A. *Apogee*: 363 km (225 mi). *Perigee*: 208 km (129 mi). *Inclination*: 70.4000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1981 September 11 - . 08:43 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: Fourth stage failure.. *Failed Stage*: U.

- **Cosmos 1305** - . *Payload*: Molniya-3 s/n 28. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 12818 . *COSPAR*: 1981-088A. *Apogee*: 12,807 km (7,957 mi). *Perigee*: 1,680 km (1,040 mi). *Inclination*: 64.1000 deg. *Period*: 263.70 min. Investigation of the upper atmosphere and outer space..

1981 September 15 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1307** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 13.00 days. *Decay Date*: 1981-09-28 . *USAF Sat Cat*: 12830 . *COSPAR*: 1981-090A. *Apogee*: 390 km (240 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 90.40 min. Photo surveillance; returned film capsule..

1981 September 18 - . 09:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1309** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 13.00 days. *Decay Date*: 1981-10-01 . *USAF Sat Cat*: 12837 . *COSPAR*: 1981-092A. *Apogee*: 257 km (159 mi). *Perigee*: 212 km (131 mi). *Inclination*: 82.3000 deg. *Period*: 89.20 min. Military topography satellite; returned film capsule; also performed mapping, geodesy..

1981 October 1 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1313** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-10-15 . *USAF Sat Cat*: 12881 . *COSPAR*: 1981-099A. *Apogee*: 286 km (177 mi). *Perigee*: 203 km (126 mi). *Inclination*: 70.4000 deg. *Period*: 89.40 min. Photo surveillance; returned film capsule; maneuverable..

1981 October 9 - . 10:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1314** - . *Payload*: Zenit-4MKT no. 19. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1981-10-22 . *USAF Sat Cat*: 12895 . *COSPAR*: 1981-101A. *Apogee*: 223 km (138 mi). *Perigee*: 209 km (129 mi). *Inclination*: 82.3000 deg. *Period*: 88.90 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1981 October 13 - . 23:01 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1315** - . *Payload*: Tselina-D no. 31. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2015-08-31 . *USAF Sat Cat*: 12903 . *COSPAR*: 1981-103A. *Apogee*: 599 km (372 mi). *Perigee*: 571 km (354 mi). *Inclination*: 81.2000 deg. *Period*: 96.40 min. Replaced Cosmos 1154..

1981 October 15 - . 09:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1316** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-10-29 . *USAF Sat Cat*: 12905 . *COSPAR*: 1981-104A. *Apogee*: 381 km (236 mi). *Perigee*: 205 km (127

mi). *Inclination*: 70.3000 deg. *Period*: 90.40 min. Photo surveillance; returned film capsule; maneuverable..

1981 October 17 - . 05:59 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-17** - . *Payload*: Molniya-3 s/n 31. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1997-01-09 . *USAF Sat Cat*: 12915 . *COSPAR*: 1981-105A. *Apogee*: 39,183 km (24,347 mi). *Perigee*: 971 km (603 mi). *Inclination*: 62.7000 deg. *Period*: 713.70 min.

  Replaced Molniya 3-12. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation.

1981 October 31 - . 22:54 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1317** - . *Payload*: Oko #23. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 12933 . *COSPAR*: 1981-108A. *Apogee*: 34,987 km (21,739 mi). *Perigee*: 5,425 km (3,370 mi). *Inclination*: 68.3000 deg. *Period*: 719.00 min. Covered Oko constellation plane 8 - 196 degree longitude of ascending node..

1981 November 3 - . 13:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1318** - . *Payload*: Yantar-2K s/n 944. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 31.00 days. *Decay Date*: 1981-12-04 . *USAF Sat Cat*: 12936 . *COSPAR*: 1981-109A. *Apogee*: 353 km (219 mi). *Perigee*: 172 km (106 mi). *Inclination*: 67.1000 deg. *Period*: 89.80 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 November 13 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1319** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-11-27 . *USAF Sat Cat*: 12954 . *COSPAR*: 1981-112A. *Apogee*: 374 km (232 mi). *Perigee*: 204 km (126 mi).

Inclination: 70.4000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1981 November 17 - . 15:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-51** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1993-11-02 . *USAF Sat Cat*: 12959 . *COSPAR*: 1981-113A. *Apogee*: 39,457 km (24,517 mi). *Perigee*: 134 km (83 mi). *Inclination*: 63.5000 deg. *Period*: 702.40 min. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network..

1981 December 4 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1329** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1981-12-18 . *USAF Sat Cat*: 12989 . *COSPAR*: 1981-118A. *Apogee*: 273 km (169 mi). *Perigee*: 231 km (143 mi). *Inclination*: 65.0000 deg. *Period*: 89.50 min. Photo surveillance; returned film capsule; maneuverable..

1981 December 19 - . 11:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1330** - . *Payload*: Yantar-2K s/n 952. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 31.00 days. *Decay Date*: 1982-01-19 . *USAF Sat Cat*: 13008 . *COSPAR*: 1981-121A. *Apogee*: 376 km (233 mi). *Perigee*: 164 km (101 mi). *Inclination*: 70.4000 deg. *Period*: 89.90 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1981 December 23 - . 13:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-52** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 13012 . *COSPAR*: 1981-123A. *Apogee*: 38,267 km (23,777 mi). *Perigee*: 2,097 km (1,303 mi). *Inclination*: 63.8000 deg. *Period*: 718.00 min.

Replaced Molniya 1-45. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network.

1982 January 12 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1332** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 13.00 days. *Decay Date*: 1982-01-25 . *USAF Sat Cat*: 13031 . *COSPAR*: 1982-002A. *Apogee*: 251 km (155 mi). *Perigee*: 207 km (128 mi). *Inclination*: 82.3000 deg. *Period*: 89.00 min. Military topography satellite; returned film capsule; also performed mapping, geodesy..

1982 January 20 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1334** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-02-03 . *USAF Sat Cat*: 13036 . *COSPAR*: 1982-005A. *Apogee*: 286 km (177 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 89.30 min. Photo surveillance; returned film capsule; maneuverable..

1982 January 30 - . 11:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1336** - . *Payload*: Yantar-2K s/n 953. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 27.00 days. *Decay Date*: 1982-02-26 . *USAF Sat Cat*: 13045 . *COSPAR*: 1982-008A. *Apogee*: 352 km (218 mi). *Perigee*: 170 km (100 mi). *Inclination*: 70.3000 deg. *Period*: 89.70 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1982 February 16 - . 11:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1338** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-03-02 . *USAF Sat Cat*: 13063 . *COSPAR*: 1982-011A. *Apogee*: 376 km (233 mi). *Perigee*: 186 km (115 mi). *Inclination*: 72.8000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1982 February 19 - . 01:42 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1340** - . *Payload*: Tselina-D no. 33. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *USAF Sat Cat*: 13067 . *COSPAR*: 1982-013A. *Apogee*: 604 km (375 mi). *Perigee*: 590 km (360 mi). *Inclination*: 81.2000 deg. *Period*: 96.60 min. Replaced Cosmos 1206..

1982 February 26 - . 20:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-53** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 13070 . *COSPAR*: 1982-015A. *Apogee*: 38,895 km (24,168 mi). *Perigee*: 1,456 km (904 mi). *Inclination*: 63.2000 deg. *Period*: 717.70 min.

  Replaced Molniya 1-47. Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network.

1982 March 3 - . 05:44 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1341** - . *Payload*: Oko #24. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 13080 . *COSPAR*: 1982-016A. *Apogee*: 36,092 km (22,426 mi). *Perigee*: 4,229 km (2,627 mi). *Inclination*: 67.5000 deg. *Period*: 717.10 min. Replaced Cosmos 1247. Covered Oko constellation plane 5 - 79 degree longitude of ascending node..

1982 March 5 - . 10:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1342** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-03-19 . *USAF Sat Cat*: 13084 . *COSPAR*: 1982-018A. *Apogee*: 297 km (184 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 89.40 min. Photo surveillance; returned film capsule; maneuverable..

1982 March 17 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1343** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-03-31 . *USAF Sat Cat*: 13096 . *COSPAR*: 1982-021A. *Apogee*: 284 km (176 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.8000 deg. *Period*: 89.30 min. Photo surveillance; returned film capsule; maneuverable..

1982 March 24 - . 00:12 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-18** - . *Payload*: Molniya-3 s/n 29. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1992-06-23 . *USAF Sat Cat*: 13107 . *COSPAR*: 1982-023A. *Apogee*: 38,589 km (23,978 mi). *Perigee*: 121 km (75 mi). *Inclination*: 63.9000 deg. *Period*: 684.70 min.

  Replaced Molniya 3-15. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation.

1982 March 31 - . 16:27 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1346** - . *Payload*: Tselina-D no. 34. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *USAF Sat Cat*: 13120 . *COSPAR*: 1982-027A. *Apogee*: 602 km (374 mi). *Perigee*: 572 km (355 mi). *Inclination*: 81.2000 deg. *Period*: 96.40 min. Replaced Cosmos 1222..

1982 April 2 - . 10:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1347** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 49.00 days. *Decay Date*: 1982-05-21 . *USAF Sat Cat*: 13122 . *COSPAR*: 1982-028A. *Apogee*: 337 km (209 mi). *Perigee*: 172 km (106 mi). *Inclination*: 70.4000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1982 April 7 - . 13:42 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1348** - . *Payload*: Oko #25. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia.

Agency: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 13124 . *COSPAR*: 1982-029A. *Apogee*: 35,126 km (21,826 mi). *Perigee*: 5,269 km (3,273 mi). *Inclination*: 68.4000 deg. *Period*: 718.60 min. Replaced Cosmos 1172. Covered Oko constellation plane 9 - 236 degree longitude of ascending node..

1982 April 15 - . 14:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1350** - . *Payload*: Yantar-2K s/n 978. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 31.00 days. *Decay Date*: 1982-05-16 . *USAF Sat Cat*: 13134 . *COSPAR*: 1982-032A. *Apogee*: 355 km (220 mi). *Perigee*: 172 km (106 mi). *Inclination*: 67.1000 deg. *Period*: 89.80 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1982 April 21 - . 09:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1352** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-05-05 . *USAF Sat Cat*: 13144 . *COSPAR*: 1982-035A. *Apogee*: 364 km (226 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.4000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1982 April 23 - . 09:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1353** - . *Payload*: Zenit-4MKT no. 20. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1982-05-06 . *USAF Sat Cat*: 13146 . *COSPAR*: 1982-036A. *Apogee*: 238 km (147 mi). *Perigee*: 207 km (128 mi). *Inclination*: 82.4000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1982 May 5 - . 08:01 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1356** - . *Payload*: Tselina-D no. 35. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *USAF Sat Cat*: 13153 . *COSPAR*:

1982-039A. *Apogee*: 612 km (380 mi). *Perigee*: 587 km (364 mi). *Inclination*: 81.2000 deg. *Period*: 96.70 min. Replaced Cosmos 1184..

1982 May 13 - . 09:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-5** - . *Call Sign*: Elbrus (Elbrus - tallest mountain in Europe). *Crew*: Berezovoi, Lebedev. *Backup Crew*: Strekalov, Titov, Vladimir. *Payload*: Soyuz T s/n 11L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Berezovoi, Lebedev, Strekalov, Titov, Vladimir. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 106.21 days. *Decay Date*: 1982-08-27 . *USAF Sat Cat*: 13173 . *COSPAR*: 1982-042A. *Apogee*: 231 km (143 mi). *Perigee*: 190 km (110 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min. Carried Anatoli Berezovoi, Valentin Lebedev to Salyut 7 to conduct scientific research and experiments; returned crew of Soyuz T-7 to Earth..

1982 May 15 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-6** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: UNKS. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. Photo surveillance mission..

1982 May 20 - . 13:09 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1367** - . *Payload*: Oko #26. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 13205 . *COSPAR*: 1982-045A. *Apogee*: 35,764 km (22,222 mi). *Perigee*: 4,640 km (2,880 mi). *Inclination*: 67.9000 deg. *Period*: 718.80 min. Covered Oko constellation plane 1 - 276 degree longitude of ascending node..

1982 May 21 - . 12:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1368** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 13.00 days. *Decay Date*: 1982-06-03 . *USAF Sat Cat*: 13208 . *COSPAR*: 1982-046A. *Apogee*: 338 km (210 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.4000 deg. *Period*: 89.90 min. Photo surveillance; returned film capsule; maneuverable..

1982 May 23 - . 05:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 13** - . *Payload*: Progress s/n 114. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 13.75 days. *Completed Operations Date*: 1982-06-06 00:03:11 . *Decay Date*: 1982-06-06 00:03:11 . *USAF Sat Cat*: 13210 . *COSPAR*: 1982-047A. *Apogee*: 263 km (163 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min.

  Unmanned supply vessel to Salyut 7. Transport of various cargoes to the Salyut-7 orbital station. Docked with Salyut 7 on 25 May 1982 07:56:36 GMT. Undocked on 4 Jun 1982 06:31:00 GMT. Destroyed in reentry on 6 Jun 1982 00:05:00 GMT. Total free-flight time 3.81 days. Total docked time 9.94 days.

1982 May 25 - . 09:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1369** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1982-06-08 . *USAF Sat Cat*: 13213 . *COSPAR*: 1982-048A. *Apogee*: 265 km (164 mi). *Perigee*: 210 km (130 mi). *Inclination*: 82.3000 deg. *Period*: 89.30 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1982 May 28 - . 09:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1370** - . *Payload*: Yantar-1KFT no. 2. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 44.00 days. *Decay Date*: 1982-07-11 . *USAF Sat Cat*: 13219 . *COSPAR*: 1982-049A. *Apogee*: 273 km (169 mi). *Perigee*: 195 km (121 mi). *Inclination*: 64.9000 deg. *Period*: 89.20 min. Military topographic / cartographic satellite..

1982 May 28 - . 22:02 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-54** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1992-11-19 . *USAF Sat Cat*: 13237 . *COSPAR*: 1982-050A. *Apogee*: 40,054 km (24,888 mi). *Perigee*: 259 km (160 mi). *Inclination*: 64.3000 deg. *Period*: 716.90 min. Replaced Molniya 1-44. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1982 June 2 - . 12:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1373** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-06-16 . *USAF Sat Cat*: 13244 . *COSPAR*: 1982-053A. *Apogee*: 347 km (215 mi). *Perigee*: 210 km (130 mi). *Inclination*: 70.4000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1982 June 8 - . 07:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1376** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1982-06-22 . *USAF Sat Cat*: 13263 . *COSPAR*: 1982-056A. *Apogee*: 242 km (150 mi). *Perigee*: 212 km (131 mi). *Inclination*: 82.3000 deg. *Period*: 89.00 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1982 June 8 - . 12:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1377** - . *Payload*: Yantar-4K1 s/n 215. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 44.00 days. *Decay Date*: 1982-07-22 . *USAF Sat Cat*: 13265 . *COSPAR*: 1982-057A. *Apogee*: 363 km (225 mi). *Perigee*: 173 km (107 mi). *Inclination*: 64.9000 deg. *Period*: 89.90 min. Photo surveillance; 2 small film capsules recovered in course of flight and main reentry capsule with remaining film, camera, and computer systems at end of flight..

1982 June 12 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Failure. *Failed Stage*: U.

- **Yantar-4K1** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: UNKS. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1982 June 18 - . 13:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1381** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Decay Date*: 1982-07-01 . *USAF Sat Cat*: 13283 . *COSPAR*: 1982-062A. *Apogee*: 374 km (232 mi). *Perigee*: 199 km (123 mi). *Inclination*: 70.4000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1982 June 24 - . 16:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-6** - . *Call Sign*: Pamir (Pamirs). *Crew*: Chretien, Dzhanibekov, Ivanchenkov. *Backup Crew*: Baudry, Kizim, Solovyov, Vladimir. *Payload*: Soyuz T s/n 9L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Baudry, Chretien, Dzhanibekov, Ivanchenkov, Kizim, Solovyov, Vladimir. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-5, Soyuz T-6. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 7.91 days. *Decay Date*: 1982-07-02 . *USAF Sat Cat*: 13292 . *COSPAR*: 1982-063A. *Apogee*: 233 km (144 mi). *Perigee*: 189 km (117 mi). *Inclination*: 51.7000 deg. *Period*: 88.70 min.

  Manned three crew. Docked with Salyut 7. Transported to the Salyut-7 orbital station the Soviet-French international crew, comprising V A Dzhanibekov (USSR), A S Ivanchenkov (USSR) and Jean-Loup Chretien (France) to conduct scientific research and experiments.

1982 June 25 - . 02:28 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1382** - . *Payload*: Oko #27. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 13295 . *COSPAR*: 1982-064A. *Apogee*: 34,865 km (21,664 mi). *Perigee*: 5,465 km (3,395 mi). *Inclination*: 68.0000 deg. *Period*: 717.30 min. Replaced Cosmos 1223. Covered Oko constellation plane 7 - 154 degree longitude of ascending node..

1982 June 30 - . 15:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1384** - . *Payload*: Yantar-2K s/n 954. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1982-07-30 . *USAF Sat Cat*: 13303 . *COSPAR*: 1982-067A. *Apogee*: 353 km (219 mi). *Perigee*: 168 km (104 mi). *Inclination*: 67.2000 deg. *Period*: 89.70 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1982 July 6 - . 07:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*:

Soyuz-U.

- **Cosmos 1385** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1982-07-20 . *USAF Sat Cat*: 13345 . *COSPAR*: 1982-068A. *Apogee*: 232 km (144 mi). *Perigee*: 181 km (112 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min. Medium resolution photo surveillance; film capsule; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1982 July 10 - . 09:57 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 14** - . *Payload*: Progress s/n 117. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 33.65 days. *Completed Operations Date*: 1982-08-13 11:29:16 . *Decay Date*: 1982-08-13 11:29:16 . *USAF Sat Cat*: 13361 . *COSPAR*: 1982-070A. *Apogee*: 325 km (201 mi). *Perigee*: 301 km (187 mi). *Inclination*: 51.6000 deg. *Period*: 90.70 min. Unmanned supply vessel to Salyut 7. Docked with Salyut 7 on 12 Jul 1982 11:41:00 GMT. Undocked on 10 Aug 1982 22:11:00 GMT. Destroyed in reentry on 13 Aug 1982 01:29:00 GMT. Total free-flight time 4.21 days. Total docked time 29.44 days..

1982 July 13 - . 08:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1387** - . *Payload*: Zenit-4MKT no. 21. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1982-07-26 . *USAF Sat Cat*: 13365 . *COSPAR*: 1982-071A. *Apogee*: 229 km (142 mi). *Perigee*: 201 km (124 mi). *Inclination*: 82.3000 deg. *Period*: 88.80 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1982 July 21 - . 09:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-55** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1992-10-08 . *USAF Sat Cat*: 13383 . *COSPAR*: 1982-074A. *Apogee*: 39,618 km (24,617 mi). *Perigee*: 160 km (90 mi). *Inclination*: 63.9000 deg. *Period*: 706.20 min.

Uncertain if Molniya-1T model was Molniya-1 or Molniya-1T. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network..

1982 July 27 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1396** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-08-10 . *USAF Sat Cat*: 13391 . *COSPAR*: 1982-075A. *Apogee*: 294 km (182 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 89.40 min. Photo surveillance; returned film capsule; maneuverable..

1982 August 3 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1398** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MT. *Duration*: 10.00 days. *Decay Date*: 1982-08-13 . *USAF Sat Cat*: 13396 . *COSPAR*: 1982-077A. *Apogee*: 231 km (143 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.4000 deg. *Period*: 88.90 min. Military topography satellite; returned film capsule; also performed mapping, geodesy..

1982 August 4 - . 11:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1399** - . *Payload*: Yantar-4K1 s/n 216. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 43.00 days. *Decay Date*: 1982-09-16 . *USAF Sat Cat*: 13399 . *COSPAR*: 1982-078A. *Apogee*: 344 km (213 mi). *Perigee*: 171 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1982 August 5 - . 06:56 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1400** - . *Payload*: Tselina-D no. 37. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2014-09-13 . *USAF Sat Cat*: 13402 . *COSPAR*: 1982-079A. *Apogee*: 590 km (360 mi). *Perigee*: 575 km (357 mi). *Inclination*: 81.2000 deg. *Period*: 96.30 min. Replaced Cosmos 1315..

1982 August 19 - . 17:11 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-7** - . *Call Sign*: Dnepr (Dnieper). *Crew*: Popov, Savitskaya, Serebrov. *Backup Crew*: Pronina, Romanenko, Savinykh. *Payload*: Soyuz T s/n 12L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Popov, Pronina, Romanenko, Savinykh, Savitskaya, Serebrov. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-5, Soyuz T-7. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 113.08 days. *Decay Date*: 1982-12-10 . *USAF Sat Cat*: 13425 . *COSPAR*: 1982-080A. *Apogee*: 299 km (185 mi). *Perigee*: 289 km (179 mi). *Inclination*: 51.6000 deg. *Period*: 90.30 min. Docked with Salyut 7. Carried Svetlana Savitskaya, Leonid Popov, Alexander Serebrov to Salyut 7 to conduct scientific and technical research and experiments..

1982 August 20 - . 09:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1401** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1982-09-03 . *USAF Sat Cat*: 13427 . *COSPAR*: 1982-081A. *Apogee*: 260 km (160 mi). *Perigee*: 210 km (130 mi). *Inclination*: 82.3000 deg. *Period*: 89.20 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1982 August 27 - . 00:02 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-19** - . *Payload*: Molniya-3 s/n 33. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2002-01-13 . *USAF Sat Cat*: 13432 . *COSPAR*: 1982-083A. *Apogee*: 38,841 km (24,134 mi). *Perigee*: 1,567 km (973 mi). *Inclination*: 63.9000 deg. *Period*: 718.90 min.

  Replaced Molniya 3-13. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation.

1982 September 1 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1403** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-09-15 . *USAF Sat Cat*: 13448 . *COSPAR*: 1982-085A. *Apogee*: 353 km (219 mi). *Perigee*: 205 km (127 mi). *Inclination*: 70.4000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1982 September 1 - . 11:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1404** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-09-15 . *USAF Sat Cat*: 13449 . *COSPAR*: 1982-086A. *Apogee*: 354 km (219 mi). *Perigee*: 196 km (121 mi). *Inclination*: 72.8000 deg. *Period*: 90.00 min. Photo surveillance; returned film capsule..

1982 September 8 - . 10:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1406** - . *Payload*: Zenit-4MKT no. 22. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1982-09-21 . *USAF Sat Cat*: 13519 . *COSPAR*: 1982-089A. *Apogee*: 227 km (141 mi). *Perigee*: 208 km (129 mi). *Inclination*: 82.3000 deg. *Period*: 88.80 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1982 September 15 - . 15:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1407** - . *Payload*: Yantar-2K s/n 955. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 31.00 days. *Decay Date*: 1982-10-16 . *USAF Sat Cat*: 13546 . *COSPAR*: 1982-091A. *Apogee*: 309 km (192 mi). *Perigee*: 169 km (105 mi). *Inclination*: 67.2000 deg. *Period*: 89.30 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1982 September 18 - . 04:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 15** - . *Payload*: Progress s/n 112. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics

spacecraft. *Flight*: Soyuz T-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 28.51 days. *Completed Operations Date*: 1982-10-16 17:08:06 . *Decay Date*: 1982-10-16 17:08:06 . *USAF Sat Cat*: 13558 . *COSPAR*: 1982-094A. *Apogee*: 241 km (149 mi). *Perigee*: 188 km (116 mi). *Inclination*: 51.7000 deg. *Period*: 88.80 min. Unmanned supply vessel to Salyut 7. Docked with Salyut 7 on 20 Sep 1982 06:12:00 GMT. Undocked on 14 Oct 1982 13:46:00 GMT. Destroyed in reentry on 16 Oct 1982 17:08:00 GMT. Total free-flight time 4.19 days. Total docked time 24.32 days..

- **Astrozond** - . *Payload*: Astrozond. *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Flight*: Soyuz T-5. *Spacecraft*: Astrozond. *Decay Date*: 1982-10-28 . *USAF Sat Cat*: 13596 . *COSPAR*: 1982-033AC. *Apogee*: 364 km (226 mi). *Perigee*: 307 km (190 mi). *Inclination*: 51.6000 deg. *Period*: 91.24 min.

1982 September 22 - . 06:23 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1409** - . *Payload*: Oko #28. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2009-06-08 . *USAF Sat Cat*: 13585 . *COSPAR*: 1982-095A. *Apogee*: 36,670 km (22,780 mi). *Perigee*: 3,715 km (2,308 mi). *Inclination*: 66.7000 deg. *Period*: 718.40 min. Replaced Cosmos 1217. Covered Oko constellation plane 2 - 317 degree longitude of ascending node..

1982 September 30 - . 11:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1411** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-10-14 . *USAF Sat Cat*: 13597 . *COSPAR*: 1982-098A. *Apogee*: 354 km (219 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Photo surveillance; returned film capsule; maneuverable..

1982 October 14 - . 09:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1416** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-10-28 . *USAF Sat Cat*: 13611 . *COSPAR*: 1982-101A. *Apogee*: 278 km (172 mi). *Perigee*: 231 km (143 mi). *Inclination*: 70.4000 deg. *Period*: 89.60 min. Photo surveillance; returned film capsule; maneuverable..

1982 October 31 - . 11:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 16** - . *Payload*: Progress s/n 115. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 44.25 days. *Completed Operations Date*: 1982-12-14 17:16:24 . *Decay Date*: 1982-12-14 17:16:24 . *USAF Sat Cat*: 13638 . *COSPAR*: 1982-107A. *Apogee*: 246 km (152 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min. Unmanned supply vessel to Salyut 7. Docked with Salyut 7 on 2 Nov 1982 13:22:00 GMT. Undocked on 13 Dec 1982 15:32:00 GMT. Destroyed in reentry on 14 Dec 1982 17:17:00 GMT. Total free-flight time 3.16 days. Total docked time 41.09 days..

1982 November 2 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1419** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-11-16 . *USAF Sat Cat*: 13641 . *COSPAR*: 1982-108A. *Apogee*: 264 km (164 mi). *Perigee*: 206 km (128 mi). *Inclination*: 70.3000 deg. *Period*: 89.20 min. Photo surveillance; returned film capsule; maneuverable..

1982 November 18 - . 09:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1421** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-12-02 . *USAF Sat Cat*: 13661 . *COSPAR*: 1982-112A. *Apogee*: 259 km (160 mi). *Perigee*: 206 km (128 mi). *Inclination*: 70.3000 deg. *Period*: 89.20 min. Photo surveillance; returned film capsule; maneuverable..

1982 December 3 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1422** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1982-12-17 . *USAF Sat Cat*: 13677 . *COSPAR*: 1982-114A. *Apogee*: 288 km (178 mi). *Perigee*: 228 km (141 mi). *Inclination*: 72.9000 deg. *Period*: 89.70 min. Photo surveillance; returned film capsule; maneuverable..

1982 December 8 - . 13:46 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1?. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*:

Fourth stage failure.. *Failed Stage*: U.

- **Cosmos 1423** - . *Payload*: Molniya-1T s/n 60. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1982-12-31 . *USAF Sat Cat*: 13685 . *COSPAR*: 1982-115A. *Apogee*: 571 km (354 mi). *Perigee*: 348 km (216 mi). *Inclination*: 62.8000 deg. *Period*: 93.80 min. Intended to replace Molniya 1-48; failed. Investigation of the upper atmosphere and outer space..

1982 December 14 - . 22:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 2-09** - . *Payload*: Meteor-2 no. 9. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-2. *USAF Sat Cat*: 13718 . *COSPAR*: 1982-116A. *Apogee*: 882 km (548 mi). *Perigee*: 803 km (498 mi). *Inclination*: 81.2000 deg. *Period*: 101.80 min. Possible replacement for Meteor 2-6. Gathering meteorological information and data on penetrating radiation fluxes in circumterrestrial space. .

1982 December 16 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1424** - . *Payload*: Yantar-4K1 s/n 217. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 43.00 days. *Decay Date*: 1983-01-28 . *USAF Sat Cat*: 13725 . *COSPAR*: 1982-117A. *Apogee*: 349 km (216 mi). *Perigee*: 171 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1982 December 23 - . 09:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Cosmos 1425** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-01-06 . *USAF Sat Cat*: 13739 . *COSPAR*: 1982-119A. *Apogee*: 352 km (218 mi). *Perigee*: 220 km (130 mi). *Inclination*: 70.0000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1982 December 28 - . 12:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1426** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 69.00 days. *Decay Date*: 1983-03-05 . *USAF Sat Cat*: 13745 . *COSPAR*: 1982-120A. *Apogee*: 384 km (238 mi). *Perigee*: 200 km (120 mi). *Inclination*: 50.6000 deg. *Period*: 90.40 min. Photo/digital surveillance..

1983 January 20 - . 17:26 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1437** - . *Payload*: Tselina-D no. 39. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *USAF Sat Cat*: 13770 . *COSPAR*: 1983-003A. *Apogee*: 604 km (375 mi). *Perigee*: 581 km (361 mi). *Inclination*: 81.2000 deg. *Period*: 96.50 min.

1983 January 27 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1438** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 11.00 days. *Decay Date*: 1983-02-07 . *USAF Sat Cat*: 13779 . *COSPAR*: 1983-005A. *Apogee*: 226 km (140 mi). *Perigee*: 205 km (127 mi). *Inclination*: 70.4000 deg. *Period*: 88.80 min. Photo surveillance; returned film capsule; maneuverable..

1983 February 6 - . 11:31 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1439** - . *Payload*: Yantar-2K s/n 956. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 16.00 days. *Decay Date*: 1983-02-22 . *USAF Sat Cat*: 13784 . *COSPAR*: 1983-007A. *Apogee*: 344 km (213 mi). *Perigee*: 168 km (104 mi). *Inclination*: 70.4000 deg. *Period*: 89.60 min. Area survey photo reconnaissance; film capsule; also performed earth resources tasks. Returned in less than usual 30 day full duration..

1983 February 10 - . 07:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1440** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1983-02-24 . *USAF Sat Cat*: 13793 . *COSPAR*: 1983-009A. *Apogee*: 272 km (169 mi). *Perigee*: 208 km (129 mi). *Inclination*: 82.4000 deg. *Period*: 89.30 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed

earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1983 February 16 - . 10:03 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1441** - . *Payload*: Tselina-D no. 40. *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Tselina. *Class*: Surveillance. *Type*: Naval signals intelligence satellite. *Spacecraft*: Tselina-D. *Decay Date*: 2014-11-08 . *USAF Sat Cat*: 13818 . *COSPAR*: 1983-010A. *Apogee*: 587 km (364 mi). *Perigee*: 578 km (359 mi). *Inclination*: 81.1000 deg. *Period*: 96.30 min.

1983 February 25 - . 12:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1442** - . *Payload*: Yantar-4K1 s/n 248. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 45.00 days. *Decay Date*: 1983-04-11 . *USAF Sat Cat*: 13850 . *COSPAR*: 1983-012A. *Apogee*: 339 km (210 mi). *Perigee*: 169 km (105 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1983 March 2 - . 10:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1444** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-03-16 . *USAF Sat Cat*: 13870 . *COSPAR*: 1983-014A. *Apogee*: 384 km (238 mi). *Perigee*: 189 km (117 mi). *Inclination*: 72.9000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1983 March 11 - . 15:29 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-20** - . *Payload*: Molniya-3 s/n 34. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 13875 . *COSPAR*: 1983-015A. *Apogee*: 38,314 km (23,807 mi). *Perigee*: 2,069 km (1,285 mi). *Inclination*: 63.9000 deg. *Period*: 718.40 min.

  Replaced Molniya 3-17. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television

programmes to stations in the Orbita network and within the framework of international cooperation.

1983 March 16 - . 08:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Cosmos 1446** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-03-30 . *USAF Sat Cat*: 13886 . *COSPAR*: 1983-018A. *Apogee*: 343 km (213 mi). *Perigee*: 223 km (138 mi). *Inclination*: 69.9000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule; maneuverable..

1983 March 16 - . 18:14 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-56** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 13890 . *COSPAR*: 1983-019A. *Apogee*: 39,043 km (24,260 mi). *Perigee*: 1,442 km (896 mi). *Inclination*: 63.9000 deg. *Period*: 720.50 min. Replaced Molniya 1-50. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1983 March 31 - . 10:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1449** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 15.00 days. *Decay Date*: 1983-04-15 . *USAF Sat Cat*: 13955 . *COSPAR*: 1983-024A. *Apogee*: 372 km (231 mi). *Perigee*: 197 km (122 mi). *Inclination*: 72.7000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1983 April 2 - . 02:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-57** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2000-01-26 . *USAF Sat Cat*: 13964 . *COSPAR*: 1983-025A. *Apogee*: 39,551 km (24,575 mi). *Perigee*: 802 km (498 mi). *Inclination*: 63.9000 deg. *Period*: 717.80 min. Replaced Molniya 1-52. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television

programmes to stations in the Orbita network..

1983 April 8 - . 08:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1451** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-04-22 . *USAF Sat Cat*: 13975 . *COSPAR*: 1983-029A. *Apogee*: 232 km (144 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.4000 deg. *Period*: 88.60 min. Photo surveillance; returned film capsule; maneuverable. First launch from LC43/4 since on-pad explosion in March 1980..

1983 April 20 - . 13:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-8** - . *Call Sign*: Okean (Ocean). *Crew*: Serebrov, Strekalov, Titov, Vladimir. *Backup Crew*: Aleksandrov, Lyakhov, Savinykh. *Payload*: Soyuz T s/n 13L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Aleksandrov, Lyakhov, Savinykh, Serebrov, Strekalov, Titov, Vladimir. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-8. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 2.01 days. *Decay Date*: 1983-04-22 . *USAF Sat Cat*: 14014 . *COSPAR*: 1983-035A. *Apogee*: 213 km (132 mi). *Perigee*: 196 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 88.60 min. Manned three crew. Unsuccessful mission. Failed to rendezvous with Salyut 7. Recovered April 22, 1983 13:29 GMT. Landed 113 km SE Arkalyk..

1983 April 22 - . 14:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1454** - . *Payload*: Yantar-2K s/n 957. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1983-05-22 . *USAF Sat Cat*: 14017 . *COSPAR*: 1983-036A. *Apogee*: 345 km (214 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.70 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1983 April 25 - . 19:34 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1456** - . *Payload*: Oko #29. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 1998-05-11 . *USAF Sat Cat*: 14034 . *COSPAR*: 1983-038A. *Apogee*: 38,464 km (23,900 mi). *Perigee*: 1,871 km (1,162 mi). *Inclination*: 66.6000 deg.

Period: 717.40 min. Replaced Cosmos 1191. Covered Oko constellation plane 4 - 37 degree longitude of ascending node..

1983 April 26 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1457** - . *Payload*: Yantar-4K1 s/n 214. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 45.00 days. *Decay Date*: 1983-06-08 . *USAF Sat Cat*: 14039 . *COSPAR*: 1983-039A. *Apogee*: 354 km (219 mi). *Perigee*: 164 km (101 mi). *Inclination*: 70.4000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1983 April 28 - . 08:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1458** - . *Payload*: Zenit-4MKT no. 23. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1983-05-11 . *USAF Sat Cat*: 14044 . *COSPAR*: 1983-040A. *Apogee*: 243 km (150 mi). *Perigee*: 208 km (129 mi). *Inclination*: 82.3000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1983 May 6 - . 09:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1460** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-05-20 . *USAF Sat Cat*: 14058 . *COSPAR*: 1983-043A. *Apogee*: 344 km (213 mi). *Perigee*: 207 km (128 mi). *Inclination*: 70.3000 deg. *Period*: 90.00 min. Photo surveillance; returned film capsule..

1983 May 17 - . 08:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1462** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1983-05-31 . *USAF Sat Cat*: 14071 . *COSPAR*: 1983-045A. *Apogee*: 297 km (184 mi). *Perigee*: 205 km (127 mi). *Inclination*: 82.4000 deg. *Period*: 89.50 min.

High resolution photo surveillance; film capsule; maneuverable; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1983 May 26 - . 12:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1466** - . *Payload*: Yantar-4K1 s/n 250. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 41.00 days. *Decay Date*: 1983-07-06 . *USAF Sat Cat*: 14089 . *COSPAR*: 1983-050A. *Apogee*: 315 km (195 mi). *Perigee*: 166 km (103 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1983 May 31 - . 11:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1467** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 12.00 days. *Decay Date*: 1983-06-12 . *USAF Sat Cat*: 14100 . *COSPAR*: 1983-052A. *Apogee*: 361 km (224 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1983 June 7 - . 07:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1468** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1983-06-21 . *USAF Sat Cat*: 14110 . *COSPAR*: 1983-055A. *Apogee*: 251 km (155 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.4000 deg. *Period*: 89.10 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1983 June 14 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1469** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok.

Spacecraft: Zenit-6U. *Duration*: 10.00 days. *Decay Date*: 1983-06-24 . *USAF Sat Cat*: 14123 . *COSPAR*: 1983-057A. *Apogee*: 357 km (221 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 90.00 min. Photo surveillance; returned film capsule; maneuverable..

1983 June 27 - . 09:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-9** - . *Call Sign*: Proton (Proton). *Crew*: Aleksandrov, Lyakhov. *Backup Crew*: Strekalov, Titov, Vladimir. *Payload*: Soyuz T s/n 14L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Aleksandrov, Lyakhov, Strekalov, Titov, Vladimir. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 149.45 days. *Decay Date*: 1983-11-23 . *USAF Sat Cat*: 14152 . *COSPAR*: 1983-062A. *Apogee*: 228 km (141 mi). *Perigee*: 197 km (122 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min. Manned two crew. Docked with Salyut 7. Transported to the Salyut-7 orbital station a crew consisting of V A Lyakhov, commander of the spacecraft, and A P Aleksandrov, flight engineer, to conduct scientific and technical research and experiments..

1983 June 28 - . 15:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1471** - . *Payload*: Yantar-2K s/n 958. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-2K. *Duration*: 30.00 days. *Decay Date*: 1983-07-28 . *USAF Sat Cat*: 14156 . *COSPAR*: 1983-064A. *Apogee*: 343 km (213 mi). *Perigee*: 170 km (100 mi). *Inclination*: 67.1000 deg. *Period*: 89.70 min. Area survey photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission. Final Yantar-2K mission..

1983 July 1 - . 12:17 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Prognoz 9** - . *Payload*: SO-M s/n 509. *Mass*: 1,060 kg (2,330 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *USAF Sat Cat*: 14163 . *COSPAR*: 1983-067A. *Apogee*: 720,000 km (440,000 mi). *Perigee*: 380 km (230 mi). *Inclination*: 1.3000 deg. *Period*: 38,448.00 min.

  Investigation of residual radiation from the Big Bang and gamma flares in deep space, and solar corpuscular and electromagnetic radiation plasma flows and magnetic fields in circumterrestrial space to determine the effects of solar activity on the interpl anetary medium and the earth's magnetosphere. In addition to Soviet scientific apparatus, carried instruments built in Czechoslovakia and France.

1983 July 5 - . 07:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1472** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-07-19 . *USAF Sat Cat*: 14169 . *COSPAR*: 1983-068A. *Apogee*: 387 km (240 mi). *Perigee*: 180 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min. Medium resolution photo surveillance; film capsule; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1983 July 8 - . 19:21 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1481** - . *Payload*: Oko #30. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 14182 . *COSPAR*: 1983-070A. *Apogee*: 36,924 km (22,943 mi). *Perigee*: 2,912 km (1,809 mi). *Inclination*: 67.3000 deg. *Period*: 707.30 min. Intended to replace Cosmos 1285; last stage exploded. Was intended to cover Oko constellation plane 6 - 118 degree longitude of ascending node..

1983 July 13 - . 09:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1482** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-07-27 . *USAF Sat Cat*: 14185 . *COSPAR*: 1983-071A. *Apogee*: 350 km (210 mi). *Perigee*: 207 km (128 mi). *Inclination*: 70.0000 deg. *Period*: 90.10 min. Medium resolution photo surveillance; film capsule. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1983 July 19 - . 15:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-58** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1995-02-23 . *USAF Sat Cat*: 14199 . *COSPAR*: 1983-073A. *Apogee*: 25,838 km (16,054 mi). *Perigee*: 200 km (120 mi). *Inclination*: 63.5000 deg. *Period*: 448.10 min. Replaced Molniya 1-49. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network..

1983 July 20 - . 08:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1483** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1983-08-03 . *USAF Sat Cat*: 14204 . *COSPAR*: 1983-074A. *Apogee*: 272 km (169 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.3000 deg. *Period*: 89.30 min. Medium resolution photo surveillance; film capsule; also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1983 July 24 - . 05:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1484** - . *Payload*: Resurs-OE s/n 3-2. *Mass*: 2,500 kg (5,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Resurs-OE. *Duration*: 3,752.00 days. *Decay Date*: 1993-10-31 . *USAF Sat Cat*: 14207 . *COSPAR*: 1983-075A. *Apogee*: 593 km (368 mi). *Perigee*: 543 km (337 mi). *Inclination*: 97.5000 deg. *Period*: 96.00 min.

  Follow-on to Meteor series. Second flight of prototype for Resurs-O1 spacecraft. Gathering regular information on the natural resources of the earth for use in various branches of the Soviet economy, and conducting further tests on new types of measuring apparatus and methods of remote sensing of the earth's surface and atmosphere.

1983 July 26 - . 12:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1485** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-08-09 . *USAF Sat Cat*: 14210 . *COSPAR*: 1983-076A. *Apogee*: 366 km (227 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1983 August 5 - . 09:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1487** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1983-08-19 . *USAF Sat Cat*: 14245 . *COSPAR*: 1983-080A. *Apogee*: 392 km (243 mi). *Perigee*:

209 km (129 mi). *Inclination*: 82.3000 deg. *Period*: 89.30 min.

High resolution photo surveillance; film capsule; maneuverable; also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1983 August 9 - . 11:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1488** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-08-23 . *USAF Sat Cat*: 14251 . *COSPAR*: 1983-082A. *Apogee*: 368 km (228 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1983 August 10 - . 13:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1489** - . *Payload*: Yantar-4K1 s/n 252. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 44.00 days. *Decay Date*: 1983-09-23 . *USAF Sat Cat*: 14256 . *COSPAR*: 1983-083A. *Apogee*: 299 km (185 mi). *Perigee*: 173 km (107 mi). *Inclination*: 64.7000 deg. *Period*: 89.20 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1983 August 17 - . 12:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 17** - . *Payload*: Progress s/n 119. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 31.48 days. *Completed Operations Date*: 1983-09-17 23:42:37 . *Decay Date*: 1983-09-17 23:42:37 . *USAF Sat Cat*: 14283 . *COSPAR*: 1983-085A. *Apogee*: 242 km (150 mi). *Perigee*: 189 km (117 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min. Unmanned supply vessel to Salyut 7. Docked with Salyut 7 on 19 Aug 1983 13:47:00 GMT. Undocked on 17 Sep 1983 11:44:00 GMT. Destroyed in reentry on 17 Sep 1983 23:43:00 GMT. Total free-flight time 2.57 days. Total docked time 28.91 days..

1983 August 23 - . 11:05 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1493** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-09-06 . *USAF Sat Cat*: 14299 . *COSPAR*: 1983-087A. *Apogee*: 362 km (224 mi). *Perigee*: 188 km (116 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Photo surveillance; returned film capsule..

1983 August 30 - . 22:49 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-21** - . *Payload*: Molniya-3 s/n 32. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2001-05-22 . *USAF Sat Cat*: 14313 . *COSPAR*: 1983-090A. *Apogee*: 38,445 km (23,888 mi). *Perigee*: 1,864 km (1,158 mi). *Inclination*: 64.4000 deg. *Period*: 716.90 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1983 September 3 - . 10:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1495** - . *Payload*: Zenit-4MKT no. 24. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1983-09-16 . *USAF Sat Cat*: 14320 . *COSPAR*: 1983-092A. *Apogee*: 221 km (137 mi). *Perigee*: 205 km (127 mi). *Inclination*: 82.3000 deg. *Period*: 88.80 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1983 September 7 - . 13:24 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1496** - . *Payload*: Yantar-4K1 s/n 251. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 42.00 days. *Decay Date*: 1983-10-19 . *USAF Sat Cat*: 14326 . *COSPAR*: 1983-093A. *Apogee*: 338 km (210 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.2000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1983 September 9 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1497** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-09-23 . *USAF Sat Cat*: 14330 . *COSPAR*: 1983-095A. *Apogee*: 372 km (231 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1983 September 14 - . 10:25 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1498** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 15.00 days. *Decay Date*: 1983-09-29 . *USAF Sat Cat*: 14334 . *COSPAR*: 1983-096A. *Apogee*: 274 km (170 mi). *Perigee*: 206 km (128 mi). *Inclination*: 82.3000 deg. *Period*: 89.30 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1983 September 17 - . 11:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1499** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-10-01 . *USAF Sat Cat*: 14339 . *COSPAR*: 1983-097A. *Apogee*: 367 km (228 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1983 September 26 - . 19:37 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Launch vehicle blew up on pad.. *Failed Stage*: 0.

- **Soyuz T-10-1** - . *Call Sign*: Okean (Ocean). *Crew*: Strekalov, Titov, Vladimir. *Backup Crew*: Kizim, Solovyov, Vladimir. *Payload*: Soyuz 7K-ST s/n 16L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Kizim, Solovyov, Vladimir, Strekalov, Titov, Vladimir. *Agency*: UNKS. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-10-1, Soyuz T-9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 0.0001 days. *Decay Date*: 1983-09-27 . *Apogee*: 2.00 km (1.20 mi). Aborted September 27, 1983 19:38 GMT. Unsuccessful mission. Launch vehicle blew up on pad at Tyuratam; crew saved by abort system..

1983 October 14 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1504** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 53.00 days. *Decay Date*: 1983-12-06 . *USAF Sat Cat*: 14403 . *COSPAR*: 1983-104A. *Apogee*: 304 km (188 mi). *Perigee*: 172 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1983 October 20 - . 09:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 18** - . *Payload*: Progress s/n 118. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 26.76 days. *Completed Operations Date*: 1983-11-16 04:17:55 . *Decay Date*: 1983-11-16 04:17:55 . *USAF Sat Cat*: 14422 . *COSPAR*: 1983-106A. *Apogee*: 242 km (150 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Transport of various cargoes to the Salyut-7 orbital station. Docked with Salyut 7 on 22 Oct 1983 11:34:00 GMT. Boosted Salyut to 326 X 356 orbit on 4 Nov 1983. Undocked on 13 Nov 1983 03:08:00 GMT. Destroyed in reentry on 16 Nov 1983 04:18:00 GMT. Total free-flight time 5.11 days. Total docked time 21.65 days.

1983 October 21 - . 12:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1505** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-11-04 . *USAF Sat Cat*: 14425 . *COSPAR*: 1983-107A. *Apogee*: 337 km (209 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 89.80 min. Photo surveillance; returned film capsule..

1983 October 28 - . 09:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Meteor 2-10** - . *Payload*: Meteor-2 no. 10. *Mass*: 2,750 kg (6,060 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-2. *USAF Sat Cat*: 14452 . *COSPAR*: 1983-109A. *Apogee*: 876 km (544 mi). *Perigee*: 742 km (461 mi). *Inclination*: 81.2000 deg. *Period*: 101.10 min. Gathering meteorological information and data on penetrating radiation fluxes in circumterrestrial space. .

1983 November 17 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1509** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-12-01 . *USAF Sat Cat*: 14490 . *COSPAR*: 1983-112A. *Apogee*: 280 km (170 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 89.20 min. Photo surveillance; returned film capsule; maneuverable..

1983 November 23 - . 16:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-59** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2001-10-30 . *USAF Sat Cat*: 14516 . *COSPAR*: 1983-114A. *Apogee*: 38,678 km (24,033 mi). *Perigee*: 1,742 km (1,082 mi). *Inclination*: 64.2000 deg. *Period*: 719.10 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1983 November 30 - . 13:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1511** - . *Payload*: Yantar-4K1 s/n 249. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 44.00 days. *Decay Date*: 1984-01-13 . *USAF Sat Cat*: 14530 . *COSPAR*: 1983-117A. *Apogee*: 332 km (206 mi). *Perigee*: 182 km (113 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min.

  Photo surveillance; 2 small film capsules recovered in course of flight and main reentry capsule with remaining film, camera, and computer systems at end of flight. Final flight of the Yantar-2K/Yantar-4K1 series. All 12 Yantar-4K1 flights were completely successful.

1983 December 7 - . 12:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1512** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1983-12-21 . *USAF Sat Cat*: 14542 . *COSPAR*: 1983-119A. *Apogee*: 380 km (230 mi). *Perigee*: 192 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1983 December 14 - . 07:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1514** - . *Payload*: Bion no. 6. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 5.00 days. *Decay Date*: 1983-12-19 . *USAF Sat Cat*: 14549 . *COSPAR*: 1983-121A. *Apogee*: 255 km (158 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.3000 deg. *Period*: 89.20 min.

  Biological experiments. Continued investigation of the influence of space flight factors on living organisms. Carried monkeys Abrek and Bion. Capsule recovered 52 deg 42 min N, 62 deg 48 min E. The first U.S.S.R. orbital flight of a non-human primate was accomplished on the Cosmos 1514 mission. Two monkeys flew on the mission, together with several pregnant rats. More than 60 experiments were performed by investigators from Bulgaria, Hungary, the German Democratic Republic, Poland, Romania, Czechoslovakia, France, the U.S.S.R. and the U.S. U.S. scientists conducted three experiments on the primates and another experiment on the rat subjects. *Additional Details*: here....

1983 December 21 - . 06:07 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-22** - . *Payload*: Molniya-3 s/n 35. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1993-08-18 . *USAF Sat Cat*: 14570 . *COSPAR*: 1983-123A. *Apogee*: 39,819 km (24,742 mi). *Perigee*: 176 km (109 mi). *Inclination*: 64.3000 deg. *Period*: 710.50 min.

  Replaced Molniya 3-16. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation.

1983 December 27 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1516** - . *Payload*: Yantar-1KFT no. 3. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 49.00 days. *Decay Date*: 1984-02-09 . *USAF Sat Cat*: 14583 . *COSPAR*: 1983-124A. *Apogee*: 274 km (170 mi). *Perigee*: 194 km (120 mi). *Inclination*: 64.9000 deg. *Period*: 89.20 min. Military topographic / cartographic satellite..

1983 December 28 - . 03:48 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1518** - . *Payload*: Oko #31. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 1998-09-19 . *USAF Sat Cat*: 14587 . *COSPAR*: 1983-126A. *Apogee*: 38,145 km (23,702 mi). *Perigee*: 2,019 km (1,254 mi). *Inclination*: 66.9000 deg. *Period*: 713.90 min. Replaced Cosmos 1341. Covered Oko constellation plane 5 - 72 degree longitude of ascending node..

1984 January 11 - . 12:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1530** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1984-01-25 . *USAF Sat Cat*: 14622 . *COSPAR*: 1984-002A. *Apogee*: 362 km (224 mi). *Perigee*: 189 km (117 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Photo surveillance; returned film capsule..

1984 January 13 - . 14:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1532** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 44.00 days. *Decay Date*: 1984-02-26 . *USAF Sat Cat*: 14634 . *COSPAR*: 1984-004A. *Apogee*: 357 km (221 mi). *Perigee*: 163 km (101 mi). *Inclination*: 67.1000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1984 January 26 - . 08:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Cosmos 1533** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1984-02-09 . *USAF Sat Cat*: 14666 . *COSPAR*: 1984-006A. *Apogee*: 354 km (219 mi). *Perigee*: 222 km (137 mi). *Inclination*: 70.4000 deg. *Period*: 90.30 min. Photo surveillance; returned film capsule..

1984 February 8 - . 12:07 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-10** - . *Call Sign*: Mayak (Beacon). *Crew*: Atkov, Kizim, Solovyov, Vladimir. *Backup Crew*: Polyakov, Savinykh, Vasyutin. *Payload*: Soyuz 7K-ST s/n 15L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Atkov, Kizim, Polyakov, Savinykh, Solovyov, Vladimir, Vasyutin. *Agency*: MOM. *Program*: Salyut 7. *Class*:

Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 62.95 days. *Decay Date*: 1984-04-11 . *USAF Sat Cat*: 14701 . *COSPAR*: 1984-014A. *Apogee*: 219 km (136 mi). *Perigee*: 199 km (123 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

Manned three crew. Docked with Salyut 7. Transported a crew consisting of ship's commander L D Kizim, flight engineer V A Solovyov and cosmonaut-research O Y Atkov to the SALYUT-7 orbital station to conduct scientific and technical studies and experiments.

1984 February 16 - . 08:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1537** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1984-03-01 . *USAF Sat Cat*: 14737 . *COSPAR*: 1984-017A. *Apogee*: 285 km (177 mi). *Perigee*: 204 km (126 mi). *Inclination*: 82.4000 deg. *Period*: 89.40 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1984 February 21 - . 06:46 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 19** - . *Payload*: Progress s/n 120. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 40.48 days. *Completed Operations Date*: 1984-04-01 18:17:55 . *Decay Date*: 1984-04-01 18:17:55 . *USAF Sat Cat*: 14757 . *COSPAR*: 1984-018A. *Apogee*: 245 km (152 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Transport of various cargoes to the Salyut-7 orbital station. Docked with Salyut 7 on 23 Feb 1984 08:21:00 GMT. Undocked on 31 Mar 1984 09:40:00 GMT. Destroyed in reentry on 1 Apr 1984 18:18:00 GMT. Total free-flight time 3.43 days. Total docked time 37.05 days.

1984 February 28 - . 13:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1539** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 41.00 days. *Decay Date*: 1984-04-09 . *USAF Sat*

Cat: 14763 . *COSPAR*: 1984-020A. *Apogee*: 338 km (210 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.2000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1984 March 6 - . 17:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1541** - . *Payload*: Oko #32. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 14790 . *COSPAR*: 1984-024A. *Apogee*: 35,015 km (21,757 mi). *Perigee*: 5,297 km (3,291 mi). *Inclination*: 68.0000 deg. *Period*: 716.90 min. Replaced Cosmos 1278. Covered Oko constellation plane 3 - 355 degree longitude of ascending node..

1984 March 7 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Cosmos 1542** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1984-03-21 . *USAF Sat Cat*: 14793 . *COSPAR*: 1984-025A. *Apogee*: 346 km (214 mi). *Perigee*: 223 km (138 mi). *Inclination*: 70.3000 deg. *Period*: 90.20 min. Photo surveillance; returned film capsule..

1984 March 10 - . 17:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1543** - . *Payload*: Efir s/n 1. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Efir. *Duration*: 26.00 days. *Decay Date*: 1984-04-05 . *USAF Sat Cat*: 14797 . *COSPAR*: 1984-026A. *Apogee*: 401 km (249 mi). *Perigee*: 214 km (132 mi). *Inclination*: 62.8000 deg. *Period*: 90.70 min. Scientific mission using spacecraft based on Vostok/Zenit design..

1984 March 16 - . 23:29 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-60** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1994-11-04 . *USAF Sat Cat*: 14825 . *COSPAR*: 1984-029A. *Apogee*: 40,011 km (24,861 mi). *Perigee*: 277 km (172 mi). *Inclination*: 64.2000 deg. *Period*: 716.50 min. Replaced Molniya 1-51. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television

programmes to stations in the Orbita network. .

1984 March 21 - . 11:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1545** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 15.00 days. *Decay Date*: 1984-04-05 . *USAF Sat Cat*: 14849 . *COSPAR*: 1984-030A. *Apogee*: 367 km (228 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1984 April 3 - . 13:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Soyuz T-11** - . *Call Sign*: Yupiter (Jupiter). *Crew*: Malyshev, Sharma, Strekalov. *Backup Crew*: Berezovoi, Grechko, Malhotra. *Payload*: Soyuz T s/n 17L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Berezovoi, Grechko, Malhotra, Malyshev, Sharma, Strekalov. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-10, Soyuz T-11. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 181.91 days. *Decay Date*: 1984-10-02 . *USAF Sat Cat*: 14872 . *COSPAR*: 1984-032A. *Apogee*: 224 km (139 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  Manned three crew. Docked with Salyut 7.Transported a Soviet-Indian international crew comprising ship's commander Y V Malyshev, flight engineer G M Strekalov (USSR) and cosmonaut-researcher R Sharma (India) to the SALYUT-7 orbital station to conduct scientific and technical studies and experiments.

1984 April 4 - . 01:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1547** - . *Payload*: Oko #33. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 14884 . *COSPAR*: 1984-033A. *Apogee*: 36,507 km (22,684 mi). *Perigee*: 3,819 km (2,373 mi). *Inclination*: 67.5000 deg. *Period*: 717.20 min. Replaced Cosmos 1382. Covered Oko constellation plane 7 - 154 degree longitude of ascending node..

1984 April 10 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1548** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 45.00 days. *Decay Date*: 1984-05-25 . *USAF Sat*

Cat: 14902 . *COSPAR*: 1984-036A. *Apogee*: 331 km (205 mi). *Perigee*: 165 km (102 mi). *Inclination*: 67.2000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1984 April 15 - . 08:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 20** - . *Payload*: Progress s/n 121. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 21.68 days. *Completed Operations Date*: 1984-05-07 00:32:58 . *Decay Date*: 1984-05-07 00:32:58 . *USAF Sat Cat*: 14932 . *COSPAR*: 1984-038A. *Apogee*: 260 km (160 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min.

  Transport of various cargoes to the Salyut-7 orbital station. First launch of Progress by Soyuz-U2 launch vehicle. Docked with Salyut 7 on 17 Apr 1984 09:22:00 GMT. Undocked on 6 May 1984 17:46:00 GMT. Destroyed in reentry on 7 May 1984 00:32:51 GMT. Total free-flight time 2.33 days. Total docked time 19.35 days.

1984 April 19 - . 11:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1549** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 14.00 days. *Decay Date*: 1984-05-03 . *USAF Sat Cat*: 14938 . *COSPAR*: 1984-040A. *Apogee*: 364 km (226 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.8000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1984 May 7 - . 22:47 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 21** - . *Payload*: Progress s/n 116. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 18.68 days. *Completed Operations Date*: 1984-05-27 15:00:15 . *Decay Date*: 1984-05-27 15:00:15 . *USAF Sat Cat*: 14961 . *COSPAR*: 1984-042A. *Apogee*: 246 km (152 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Transport of various cargoes to the Salyut-7 orbital station. Docked with Salyut 7 on 10 May 1984 00:10:00 GMT. Undocked on 26 May 1984 09:41:00 GMT. Destroyed in reentry on 26 May 1984 15:00:30 GMT. Total free-flight time 2.28 days. Total docked time 16.40 days.

1984 May 11 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1551** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 12.00 days. *Decay Date*: 1984-05-23 . *USAF Sat Cat*: 14967 . *COSPAR*: 1984-044A. *Apogee*: 276 km (171 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 89.20 min. Photo surveillance; returned film capsule; maneuverable..

1984 May 14 - . 14:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1552** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 173.00 days. *Decay Date*: 1984-11-03 . *USAF Sat Cat*: 14971 . *COSPAR*: 1984-045A. *Apogee*: 320 km (190 mi). *Perigee*: 180 km (110 mi). *Inclination*: 64.9000 deg. *Period*: 89.50 min. Photo/digital surveillance..

1984 May 22 - . 08:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1557** - . *Payload*: Zenit-4MKT no. 25. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1984-06-04 . *USAF Sat Cat*: 14982 . *COSPAR*: 1984-048A. *Apogee*: 245 km (152 mi). *Perigee*: 208 km (129 mi). *Inclination*: 82.3000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1984 May 25 - . 11:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1558** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 44.00 days. *Decay Date*: 1984-07-08 . *USAF Sat Cat*: 14993 . *COSPAR*: 1984-050A. *Apogee*: 293 km (182 mi). *Perigee*: 163 km (101 mi). *Inclination*: 67.1000 deg. *Period*: 89.10 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1984 May 28 - . 14:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 22** - . *Payload*: Progress s/n 122. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 48.19 days. *Completed Operations Date*: 1984-07-15 18:52:08 . *Decay Date*: 1984-07-15 18:52:08 . *USAF Sat Cat*: 14996 . *COSPAR*: 1984-051A. *Apogee*: 244 km (151 mi). *Perigee*: 188 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Transport of various cargoes to the Salyut-7 orbital station. Docked with Salyut 7 on 30 May 1984 15:47:00 GMT. Undocked on 15 Jul 1984 13:36:00 GMT. Destroyed in reentry on 15 Jul 1984 18:52:00 GMT. Total free-flight time 2.28 days. Total docked time 45.91 days.

1984 June 1 - . 13:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1568** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 13.00 days. *Decay Date*: 1984-06-14 . *USAF Sat Cat*: 15011 . *COSPAR*: 1984-054A. *Apogee*: 365 km (226 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Photo surveillance; returned film capsule..

1984 June 6 - . 15:34 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1569** - . *Payload*: Oko #34. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2001-05-07 . *USAF Sat Cat*: 15027 . *COSPAR*: 1984-055A. *Apogee*: 37,578 km (23,349 mi). *Perigee*: 2,729 km (1,695 mi). *Inclination*: 66.1000 deg. *Period*: 716.80 min. Replaced Cosmos 1518. Covered Oko constellation plane 5 - 74 degree longitude of ascending node..

1984 June 11 - . 08:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1571** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 15.00 days. *Decay Date*: 1984-06-26 . *USAF Sat Cat*: 15036 . *COSPAR*: 1984-058A. *Apogee*: 362 km (224 mi). *Perigee*: 213 km (132 mi). *Inclination*: 69.9000 deg. *Period*: 90.30 min. Military cartographic satellite; returned film capsule..

1984 June 15 - . 08:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1572** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1984-06-29 . *USAF Sat Cat*: 15046 . *COSPAR*: 1984-060A. *Apogee*: 265 km (164 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.4000 deg. *Period*: 89.30 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1984 June 19 - . 10:55 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1573** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-6U. *Duration*: 9.00 days. *Decay Date*: 1984-06-28 . *USAF Sat Cat*: 15051 . *COSPAR*: 1984-061A. *Apogee*: 287 km (178 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 89.30 min. Photo surveillance; returned film capsule; maneuverable..

1984 June 22 - . 07:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1575** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 15.00 days. *Decay Date*: 1984-07-07 . *USAF Sat Cat*: 15060 . *COSPAR*: 1984-064A. *Apogee*: 264 km (164 mi). *Perigee*: 212 km (131 mi). *Inclination*: 82.3000 deg. *Period*: 89.30 min. High resolution photo surveillance; film capsule; maneuverable. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1984 June 26 - . 15:35 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1576** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1984-08-24 . *USAF Sat Cat*: 15070 . *COSPAR*: 1984-066A. *Apogee*: 348 km (216 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1984 June 29 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*:

Soyuz-U.

- **Cosmos 1580** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1984-07-13 . *USAF Sat Cat*: 15090 . *COSPAR*: 1984-070A. *Apogee*: 345 km (214 mi). *Perigee*: 241 km (149 mi). *Inclination*: 62.8000 deg. *Period*: 90.40 min. Military cartographic satellite; returned film capsule..

1984 July 3 - . 21:31 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1581** - . *Payload*: Oko #35. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 15095 . *COSPAR*: 1984-071A. *Apogee*: 36,014 km (22,378 mi). *Perigee*: 4,498 km (2,794 mi). *Inclination*: 67.8000 deg. *Period*: 721.00 min. Replaced Cosmos 1317. Covered Oko constellation plane 8 - 194 degree longitude of ascending node..

1984 July 17 - . 17:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz T-12** - . *Call Sign*: Pamir (Pamir mountains). *Crew*: Dzhanibekov, Savitskaya, Volk. *Backup Crew*: Ivanova, Savinykh, Vasyutin. *Payload*: Soyuz T s/n 18L. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Related Persons*: Dzhanibekov, Ivanova, Savinykh, Savitskaya, Vasyutin, Volk. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-10, Soyuz T-12. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 11.80 days. *Decay Date*: 1984-07-29 . *USAF Sat Cat*: 15119 . *COSPAR*: 1984-073A. *Apogee*: 218 km (135 mi). *Perigee*: 192 km (119 mi). *Inclination*: 51.6000 deg. *Period*: 88.60 min. Docked with Salyut 7. Transported a crew comprising ship's commander V A Dzhanibekov, flight engineer S E Savitskaya and cosmonaut-research I P Volk to the Salyut-7 orbital station to conduct scientific and technical studies and experiments..

1984 July 19 - . 08:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1582** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1984-08-02 . *USAF Sat Cat*: 15121 . *COSPAR*: 1984-074A. *Apogee*: 266 km (165 mi). *Perigee*: 216 km (134 mi). *Inclination*: 82.3000 deg. *Period*: 89.30 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international

cooperation.

1984 July 24 - . 12:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1583** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 15.00 days. *Decay Date*: 1984-08-08 . *USAF Sat Cat*: 15123 . *COSPAR*: 1984-075A. *Apogee*: 359 km (223 mi). *Perigee*: 195 km (121 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule..

1984 July 27 - . 08:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1584** - . *Payload*: Zenit-8 / Oblik no. 1. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1984-08-10 . *USAF Sat Cat*: 15131 . *COSPAR*: 1984-076A. *Apogee*: 245 km (152 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.70 min.

  Military cartographic satellite; returned film capsule; also performed earth resources tasks; possibly stranded in bad orbit. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1984 July 31 - . 12:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1585** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1984-09-28 . *USAF Sat Cat*: 15142 . *COSPAR*: 1984-077A. *Apogee*: 300 km (180 mi). *Perigee*: 172 km (106 mi). *Inclination*: 64.7000 deg. *Period*: 89.20 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1984 August 2 - . 08:38 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1586** - . *Payload*: Oko #36. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2016-01-06 . *USAF Sat Cat*: 15147 . *COSPAR*: 1984-079A. *Apogee*: 36,751 km (22,835 mi). *Perigee*: 3,607 km (2,241 mi). *Inclination*: 66.4000 deg. *Period*: 717.90 min. Replaced Cosmos 1456. Covered Oko constellation plane 4 - 35

degree longitude of ascending node..

1984 August 6 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1587** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 25.00 days. *Decay Date*: 1984-08-31 . *USAF Sat Cat*: 15163 . *COSPAR*: 1984-082A. *Apogee*: 365 km (226 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule. Return date suspect..

1984 August 10 - . 00:03 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-61** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2002-12-31 . *USAF Sat Cat*: 15182 . *COSPAR*: 1984-085A. *Apogee*: 38,330 km (23,810 mi). *Perigee*: 1,935 km (1,202 mi). *Inclination*: 64.2000 deg. *Period*: 716.00 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network..

1984 August 14 - . 06:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 23** - . *Payload*: Progress s/n 124. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 13.79 days. *Completed Operations Date*: 1984-08-28 01:27:45 . *Decay Date*: 1984-08-28 01:27:45 . *USAF Sat Cat*: 15193 . *COSPAR*: 1984-086A. *Apogee*: 250 km (150 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min.

  Transport of various cargoes to the Salyut-7 orbital station. Docked with Salyut 7 on 16 Aug 1984 08:11:00 GMT. Undocked on 26 Aug 1984 16:13:00 GMT. Destroyed in reentry on 28 Aug 1984 01:28:00 GMT. Total free-flight time 3.46 days. Total docked time 10.33 days.

1984 August 16 - . 09:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1590** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*:

Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1984-08-30 . *USAF Sat Cat*: 15197 . *COSPAR*: 1984-087A. *Apogee*: 262 km (162 mi). *Perigee*: 207 km (128 mi). *Inclination*: 82.4000 deg. *Period*: 89.20 min. High resolution photo surveillance; film capsule; maneuverable. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1984 August 24 - . 08:26 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-62** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 15214 . *COSPAR*: 1984-089A. *Apogee*: 40,372 km (25,085 mi). *Perigee*: 836 km (519 mi). *Inclination*: 63.9000 deg. *Period*: 735.20 min. Replaced Molniya 1-54. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network..

1984 August 30 - . 10:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1591** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1984-09-13 . *USAF Sat Cat*: 15232 . *COSPAR*: 1984-092A. *Apogee*: 268 km (166 mi). *Perigee*: 206 km (128 mi). *Inclination*: 82.3000 deg. *Period*: 89.30 min. High resolution photo surveillance; film capsule; maneuverable. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1984 September 4 - . 10:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1592** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1984-09-18 . *USAF Sat Cat*: 15257 . *COSPAR*: 1984-094A. *Apogee*: 352 km (218 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Military cartographic satellite; returned film capsule; maneuverable..

1984 September 7 - . 19:13 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1596** - . *Payload*: Oko #37. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia.

Agency: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 15267 . *COSPAR*: 1984-096A. *Apogee*: 35,908 km (22,312 mi). *Perigee*: 4,503 km (2,798 mi). *Inclination*: 67.8000 deg. *Period*: 718.90 min. Replaced Cosmos 1348. Covered Oko constellation plane 9 - 238 degree longitude of ascending node..

1984 September 13 - . 10:25 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1597** - . *Payload*: Zenit-4MKT no. 26. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1984-09-26 . *USAF Sat Cat*: 15287 . *COSPAR*: 1984-099A. *Apogee*: 241 km (149 mi). *Perigee*: 208 km (129 mi). *Inclination*: 82.3000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1984 September 25 - . 14:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1599** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 56.00 days. *Decay Date*: 1984-11-20 . *USAF Sat Cat*: 15318 . *COSPAR*: 1984-102A. *Apogee*: 247 km (153 mi). *Perigee*: 164 km (101 mi). *Inclination*: 67.1000 deg. *Period*: 88.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1984 September 27 - . 08:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1600** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1984-10-11 . *USAF Sat Cat*: 15324 . *COSPAR*: 1984-103A. *Apogee*: 377 km (234 mi). *Perigee*: 201 km (124 mi). *Inclination*: 70.0000 deg. *Period*: 90.30 min. Military cartographic satellite; returned film capsule..

1984 October 4 - . 19:49 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1604** - . *Payload*: Oko #38. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 15350 . *COSPAR*: 1984-107A. *Apogee*: 36,050 km (22,400 mi).

Perigee: 4,359 km (2,708 mi). *Inclination*: 67.9000 deg. *Period*: 718.90 min. Replaced Cosmos 1367. Covered Oko constellation plane 1 - 274 degree longitude of ascending node..

1984 November 14 - . 07:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1608** - . *Payload*: Yantar-1KFT no. 4. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 33.00 days. *Decay Date*: 1984-12-17 . *USAF Sat Cat*: 15393 . *COSPAR*: 1984-116A. *Apogee*: 248 km (154 mi). *Perigee*: 195 km (121 mi). *Inclination*: 70.0000 deg. *Period*: 88.90 min. Military topographic / cartographic satellite..

1984 November 14 - . 12:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1609** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1984-11-28 . *USAF Sat Cat*: 15395 . *COSPAR*: 1984-117A. *Apogee*: 354 km (219 mi). *Perigee*: 195 km (121 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Military cartographic satellite; returned film capsule..

1984 November 21 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1611** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 51.00 days. *Decay Date*: 1985-01-11 . *USAF Sat Cat*: 15403 . *COSPAR*: 1984-119A. *Apogee*: 299 km (185 mi). *Perigee*: 172 km (106 mi). *Inclination*: 64.7000 deg. *Period*: 89.20 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1984 November 29 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1613** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 25.00 days. *Decay Date*: 1984-12-24 . *USAF Sat Cat*: 15414 . *COSPAR*: 1984-121A. *Apogee*: 353 km (219 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.8000 deg. *Period*: 90.00 min. Military cartographic satellite; returned film capsule..

1984 December 14 - . 20:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch*

Vehicle: Molniya 8K78M.

- **Molniya 1-63** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 15429 . *COSPAR*: 1984-124A. *Apogee*: 38,722 km (24,060 mi). *Perigee*: 1,605 km (997 mi). *Inclination*: 64.0000 deg. *Period*: 717.20 min. Replaced Molniya 1-55. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network..

1985 January 9 - . 10:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1616** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 54.00 days. *Decay Date*: 1985-03-04 . *USAF Sat Cat*: 15467 . *COSPAR*: 1985-002A. *Apogee*: 356 km (221 mi). *Perigee*: 171 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.80 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1985 January 16 - . 06:22 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-23** - . *Payload*: Molniya-3 s/n 36. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1994-12-05 . *USAF Sat Cat*: 15476 . *COSPAR*: 1985-004A. *Apogee*: 39,732 km (24,688 mi). *Perigee*: 626 km (388 mi). *Inclination*: 64.8000 deg. *Period*: 717.90 min.

  Replaced Molniya 3-19. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation.

1985 January 16 - . 08:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1623** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-01-30 . *USAF Sat Cat*: 15479 . *COSPAR*: 1985-005A. *Apogee*: 387 km (240 mi). *Perigee*: 198 km (123 mi). *Inclination*: 70.0000 deg. *Period*: 90.40 min. Military cartographic satellite; returned film capsule..

1985 February 6 - . 11:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1628** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-02-20 . *USAF Sat Cat*: 15514 . *COSPAR*: 1985-012A. *Apogee*: 378 km (234 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 90.20 min. Military cartographic satellite; returned film capsule..

1985 February 27 - . 11:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1630** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 55.00 days. *Decay Date*: 1985-04-23 . *USAF Sat Cat*: 15582 . *COSPAR*: 1985-017A. *Apogee*: 332 km (206 mi). *Perigee*: 173 km (107 mi). *Inclination*: 64.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1985 March 1 - . 10:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1632** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-03-15 . *USAF Sat Cat*: 15589 . *COSPAR*: 1985-019A. *Apogee*: 233 km (144 mi). *Perigee*: 190 km (110 mi). *Inclination*: 72.9000 deg. *Period*: 88.70 min. Military cartographic satellite; returned film capsule; maneuverable..

1985 March 25 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1643** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 207.00 days. *Decay Date*: 1985-10-18 . *USAF Sat Cat*: 15634 . *COSPAR*: 1985-026A. *Apogee*: 276 km (171 mi). *Perigee*: 182 km (113 mi). *Inclination*: 64.8000 deg. *Period*: 89.10 min. Photo/digital surveillance..

1985 April 3 - . 08:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1644** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8.

Duration: 14.00 days. *Decay Date*: 1985-04-17 . *USAF Sat Cat*: 15636 . *COSPAR*: 1985-027A. *Apogee*: 335 km (208 mi). *Perigee*: 206 km (128 mi). *Inclination*: 70.3000 deg. *Period*: 90.30 min. Military cartographic satellite; returned film capsule..

1985 April 16 - . 17:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1645 / Foton 1** - . *Payload*: Foton s/n 1L. *Mass*: 6,200 kg (13,600 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 12.16 days. *Decay Date*: 1985-04-29 . *USAF Sat Cat*: 15645 . *COSPAR*: 1985-029A. *Apogee*: 388 km (241 mi). *Perigee*: 214 km (132 mi). *Inclination*: 62.8000 deg. *Period*: 90.50 min. Materials processing tests..

1985 April 19 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1647** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 53.00 days. *Decay Date*: 1985-06-11 . *USAF Sat Cat*: 15655 . *COSPAR*: 1985-031A. *Apogee*: 321 km (199 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.40 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1985 April 25 - . 09:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1648** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 11.00 days. *Decay Date*: 1985-05-06 . *USAF Sat Cat*: 15659 . *COSPAR*: 1985-032A. *Apogee*: 234 km (145 mi). *Perigee*: 179 km (111 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min. Military cartographic satellite; returned film capsule..

1985 April 26 - . 05:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Intercosmos 23** - . *Payload*: SO-M s/n 510. *Mass*: 1,000 kg (2,200 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Intercosmos. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz. *Completed Operations Date*: 1985-11-19 . *Decay Date*: 1994-01-12 . *USAF Sat Cat*: 15661 . *COSPAR*: 1985-033A. *Apogee*: 194,734 km (121,001 mi). *Perigee*: 5,975 km (3,712 mi). *Inclination*: 76.8000 deg. *Period*: 5,783.70 min.

Magnetosphere and solar wind investigations. Prognoz-10-Intercosmos. Investigation of the structure of interplanetary and circumterrestrial shock waves generated by the interaction of the solar wind and the earth's magnetosphere. Carries scientific apparatus developed by scientists and specialists o f the USSR and the Czechoslovak Socialist Republic in the 'Intercosmos' programme of international cooperation in the exploration and peaceful uses of outer space.

1985 May 15 - . 12:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1649** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-05-29 . *USAF Sat Cat*: 15694 . *COSPAR*: 1985-036A. *Apogee*: 366 km (227 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule..

1985 May 22 - . 08:35 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1653** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1985-06-05 . *USAF Sat Cat*: 15732 . *COSPAR*: 1985-038A. *Apogee*: 290 km (180 mi). *Perigee*: 206 km (128 mi). *Inclination*: 82.3000 deg. *Period*: 89.50 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1985 May 23 - . 12:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1654** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 29.00 days. *Decay Date*: 1985-06-30 . *USAF Sat Cat*: 15734 . *COSPAR*: 1985-039A. *Apogee*: 341 km (211 mi). *Perigee*: 170 km (100 mi). *Inclination*: 64.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance. Spacecraft failed. Blown up in orbit on June 21..

1985 May 29 - . 07:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-24** - . *Payload*: Molniya-3 s/n 39. *Mass*: 1,600 kg (3,500 lb). *Nation*:

Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 15738 . *COSPAR*: 1985-040A. *Apogee*: 38,895 km (24,168 mi). *Perigee*: 1,449 km (900 mi). *Inclination*: 64.1000 deg. *Period*: 717.60 min.

Replaced Molniya 3-18. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation.

1985 June 6 - . 06:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz T-13** - . *Call Sign*: Pamir (Pamir mountains). *Crew*: Dzhanibekov, Savinykh. *Backup Crew*: Aleksandrov, Popov. *Payload*: Soyuz T s/n 19L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Aleksandrov, Dzhanibekov, Popov, Savinykh. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-13 EO-4-a, Soyuz T-13 EO-4-b. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 112.13 days. *Decay Date*: 1985-09-26 . *USAF Sat Cat*: 15804 . *COSPAR*: 1985-043A. *Apogee*: 222 km (137 mi). *Perigee*: 198 km (123 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  Docked with Salyut 7. Delivered to the Salyut-7 orbital station a crew consisting of flight commander V A Dzhanibekov and flight engineer V P Savinykh to carry out emergency repairs to inert Salyut 7 station and to conduct scientific and technical research and experiments.

1985 June 7 - . 07:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1657** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1985-06-21 . *USAF Sat Cat*: 15806 . *COSPAR*: 1985-044A. *Apogee*: 282 km (175 mi). *Perigee*: 177 km (109 mi). *Inclination*: 82.3000 deg. *Period*: 89.10 min. High resolution photo surveillance; film capsule; maneuverable (?). Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1985 June 11 - . 14:27 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1658** - . *Payload*: Oko #39. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2005-11-12 . *USAF Sat Cat*: 15808 . *COSPAR*: 1985-045A. *Apogee*: 36,933 km (22,949 mi). *Perigee*: 3,366 km (2,091 mi). *Inclination*: 65.6000 deg.

Period: 716.70 min. Replaced Cosmos 1481. Covered Oko constellation plane 6 - 114 degree longitude of ascending node..

1985 June 13 - . 12:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1659** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-06-27 . *USAF Sat Cat*: 15818 . *COSPAR*: 1985-046A. *Apogee*: 350 km (210 mi). *Perigee*: 196 km (121 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Military cartographic satellite; returned film capsule..

1985 June 18 - . 00:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1661** - . *Payload*: Oko #40. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 15827 . *COSPAR*: 1985-049A. *Apogee*: 36,253 km (22,526 mi). *Perigee*: 4,148 km (2,577 mi). *Inclination*: 67.4000 deg. *Period*: 718.70 min. Covered Oko constellation plane 1 - 275 degree longitude of ascending node..

1985 June 21 - . 00:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress 24** - . *Payload*: Progress s/n 125. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-13 EO-4-a, Soyuz T-13 EO-4-b. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 24.91 days. *Completed Operations Date*: 1985-07-15 22:33:50 . *Decay Date*: 1985-07-15 22:33:50 . *USAF Sat Cat*: 15838 . *COSPAR*: 1985-051A. *Apogee*: 251 km (155 mi). *Perigee*: 189 km (117 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min.

  Delivery to the Salyut-7 orbital station of a mixed cargo with a total mass of 2,000 kg. Docked with Salyut 7 on 23 Jun 1985 02:54:00 GMT. Undocked on 15 Jul 1985 12:28:00 GMT. Destroyed in reentry on 15 Jul 1985 22:33:31 GMT. Total free-flight time 2.51 days. Total docked time 22.40 days.

1985 June 21 - . 07:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1663** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1985-07-05 . *USAF Sat Cat*: 15840 . *COSPAR*: 1985-052A. *Apogee*: 256 km (159 mi). *Perigee*:

210 km (130 mi). *Inclination*: 82.3000 deg. *Period*: 89.20 min.

High resolution photo surveillance; film capsule; maneuverable; also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1985 June 26 - . 12:35 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1664** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 9.00 days. *Decay Date*: 1985-07-05 . *USAF Sat Cat*: 15860 . *COSPAR*: 1985-054A. *Apogee*: 376 km (233 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 90.20 min. Military cartographic satellite; returned film capsule; maneuverable..

1985 July 3 - . 12:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1665** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-07-17 . *USAF Sat Cat*: 15877 . *COSPAR*: 1985-057A. *Apogee*: 280 km (170 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 89.20 min. Military cartographic satellite; returned film capsule; maneuverable..

1985 July 10 - . 03:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1667** - . *Payload*: Bion no. 7. *Mass*: 5,700 kg (12,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 6.90 days. *Decay Date*: 1985-07-17 . *USAF Sat Cat*: 15891 . *COSPAR*: 1985-059A. *Apogee*: 262 km (162 mi). *Perigee*: 206 km (128 mi). *Inclination*: 82.4000 deg. *Period*: 89.20 min.

  Biological research. Carried monkeys Verniy and Gordiy. Continued investigations of the influence of space flight factors on living organisms and radiation physics research. Cosmos 1667 was the second USSR biosatellite mission with a primate payload. Cosmos 1667 also featured a large rodent payload, however the U.S. only conducted a single experiment cardiovascular experiment on one of the two flight monkeys. Mission parameters were very similar to those of Cosmos 1514. Countries participating in the mission included the USSR, U.S., France, Czechoslovakia, the German Democratic Republic, Poland, Romania, Bulgaria and Hungary. *Additional Details*: here....

1985 July 15 - . 06:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1668** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-07-29 . *USAF Sat Cat*: 15906 . *COSPAR*: 1985-060A. *Apogee*: 271 km (168 mi). *Perigee*: 206 km (128 mi). *Inclination*: 70.4000 deg. *Period*: 89.30 min. Military cartographic satellite; returned film capsule; maneuverable..

1985 July 17 - . 01:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-25** - . *Payload*: Molniya-3 s/n 37. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2002-09-21 . *USAF Sat Cat*: 15909 . *COSPAR*: 1985-061A. *Apogee*: 38,334 km (23,819 mi). *Perigee*: 1,797 km (1,116 mi). *Inclination*: 64.7000 deg. *Period*: 713.30 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1985 July 19 - . 13:05 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1669** - . *Payload*: Progress s/n 126. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-13 EO-4-a, Soyuz T-13 EO-4-b. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 41.51 days. *Completed Operations Date*: 1985-08-30 01:19:52 . *Decay Date*: 1985-08-30 01:19:52 . *USAF Sat Cat*: 15918 . *COSPAR*: 1985-062A. *Apogee*: 247 km (153 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Progress vehicle, given Cosmos designation instead of Progress because control lost early in mission but regained later. Resupplied Salyut 7. On departure briefly undocked and redocked to verify reliability of docking system. Transported of various cargoes to the Salyut-7 orbital station. Docked with Salyut 7 on 21 Jul 1985 15:05:00 GMT. Undocked on 28 Aug 1985 21:50:00 GMT. Destroyed in reentry on 30 Aug 1985 01:20:00 GMT. Total free-flight time 3.23 days. Total docked time 38.28 days.

1985 August 2 - . 11:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1671** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-08-16 . *USAF Sat Cat*: 15931 . *COSPAR*: 1985-065A. *Apogee*: 281 km (174 mi). *Perigee*: 195 km (121 mi). *Inclination*: 72.9000 deg. *Period*: 89.30 min. Military cartographic satellite; returned film capsule; maneuverable..

1985 August 7 - . 09:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1672** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1985-08-21 . *USAF Sat Cat*: 15940 . *COSPAR*: 1985-067A. *Apogee*: 255 km (158 mi). *Perigee*: 183 km (113 mi). *Inclination*: 82.3000 deg. *Period*: 88.90 min. High resolution photo surveillance; film capsule; maneuverable. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1985 August 8 - . 10:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1673** - . *Payload*: Yantar-1KFT no. 5. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 42.00 days. *Decay Date*: 1985-09-19 . *USAF Sat Cat*: 15942 . *COSPAR*: 1985-068A. *Apogee*: 271 km (168 mi). *Perigee*: 195 km (121 mi). *Inclination*: 64.8000 deg. *Period*: 89.20 min. Military topographic / cartographic satellite..

1985 August 12 - . 15:09 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1675** - . *Payload*: Oko #41. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 15952 . *COSPAR*: 1985-071A. *Apogee*: 36,967 km (22,970 mi). *Perigee*: 3,363 km (2,089 mi). *Inclination*: 67.4000 deg. *Period*: 717.30 min. Replaced Cosmos 1581. Covered Oko constellation plane 8 - 195 degree longitude of ascending node..

1985 August 16 - . 15:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1676** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1985-10-14 . *USAF Sat Cat*: 15959 . *COSPAR*: 1985-072A. *Apogee*: 332 km (206 mi). *Perigee*: 169 km (105

mi). *Inclination*: 67.1000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1985 August 22 - . 19:28 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-64** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2000-03-22 . *USAF Sat Cat*: 15977 . *COSPAR*: 1985-074A. *Apogee*: 38,370 km (23,840 mi). *Perigee*: 1,987 km (1,234 mi). *Inclination*: 64.7000 deg. *Period*: 717.80 min. Replaced Molniya 1-61. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1985 August 29 - . 10:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1678** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1985-09-12 . *USAF Sat Cat*: 15997 . *COSPAR*: 1985-077A. *Apogee*: 280 km (170 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 89.10 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1985 August 29 - . 11:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1679** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 50.00 days. *Decay Date*: 1985-10-18 . *USAF Sat Cat*: 15999 . *COSPAR*: 1985-078A. *Apogee*: 341 km (211 mi). *Perigee*: 172 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1985 September 6 - . 10:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1681** - . *Payload*: Zenit-4MKT no. 27. *Mass*: 6,300 kg (13,800 lb). *Nation*:

Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-4MKT. *Duration*: 13.00 days. *Decay Date*: 1985-09-19 . *USAF Sat Cat*: 16018 . *COSPAR*: 1985-080A. *Apogee*: 225 km (139 mi). *Perigee*: 206 km (128 mi). *Inclination*: 82.3000 deg. *Period*: 88.80 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1985 September 17 - . 12:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz T-14** - . *Call Sign*: Cheget (Tcheget - mountain in the Caucasus). *Crew*: Grechko, Vasyutin, Volkov, Aleksandr. *Backup Crew*: Saley, Strekalov, Viktorenko. *Payload*: Soyuz T s/n 20L. *Mass*: 6,850 kg (15,100 lb). *Nation*: Russia. *Related Persons*: Grechko, Saley, Strekalov, Vasyutin, Viktorenko, Volkov, Aleksandr. *Agency*: MOM. *Program*: Salyut 7. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-13 EO-4-a, Soyuz T-13 EO-4-b, Soyuz T-14 EO-4-c, Soyuz T-14 Salyut 7 EP-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 64.91 days. *Decay Date*: 1985-11-21 . *USAF Sat Cat*: 16051 . *COSPAR*: 1985-081A. *Apogee*: 223 km (138 mi). *Perigee*: 196 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  Docked with Salyut 7. Transported a crew comprising ship's commander V V Vasyutin, flight engineer G M Grechko and cosmonaut-researcher A A Volkov to the Salyut-7 orbital station to conduct scientific and technical studies and experiments. Grechko returned in Soyuz T-13 on 25 September 1985 - emergency return.

1985 September 19 - . 10:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1683** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 15.00 days. *Decay Date*: 1985-10-04 . *USAF Sat Cat*: 16056 . *COSPAR*: 1985-083A. *Apogee*: 370 km (220 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule..

1985 September 24 - . 01:18 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1684** - . *Payload*: Oko #42. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 16064 . *COSPAR*: 1985-084A. *Apogee*: 32,715 km (20,328 mi). *Perigee*: 7,606 km (4,726 mi). *Inclination*: 67.9000 deg. *Period*: 717.10 min. Replaced Cosmos 1586. Covered Oko constellation plane 4 - 35 degree longitude of ascending node..

1985 September 26 - . 11:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1685** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-10-10 . *USAF Sat Cat*: 16088 . *COSPAR*: 1985-085A. *Apogee*: 350 km (210 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Military cartographic satellite; returned film capsule..

1985 September 30 - . 19:23 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1687** - . *Payload*: Oko #43. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 16103 . *COSPAR*: 1985-088A. *Apogee*: 36,187 km (22,485 mi). *Perigee*: 4,160 km (2,580 mi). *Inclination*: 67.7000 deg. *Period*: 717.70 min. Replaced Cosmos 1401. Covered Oko constellation plane 2 - 314 degree longitude of ascending node..

1985 October 3 - . 05:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1689** - . *Payload*: Resurs-O1 no. 1. *Mass*: 1,500 kg (3,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Resurs-O1. *Decay Date*: 2001-01-14 . *USAF Sat Cat*: 16110 . *COSPAR*: 1985-090A. *Apogee*: 545 km (338 mi). *Perigee*: 496 km (308 mi). *Inclination*: 97.6000 deg. *Period*: 95.10 min.

  First flight of Resurs-O1. Acquisition of operational information on the natural resources of the earth in the interests of various branches of the national economy of the USSR; continued trials of new types of informational and measurement apparatus and methods of remote sensing of the earth's surface and atmosphere. Operated for one year, two months. Re-entered January 14, 2001.

1985 October 3 - . 07:33 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-26** - . *Payload*: Molniya-3 s/n 38. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2001-02-22 . *USAF Sat Cat*: 16112 . *COSPAR*: 1985-091A. *Apogee*: 38,722 km (24,060 mi). *Perigee*: 1,660 km (1,030 mi). *Inclination*: 64.6000 deg. *Period*: 718.40 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to

stations in the Orbita network and within the framework of international cooperation. .

1985 October 16 - . 09:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1696** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-10-30 . *USAF Sat Cat*: 16169 . *COSPAR*: 1985-095A. *Apogee*: 270 km (160 mi). *Perigee*: 205 km (127 mi). *Inclination*: 70.4000 deg. *Period*: 89.30 min. Military cartographic satellite; returned film capsule; maneuverable..

1985 October 22 - . 20:24 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1698** - . *Payload*: Oko #44. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 16183 . *COSPAR*: 1985-098A. *Apogee*: 35,412 km (22,003 mi). *Perigee*: 4,994 km (3,103 mi). *Inclination*: 67.8000 deg. *Period*: 718.80 min. Replaced Cosmos 1541. Covered Oko constellation plane 3 - 351 degree longitude of ascending node..

1985 October 23 - . 00:42 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-65** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1999-02-13 . *USAF Sat Cat*: 16187 . *COSPAR*: 1985-099A. *Apogee*: 39,239 km (24,381 mi). *Perigee*: 1,104 km (685 mi). *Inclination*: 64.5000 deg. *Period*: 717.60 min. Replaced Molniya 1-58. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1985 October 25 - . 14:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1699** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1985-12-23 . *USAF Sat Cat*: 16198 . *COSPAR*: 1985-101A. *Apogee*: 335 km (208 mi). *Perigee*: 166 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1985 October 28 - . 17:24 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-66** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2002-08-02 . *USAF Sat Cat*: 16220 . *COSPAR*: 1985-103A. *Apogee*: 38,699 km (24,046 mi). *Perigee*: 1,656 km (1,028 mi). *Inclination*: 64.1000 deg. *Period*: 717.80 min. Replaced Molniya 1-56. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1985 November 9 - . 08:25 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1701** - . *Payload*: Oko #45. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2001-05-11 . *USAF Sat Cat*: 16235 . *COSPAR*: 1985-105A. *Apogee*: 36,974 km (22,974 mi). *Perigee*: 3,375 km (2,097 mi). *Inclination*: 67.2000 deg. *Period*: 717.70 min. Replaced Cosmos 1675. Covered Oko constellation plane 8 - 192 degree longitude of ascending node..

1985 November 13 - . 12:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1702** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-11-27 . *USAF Sat Cat*: 16247 . *COSPAR*: 1985-106A. *Apogee*: 370 km (220 mi). *Perigee*: 192 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule..

1985 December 3 - . 12:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1705** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1985-12-17 . *USAF Sat Cat*: 16296 . *COSPAR*: 1985-111A. *Apogee*: 358 km (222 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.00 min. Military cartographic satellite; returned film capsule..

1985 December 11 - . 14:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1706** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 60.00 days. *Decay Date*: 1986-02-09 . *USAF Sat Cat*: 16306 . *COSPAR*: 1985-112A. *Apogee*: 323 km (200 mi). *Perigee*: 175 km (108 mi). *Inclination*: 67.1000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1985 December 13 - . 07:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1708** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1985-12-27 . *USAF Sat Cat*: 16331 . *COSPAR*: 1985-115A. *Apogee*: 281 km (174 mi). *Perigee*: 179 km (111 mi). *Inclination*: 82.3000 deg. *Period*: 89.10 min.

  High resolution photo surveillance; film capsule; maneuverable; also performed earth resource tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation.

1985 December 24 - . 18:56 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-27** - . *Payload*: Molniya-3 s/n 40. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 16393 . *COSPAR*: 1985-117A. *Apogee*: 38,555 km (23,956 mi). *Perigee*: 1,554 km (965 mi). *Inclination*: 64.5000 deg. *Period*: 712.80 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1985 December 27 - . 17:06 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Cosmos 1713** - . *Payload*: Efir s/n 2. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Efir. *Duration*: 26.00 days. *Decay Date*: 1986-01-22 . *USAF Sat Cat*: 16429 . *COSPAR*: 1985-120A. *Apogee*: 397 km (246 mi). *Perigee*: 215 km (133 mi). *Inclination*: 62.8000 deg. *Period*: 90.60 min.

1986 January 8 - . 11:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1715** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-01-22 . *USAF Sat Cat*: 16447 . *COSPAR*: 1986-001A. *Apogee*: 288 km (178 mi). *Perigee*: 192 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 89.30 min. Military cartographic satellite; returned film capsule..

1986 January 15 - . 14:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1724** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1986-03-15 . *USAF Sat Cat*: 16490 . *COSPAR*: 1986-004A. *Apogee*: 330 km (200 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1986 January 28 - . 08:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1728** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-02-11 . *USAF Sat Cat*: 16512 . *COSPAR*: 1986-009A. *Apogee*: 278 km (172 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.0000 deg. *Period*: 89.30 min. Military cartographic satellite; returned film capsule..

1986 February 1 - . 18:11 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1729** - . *Payload*: Oko #46. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 16527 . *COSPAR*: 1986-011A. *Apogee*: 33,130 km (20,580 mi). *Perigee*: 7,251 km (4,505 mi). *Inclination*: 68.0000 deg. *Period*: 718.30 min. Replaced Cosmos 1569. Covered Oko constellation plane 5 - 75 degree longitude of ascending node..

1986 February 4 - . 11:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1730** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 9.00 days. *Decay Date*: 1986-02-13 . *USAF Sat Cat*: 16540 . *COSPAR*: 1986-012A. *Apogee*: 303 km (188 mi). *Perigee*: 191 km (118 mi). *Inclination*:

72.9000 deg. *Period*: 89.50 min. Military cartographic satellite; returned film capsule..

1986 February 7 - . 08:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1731** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 238.00 days. *Decay Date*: 1986-10-03 . *USAF Sat Cat*: 16589 . *COSPAR*: 1986-013A. *Apogee*: 263 km (163 mi). *Perigee*: 233 km (144 mi). *Inclination*: 64.7000 deg. *Period*: 89.50 min. Photo/digital surveillance..

1986 February 26 - . 13:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1734** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1986-04-26 . *USAF Sat Cat*: 16618 . *COSPAR*: 1986-020A. *Apogee*: 343 km (213 mi). *Perigee*: 165 km (102 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1986 March 13 - . 12:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz T-15** - . *Call Sign*: Mayak (Beacon). *Crew*: Kizim, Solovyov, Vladimir. *Backup Crew*: Aleksandrov, Viktorenko. *Payload*: Soyuz T 11F732 s/n 21L. *Mass*: 7,020 kg (15,470 lb). *Nation*: Russia. *Related Persons*: Aleksandrov, Kizim, Solovyov, Vladimir, Viktorenko. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz T. *Duration*: 125.00 days. *Decay Date*: 1986-07-16 . *USAF Sat Cat*: 16643 . *COSPAR*: 1986-022A. *Apogee*: 366 km (227 mi). *Perigee*: 331 km (205 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min.

  Mir Main Expedition EO-01. Epic repair mission. The crew, consisting of ship's commander L D Kizim and flight engineer V A Solovyov first docked with the Mir orbital station to conduct scientific and technical studies and experiments. Mir then maneuvered 17 April to match Salyut 7's orbit at 4000 km separation, then again on 4 May to catch up. After six weeks aboard Mir, Soyuz T-15 undocked on 5 May, then rendezvoused and manually docked with the inoperative Salyut 7 station. This was the only flight in history by a single spacecraft between two space stations. The Salyut-7 station was found to be ice bound and without electrical power. The crew repaired the station, regaining power, heat, and environmental control. The also removed experimental results left behind by last crew. Soyuz T-15 undocked Salyut 7

on 25 June, and redocked with Mir on 26 June, delivering 400 kg of scientific material from Salyut 7, including a multichannel spectrometer. Following further work aboard Mir, the crew landed on July 16, 1986 at 12:34 GMT. No crew ever revisited Salyut 7; it made an uncontrolled reentry over Argentina.

1986 March 19 - . 10:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 25** - . *Payload*: Progress s/n 134. *Mass*: 7,270 kg (16,020 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 32.61 days. *Completed Operations Date*: 1986-04-21 00:48:05 . *Decay Date*: 1986-04-21 00:48:05 . *USAF Sat Cat*: 16645 . *COSPAR*: 1986-023A. *Apogee*: 251 km (155 mi). *Perigee*: 183 km (113 mi). *Inclination*: 51.7000 deg. *Period*: 88.80 min.

  Unmanned supply vessel transporting sundry cargoes to the Mir orbital station. Docked with Mir on 21 Mar 1986 11:16:02 GMT. Undocked on 20 Apr 1986 19:24:08 GMT. Destroyed in reentry on 21 Apr 1986 00:48:30 GMT. Total free-flight time 2.27 days. Total docked time 30.34 days.

1986 March 26 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Failure. *Failed Stage*: U.

- **Zenit-8** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: UNKS. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. Military cartographic mission..

1986 April 9 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1739** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1986-06-07 . *USAF Sat Cat*: 16677 . *COSPAR*: 1986-028A. *Apogee*: 326 km (202 mi). *Perigee*: 171 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1986 April 15 - . 11:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1740** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 13.00 days. *Decay Date*: 1986-04-28 . *USAF Sat Cat*: 16679 . *COSPAR*:

1986-029A. *Apogee*: 362 km (224 mi). *Perigee*: 193 km (119 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule..

1986 April 18 - . 19:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-28** - . *Payload*: Molniya-3 s/n 43. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1999-02-25 . *USAF Sat Cat*: 16683 . *COSPAR*: 1986-031A. *Apogee*: 39,095 km (24,292 mi). *Perigee*: 1,255 km (779 mi). *Inclination*: 64.7000 deg. *Period*: 717.70 min.

  Replaced Molniya 3-23. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation.

1986 April 23 - . 19:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 26** - . *Payload*: Progress s/n 136. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz T-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 60.83 days. *Completed Operations Date*: 1986-06-23 15:40:56 . *Decay Date*: 1986-06-23 15:40:56 . *USAF Sat Cat*: 16687 . *COSPAR*: 1986-032A. *Apogee*: 257 km (159 mi). *Perigee*: 184 km (114 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min.

  Unmanned supply vessel to Mir. Rendezvoused with Mir on 25 April, but problem with Mir's radio communication system delays docking until the next day. Docked with Mir on 26 Apr 1986 21:26:06 GMT. Undocked on 22 Jun 1986 18:25:00 GMT. Destroyed in reentry on 23 Jun 1986 15:41:01 GMT. Total free-flight time 3.96 days. Total docked time 56.87 days.

1986 May 14 - . 12:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1742** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-05-28 . *USAF Sat Cat*: 16717 . *COSPAR*: 1986-033A. *Apogee*: 358 km (222 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.8000 deg. *Period*: 90.00 min. Military cartographic satellite; returned film capsule..

1986 May 21 - . 08:21 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-1** - . *Payload*: Soyuz TM s/n 51. *Mass*: 7,070 kg (15,580 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz T-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 8.93 days. *Decay Date*: 1986-05-30 . *USAF Sat Cat*: 16722 . *COSPAR*: 1986-035A. *Apogee*: 225 km (139 mi). *Perigee*: 192 km (119 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  Test of new Soyuz vehicle. Recovered May 30, 1986 6:49 GMT. Unmanned test of Soyuz TM. Docked with Mir May 23 1987. Undocked 29 May.
  Officially: Comprehensive experimental testing of spacecraft in independent flight and jointly with the Mir orbital station.

1986 May 21 - . 16:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1744 / Foton 2** - . *Payload*: Foton s/n 2L. *Mass*: 6,200 kg (13,600 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 13.19 days. *Decay Date*: 1986-06-04 . *USAF Sat Cat*: 16724 . *COSPAR*: 1986-036A. *Apogee*: 371 km (230 mi). *Perigee*: 217 km (134 mi). *Inclination*: 62.8000 deg. *Period*: 90.40 min. 216 orbits. Materials processing experiments. Continuation of research on materials science in space..

1986 May 28 - . 07:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1746** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-17F41. *Duration*: 14.00 days. *Decay Date*: 1986-06-11 . *USAF Sat Cat*: 16737 . *COSPAR*: 1986-040A. *Apogee*: 277 km (172 mi). *Perigee*: 176 km (109 mi). *Inclination*: 82.4000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1986 May 29 - . 09:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1747** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-06-12 . *USAF Sat Cat*: 16745 . *COSPAR*: 1986-041A. *Apogee*: 389 km (241 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.3000 deg. *Period*: 90.50 min. Military cartographic satellite; returned film capsule..

1986 June 6 - . 12:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1756** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1986-08-04 . *USAF Sat Cat*: 16767 . *COSPAR*: 1986-043A. *Apogee*: 268 km (166 mi). *Perigee*: 172 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 88.90 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1986 June 11 - . 07:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1757** - . *Payload*: Zenit-8 / Oblik no. 2. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-06-25 . *USAF Sat Cat*: 16772 . *COSPAR*: 1986-045A. *Apogee*: 220 km (130 mi). *Perigee*: 176 km (109 mi). *Inclination*: 82.3000 deg. *Period*: 88.50 min. Military cartographic satellite; returned film capsule. Also investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1986 June 19 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1760** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-07-03 . *USAF Sat Cat*: 16800 . *COSPAR*: 1986-048A. *Apogee*: 412 km (256 mi). *Perigee*: 348 km (216 mi). *Inclination*: 70.0000 deg. *Period*: 92.20 min. Military cartographic satellite; returned film capsule..

1986 June 19 - . 21:09 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-29** - . *Payload*: Molniya-3 s/n 44. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1996-11-10 . *USAF Sat Cat*: 16802 . *COSPAR*: 1986-049A. *Apogee*: 38,815 km (24,118 mi). *Perigee*: 1,581 km (982 mi). *Inclination*: 64.7000 deg. *Period*: 718.60 min.

  Replaced Molniya 3-20. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television

programmes to stations in the Orbita network and within the framework of international cooperation.

1986 July 5 - . 01:16 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1761** - . *Payload*: Oko #47. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 16849 . *COSPAR*: 1986-050A. *Apogee*: 35,495 km (22,055 mi). *Perigee*: 4,856 km (3,017 mi). *Inclination*: 67.8000 deg. *Period*: 717.70 min. Replaced Cosmos 1698. Covered Oko constellation plane 3 - 354 degree longitude of ascending node..

1986 July 10 - . 08:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1762** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F40. *Duration*: 8.00 days. *Decay Date*: 1986-07-24 . *USAF Sat Cat*: 16855 . *COSPAR*: 1986-051A. *Apogee*: 263 km (163 mi). *Perigee*: 177 km (109 mi). *Inclination*: 82.5000 deg. *Period*: 88.90 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1986 July 17 - . 12:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1764** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 56.00 days. *Decay Date*: 1986-09-11 . *USAF Sat Cat*: 16861 . *COSPAR*: 1986-053A. *Apogee*: 339 km (210 mi). *Perigee*: 171 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1986 July 24 - . 12:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1765** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-08-07 . *USAF Sat Cat*: 16874 . *COSPAR*: 1986-054A. *Apogee*: 367 km (228 mi). *Perigee*: 189 km (117 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule..

1986 July 30 - . 15:06 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-67** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2000-01-28 . *USAF Sat Cat*: 16885 . *COSPAR*: 1986-057A. *Apogee*: 38,765 km (24,087 mi). *Perigee*: 1,595 km (991 mi). *Inclination*: 64.7000 deg. *Period*: 717.90 min. Replaced Molniya 1-59. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1986 August 2 - . 09:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1768** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F40. *Duration*: 14.00 days. *Decay Date*: 1986-08-16 . *USAF Sat Cat*: 16890 . *COSPAR*: 1986-058A. *Apogee*: 273 km (169 mi). *Perigee*: 180 km (110 mi). *Inclination*: 82.6000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1986 August 6 - . 13:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1770** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 180.00 days. *Decay Date*: 1987-02-02 . *USAF Sat Cat*: 16897 . *COSPAR*: 1986-060A. *Apogee*: 292 km (181 mi). *Perigee*: 234 km (145 mi). *Inclination*: 64.7000 deg. *Period*: 89.80 min. Photo/digital surveillance..

1986 August 21 - . 11:04 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1772** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 13.00 days. *Decay Date*: 1986-09-03 . *USAF Sat Cat*: 16918 . *COSPAR*: 1986-063A. *Apogee*: 338 km (210 mi). *Perigee*: 195 km (121 mi). *Inclination*: 72.9000 deg. *Period*: 89.90 min. Military cartographic satellite; returned film capsule..

1986 August 27 - . 11:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1773** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 55.00 days. *Decay Date*: 1986-10-21 . *USAF Sat Cat*: 16920 . *COSPAR*: 1986-064A. *Apogee*: 339 km (210 mi). *Perigee*: 171 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1986 August 28 - . 08:02 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1774** - . *Payload*: Oko #48. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2010-10-01 . *USAF Sat Cat*: 16922 . *COSPAR*: 1986-065A. *Apogee*: 36,998 km (22,989 mi). *Perigee*: 3,405 km (2,115 mi). *Inclination*: 65.0000 deg. *Period*: 718.80 min. Replaced Cosmos 1547. Covered Oko constellation plane 7 - 156 degree longitude of ascending node..

1986 September 3 - . 07:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1775** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-09-17 . *USAF Sat Cat*: 16926 . *COSPAR*: 1986-066A. *Apogee*: 412 km (256 mi). *Perigee*: 345 km (214 mi). *Inclination*: 70.4000 deg. *Period*: 92.10 min. Military cartographic satellite; returned film capsule..

1986 September 5 - . 09:12 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-68** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2000-06-20 . *USAF Sat Cat*: 16934 . *COSPAR*: 1986-068A. *Apogee*: 38,643 km (24,011 mi). *Perigee*: 1,710 km (1,060 mi). *Inclination*: 64.6000 deg. *Period*: 717.80 min. Replaced Molniya 1-57. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1986 September 17 - . 07:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1781** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8.

Duration: 14.00 days. *Decay Date*: 1986-10-01 . *USAF Sat Cat*: 16966 . *COSPAR*: 1986-072A. *Apogee*: 379 km (235 mi). *Perigee*: 203 km (126 mi). *Inclination*: 70.4000 deg. *Period*: 90.40 min. Military cartographic satellite; returned film capsule..

1986 October 3 - . 13:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: Fourth stage failure.. *Failed Stage*: U.

- **Cosmos 1783** - . *Payload*: Oko #49. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 16993 . *COSPAR*: 1986-075A. *Apogee*: 18,679 km (11,606 mi). *Perigee*: 1,970 km (1,220 mi). *Inclination*: 64.6000 deg. *Period*: 358.00 min. Unusable orbit. Was intended to cover Oko constellation plane 1 - 272 degree longitude of ascending node..

1986 October 6 - . 07:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1784** - . *Payload*: Yantar-1KFT no. 6. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 36.00 days. *Decay Date*: 1986-11-11 . *USAF Sat Cat*: 17003 . *COSPAR*: 1986-077A. *Apogee*: 283 km (175 mi). *Perigee*: 190 km (110 mi). *Inclination*: 64.8000 deg. *Period*: 89.20 min. Military topographic / cartographic satellite..

1986 October 15 - . 09:29 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1785** - . *Payload*: Oko #50. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2002-02-28 . *USAF Sat Cat*: 17031 . *COSPAR*: 1986-078A. *Apogee*: 37,013 km (22,998 mi). *Perigee*: 3,408 km (2,117 mi). *Inclination*: 67.0000 deg. *Period*: 719.10 min. Replaced Cosmos 1596. Covered Oko constellation plane 9 - 233 degree longitude of ascending node..

1986 October 20 - . 08:49 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-30** - . *Payload*: Molniya-3 s/n 41. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 1999-10-15 . *USAF Sat Cat*: 17038 . *COSPAR*: 1986-079A. *Apogee*: 38,570 km (23,960 mi). *Perigee*: 1,742 km (1,082 mi). *Inclination*: 64.9000 deg. *Period*: 716.90 min.

Replaced Molniya 3-21. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation.

1986 October 22 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1787** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 13.00 days. *Decay Date*: 1986-11-04 . *USAF Sat Cat*: 17044 . *COSPAR*: 1986-081A. *Apogee*: 262 km (162 mi). *Perigee*: 211 km (131 mi). *Inclination*: 70.0000 deg. *Period*: 89.20 min. Military cartographic satellite; returned film capsule..

1986 October 31 - . 08:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1789** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F40. *Duration*: 14.00 days. *Decay Date*: 1986-11-14 . *USAF Sat Cat*: 17054 . *COSPAR*: 1986-084A. *Apogee*: 272 km (169 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.6000 deg. *Period*: 89.00 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1986 November 4 - . 11:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1790** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-11-18 . *USAF Sat Cat*: 17056 . *COSPAR*: 1986-085A. *Apogee*: 286 km (177 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 89.30 min. Military cartographic satellite; returned film capsule..

1986 November 13 - . 10:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1792** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 53.00 days. *Decay Date*: 1987-01-05 . *USAF Sat Cat*: 17068 . *COSPAR*: 1986-087A. *Apogee*: 309 km (192 mi). *Perigee*: 184 km (114 mi). *Inclination*: 64.9000 deg. *Period*: 89.40 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and

with the main capsule at completion of the mission..

1986 November 15 - . 21:34 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-69** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 17078 . *COSPAR*: 1986-089A. *Apogee*: 38,824 km (24,124 mi). *Perigee*: 1,506 km (935 mi). *Inclination*: 64.0000 deg. *Period*: 717.30 min. Replaced Molniya 1-60. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1986 November 20 - . 12:09 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1793** - . *Payload*: Oko #51. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2011-05-15 . *USAF Sat Cat*: 17134 . *COSPAR*: 1986-091A. *Apogee*: 36,922 km (22,942 mi). *Perigee*: 3,455 km (2,146 mi). *Inclination*: 67.2000 deg. *Period*: 718.20 min. Replaced Cosmos 1687. Covered Oko constellation plane 2 - 313 degree longitude of ascending node..

1986 December 4 - . 10:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1804** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1986-12-18 . *USAF Sat Cat*: 17179 . *COSPAR*: 1986-095A. *Apogee*: 421 km (261 mi). *Perigee*: 198 km (123 mi). *Inclination*: 70.0000 deg. *Period*: 90.70 min. Military cartographic satellite; returned film capsule..

1986 December 12 - . 18:35 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1806** - . *Payload*: Oko #52. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 17213 . *COSPAR*: 1986-098A. *Apogee*: 32,850 km (20,410 mi). *Perigee*: 7,495 km (4,657 mi). *Inclination*: 67.9000 deg. *Period*: 717.60 min. Replaced Cosmos 1729. Covered Oko constellation plane 5 - 73 degree longitude of ascending node..

1986 December 16 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch*

Vehicle: Soyuz-U-PVB.

- **Cosmos 1807** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 38.00 days. *Decay Date*: 1987-01-23 . *USAF Sat Cat*: 17217 . *COSPAR*: 1986-099A. *Apogee*: 366 km (227 mi). *Perigee*: 165 km (102 mi). *Inclination*: 67.1000 deg. *Period*: 89.80 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1986 December 26 - . 11:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1810** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 259.00 days. *Decay Date*: 1987-09-11 . *USAF Sat Cat*: 17262 . *COSPAR*: 1986-102A. *Apogee*: 275 km (170 mi). *Perigee*: 224 km (139 mi). *Inclination*: 64.7000 deg. *Period*: 89.50 min. Photo/digital surveillance..

1986 December 26 - . 15:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-70** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2006-02-01 . *USAF Sat Cat*: 17264 . *COSPAR*: 1986-103A. *Apogee*: 39,283 km (24,409 mi). *Perigee*: 1,070 km (660 mi). *Inclination*: 64.2000 deg. *Period*: 717.80 min. Replaced Molniya 1-62. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1987 January 9 - . 12:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1811** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 35.00 days. *Decay Date*: 1987-02-13 . *USAF Sat Cat*: 17292 . *COSPAR*: 1987-002A. *Apogee*: 345 km (214 mi). *Perigee*: 169 km (105 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1987 January 15 - . 11:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1813** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Decay Date*: 1989-03-13 . *USAF Sat Cat*: 17297 . *COSPAR*: 1987-004A. *Apogee*: 397 km (246 mi). *Perigee*: 347 km (215 mi). *Inclination*: 72.8000 deg. *Period*: 92.00 min. Military cartographic satellite; reentry capsule destroyed in orbit..

1987 January 16 - . 06:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 27** - . *Payload*: Progress s/n 135. *Mass*: 7,230 kg (15,930 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-2, Soyuz TM-2 Mir LD-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 40.42 days. *Completed Operations Date*: 1987-02-26 07:04:37 . *Decay Date*: 1987-02-26 07:04:37 . *USAF Sat Cat*: 17299 . *COSPAR*: 1987-005A. *Apogee*: 263 km (163 mi). *Perigee*: 183 km (113 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min.

  Unmanned supply vessel to Mir; raised Mir's orbit. Transported sundry cargoes to the Mir orbital station. Docked with Salyut 7 on 18 Jan 1987 07:26:50 GMT. Undocked on 23 Feb 1987 11:29:01 GMT. Destroyed in reentry on 25 Feb 1987 16:05:00 GMT. Total free-flight time 4.25 days. Total docked time 36.17 days.

1987 January 22 - . 16:06 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-31** - . *Payload*: Molniya-3 s/n 42. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 17328 . *COSPAR*: 1987-008A. *Apogee*: 39,069 km (24,276 mi). *Perigee*: 1,285 km (798 mi). *Inclination*: 64.1000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1987 February 5 - . 21:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-2** - . *Call Sign*: Taimyr (Taimyr - Russian peninsula). *Crew*: Laveykin, Romanenko. *Backup Crew*: Serebrov, Titov, Vladimir. *Payload*: Soyuz TM s/n 52. *Mass*: 7,100 kg (15,600 lb). *Nation*: Russia. *Related Persons*: Laveykin, Romanenko, Serebrov, Titov, Vladimir. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-2, Soyuz TM-2 Mir LD-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 174.14 days. *Decay Date*: 1987-07-30 . *USAF Sat Cat*: 17482 . *COSPAR*: 1987-013A. *Apogee*: 365 km (226 mi). *Perigee*: 341 km (211 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min. Mir Expedition EO-02.

Docked with Mir 7 February 1987. Carried Yuri Romanenko, Aleksander Laveykin to Mir; returned Laveykin, crew of Soyuz TM-3 to Earth..

1987 February 7 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1819** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 11.00 days. *Decay Date*: 1987-02-18 . *USAF Sat Cat*: 17484 . *COSPAR*: 1987-014A. *Apogee*: 227 km (141 mi). *Perigee*: 188 km (116 mi). *Inclination*: 72.8000 deg. *Period*: 88.70 min. Military cartographic satellite; returned film capsule..

1987 February 19 - . 10:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1822** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1987-03-05 . *USAF Sat Cat*: 17533 . *COSPAR*: 1987-019A. *Apogee*: 303 km (188 mi). *Perigee*: 190 km (110 mi). *Inclination*: 72.9000 deg. *Period*: 89.40 min. Military cartographic satellite; returned film capsule..

1987 February 26 - . 13:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1824** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 55.00 days. *Decay Date*: 1987-04-22 . *USAF Sat Cat*: 17559 . *COSPAR*: 1987-021A. *Apogee*: 352 km (218 mi). *Perigee*: 162 km (100 mi). *Inclination*: 67.2000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1987 March 3 - . 11:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 28** - . *Payload*: Progress s/n 137. *Mass*: 7,246 kg (15,974 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-2, Soyuz TM-2 Mir LD-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 24.69 days. *Completed Operations Date*: 1987-03-28 03:48:55 . *Decay Date*: 1987-03-28 03:48:55 . *USAF Sat Cat*: 17564 . *COSPAR*: 1987-023A. *Apogee*: 254 km (157 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min.

Unmanned supply vessel to Mir. Orbit of station at time of rendezvous was 344 X 369 km, 51. 62 deg. Docked with Mir on 5 Mar 1987 12:42:36 GMT. Undocked on 26 Mar 1987 05:06:48 GMT. Destroyed in reentry on 28 Mar 1987 03:49:00 GMT. Total free-flight time 4.01 days. Total docked time 20.68 days.

1987 March 11 - . 10:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1826** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1987-03-25 . *USAF Sat Cat*: 17577 . *COSPAR*: 1987-025A. *Apogee*: 374 km (232 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 90.20 min. Military cartographic satellite; returned film capsule..

1987 April 9 - . 11:44 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1835** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 56.00 days. *Decay Date*: 1987-06-04 . *USAF Sat Cat*: 17849 . *COSPAR*: 1987-032A. *Apogee*: 343 km (213 mi). *Perigee*: 170 km (100 mi). *Inclination*: 64.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1987 April 16 - . 06:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1836** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 230.00 days. *Decay Date*: 1987-12-02 . *USAF Sat Cat*: 17876 . *COSPAR*: 1987-033A. *Apogee*: 289 km (179 mi). *Perigee*: 236 km (146 mi). *Inclination*: 64.8000 deg. *Period*: 89.80 min. Photo/digital surveillance..

1987 April 21 - . 15:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 29** - . *Payload*: Progress s/n 127. *Mass*: 7,100 kg (15,600 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-2, Soyuz TM-2 Mir LD-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 19.72 days. *Completed Operations Date*: 1987-05-11 08:27:43 . *Decay Date*: 1987-05-11 08:27:43 . *USAF Sat Cat*: 17878 . *COSPAR*: 1987-034A. *Apogee*: 237 km (147 mi). *Perigee*: 189 km (117 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

Unmanned supply vessel to Mir. Deorbited May 11, 1987. Docked with Mir at 343 X 363 1705 23 April at rear port of Kvant. Undocked May 11 03:10. Deorbited28 May 02:59 .
Officially: Transporting sundry cargoes to the Mir orbital station. Docked with Salyut 7 on 23 Apr 1987 17:04:51 GMT. Undocked on 11 May 1987 03:10:01 GMT. Destroyed in reentry on 11 May 1987 08:28:00 GMT. Total free-flight time 2.30 days. Total docked time 17.42 days.

1987 April 22 - . 09:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1837** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 6.00 days. *Decay Date*: 1987-04-28 . *USAF Sat Cat*: 17880 . *COSPAR*: 1987-035A. *Apogee*: 227 km (141 mi). *Perigee*: 174 km (108 mi). *Inclination*: 82.2000 deg. *Period*: 88.50 min. Military cartographic satellite; returned film capsule..

1987 April 24 - . 16:59 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1841 / Foton 3** - . *Payload*: Foton s/n 3L. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 13.17 days. *Decay Date*: 1987-05-08 . *USAF Sat Cat*: 17907 . *COSPAR*: 1987-037A. *Apogee*: 380 km (230 mi). *Perigee*: 217 km (134 mi). *Inclination*: 62.9000 deg. *Period*: 90.50 min. Materials processing tests. Conduct of experiments on the production of semi-conducting materials and super-pure biological preparations in micro-gravity. .

1987 May 5 - . 09:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1843** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1987-05-19 . *USAF Sat Cat*: 17940 . *COSPAR*: 1987-039A. *Apogee*: 285 km (177 mi). *Perigee*: 202 km (125 mi). *Inclination*: 70.4000 deg. *Period*: 89.40 min. Military cartographic satellite; returned film capsule..

1987 May 13 - . 06:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1845** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1987-05-27 . *USAF Sat Cat*: 17975 . *COSPAR*:

1987-042A. *Apogee*: 373 km (231 mi). *Perigee*: 205 km (127 mi). *Inclination*: 70.4000 deg. *Period*: 90.30 min. Military cartographic satellite; returned film capsule..

1987 May 19 - . 04:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 30** - . *Payload*: Progress s/n 128. *Mass*: 7,249 kg (15,981 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-2, Soyuz TM-2 Mir LD-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 61.07 days. *Completed Operations Date*: 1987-07-19 05:41:50 . *Decay Date*: 1987-07-19 05:41:50 . *USAF Sat Cat*: 17999 . *COSPAR*: 1987-044A. *Apogee*: 365 km (226 mi). *Perigee*: 341 km (211 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min.

  Unmanned supply vessel to Mir. Rendezvoused with Mir/Kvant in its orbit of 343 X 366 km, 51. 6 deg. Docked with the station on 21 May 1987 05:50:38 GMT. Undocked on 19 Jul 1987 00:19:51 GMT. Destroyed in reentry on 19 Jul 1987 05:42:00 GMT. Total free-flight time 2.30 days. Total docked time 58.77 days.

1987 May 21 - . 07:44 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1846** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F40. *Duration*: 14.00 days. *Decay Date*: 1987-06-04 . *USAF Sat Cat*: 18004 . *COSPAR*: 1987-045A. *Apogee*: 283 km (175 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 89.10 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1987 May 26 - . 13:39 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1847** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 57.00 days. *Decay Date*: 1987-07-22 . *USAF Sat Cat*: 18011 . *COSPAR*: 1987-046A. *Apogee*: 315 km (195 mi). *Perigee*: 175 km (108 mi). *Inclination*: 67.1000 deg. *Period*: 89.40 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1987 May 28 - . 12:44 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1848** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1987-06-11 . *USAF Sat Cat*: 18017 . *COSPAR*: 1987-047A. *Apogee*: 368 km (228 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule..

1987 June 4 - . 18:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1849** - . *Payload*: Oko #53. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2003-02-04 . *USAF Sat Cat*: 18083 . *COSPAR*: 1987-048A. *Apogee*: 37,311 km (23,183 mi). *Perigee*: 3,104 km (1,928 mi). *Inclination*: 67.1000 deg. *Period*: 719.00 min. Covered Oko constellation plane 1 - 274 degree longitude of ascending node..

1987 June 12 - . 07:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1851** - . *Payload*: Oko #54. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 18103 . *COSPAR*: 1987-050A. *Apogee*: 33,453 km (20,786 mi). *Perigee*: 6,926 km (4,303 mi). *Inclination*: 67.9000 deg. *Period*: 718.30 min. Covered Oko constellation plane 6 - 113 degree longitude of ascending node..

1987 June 18 - . 07:24 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Booster exploded on pad.. *Failed Stage*: 0.

- **Resurs-F1 14F40** - . *Payload*: Resurs-F1 14F40 No. 105. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: UNKS. *Program*: Resurs. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F40. Pad was badly damaged and not put back into service until December 1988..

1987 July 4 - . 12:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1863** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1987-07-18 . *USAF Sat Cat*: 18155 . *COSPAR*: 1987-056A. *Apogee*: 417 km (259 mi). *Perigee*: 358 km (222 mi). *Inclination*: 72.9000 deg. *Period*: 92.30 min. Military cartographic satellite; returned film capsule..

1987 July 8 - . 10:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1865** - . *Payload*: Yantar-1KFT no. 7. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 37.00 days. *Decay Date*: 1987-08-14 . *USAF Sat Cat*: 18162 . *COSPAR*: 1987-058A. *Apogee*: 297 km (184 mi). *Perigee*: 192 km (119 mi). *Inclination*: 64.8000 deg. *Period*: 89.40 min. Military topographic / cartographic satellite..

1987 July 9 - . 16:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1866** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 17.00 days. *Decay Date*: 1987-08-31 . *USAF Sat Cat*: 18184 . *COSPAR*: 1987-059A. *Apogee*: 769 km (477 mi). *Perigee*: 223 km (138 mi). *Inclination*: 67.2000 deg. *Period*: 94.50 min. High resolution photo reconnaissance. Engine failure prematurely depleted fuel supply. Blown up in orbit on July 26..

1987 July 22 - . 01:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-3** - . *Call Sign*: Vityaz (Knight). *Crew*: Aleksandrov, Faris, Viktorenko. *Backup Crew*: Habib, Savinykh, Solovyov. *Payload*: Soyuz TM s/n 53. *Mass*: 7,100 kg (15,600 lb). *Nation*: Russia. *Related Persons*: Aleksandrov, Faris, Habib, Savinykh, Solovyov, Viktorenko. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-2, Soyuz TM-2 Mir LD-1, Soyuz TM-3, Soyuz TM-3 Mir EP-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 160.30 days. *Decay Date*: 1987-12-29 . *USAF Sat Cat*: 18222 . *COSPAR*: 1987-063A. *Apogee*: 353 km (219 mi). *Perigee*: 297 km (184 mi). *Inclination*: 51.6000 deg. *Period*: 91.00 min.

  Manned three crew. Transported to the Mir orbital space station a Soviet-Syrian crew comprising cosmonauts A S Viktorenko, A P Aleksandrov and M A Faris to conduct joint research and experiments with cosmonauts Y Romanenko and A Laveykin. Maneuvered from initial 231 X 217 km orbit to Mir's 311 X 359 km orbit. Docked with rear Mir port at 3:30 GMT 24 July. Undocked with rear port 30 July and docked to forward port.

1987 August 3 - . 20:44 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 31** - . *Payload*: Progress s/n 138. *Mass*: 7,212 kg (15,899 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics

spacecraft. *Flight*: Soyuz TM-2 Mir LD-1, Soyuz TM-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 50.18 days. *Completed Operations Date*: 1987-09-24 01:01:49 . *Decay Date*: 1987-09-24 01:01:49 . *USAF Sat Cat*: 18283 . *COSPAR*: 1987-066A. *Apogee*: 250 km (150 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min.

Unmanned resupply vessel to Mir. Rendezvous transfer orbits 187 X 250 km, 51. 64 deg; 266 X 314 km; 309 X 360 km. Docked with Mir on 5 Aug 1987 22:27:35 GMT. Refueled Mir propellants tanks on 15/16 Sept. Undocked on 21 Sep 1987 23:57:41 GMT. Destroyed in reentry on 23 Sep 1987 01:02:00 GMT. Total free-flight time 3.12 days. Total docked time 47.06 days.

1987 August 19 - . 06:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1872** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 11.00 days. *Decay Date*: 1987-08-30 . *USAF Sat Cat*: 18314 . *COSPAR*: 1987-069A. *Apogee*: 299 km (185 mi). *Perigee*: 196 km (121 mi). *Inclination*: 72.9000 deg. *Period*: 89.60 min. Military cartographic satellite; returned film capsule..

1987 September 3 - . 10:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1874** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1987-09-17 . *USAF Sat Cat*: 18326 . *COSPAR*: 1987-072A. *Apogee*: 284 km (176 mi). *Perigee*: 223 km (138 mi). *Inclination*: 72.9000 deg. *Period*: 89.60 min. Military cartographic satellite; returned film capsule..

1987 September 11 - . 02:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1881** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 201.00 days. *Decay Date*: 1988-03-30 . *USAF Sat Cat*: 18343 . *COSPAR*: 1987-076A. *Apogee*: 294 km (182 mi). *Perigee*: 228 km (141 mi). *Inclination*: 64.7000 deg. *Period*: 89.70 min. Photo/digital surveillance..

1987 September 15 - . 10:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1882** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM.

Program: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F40. *Duration*: 21.00 days. *Decay Date*: 1987-10-06 . *USAF Sat Cat*: 18348 . *COSPAR*: 1987-077A. *Apogee*: 269 km (167 mi). *Perigee*: 253 km (157 mi). *Inclination*: 82.3000 deg. *Period*: 89.70 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1987 September 17 - . 14:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1886** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 46.00 days. *Decay Date*: 1987-11-02 . *USAF Sat Cat*: 18366 . *COSPAR*: 1987-081A. *Apogee*: 321 km (199 mi). *Perigee*: 170 km (100 mi). *Inclination*: 67.1000 deg. *Period*: 89.40 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1987 September 23 - . 23:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 32** - . *Payload*: Progress s/n 139. *Mass*: 7,035 kg (15,509 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-2 Mir LD-1, Soyuz TM-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 55.98 days. *Completed Operations Date*: 1987-11-19 23:19:51 . *Decay Date*: 1987-11-19 23:19:51 . *USAF Sat Cat*: 18376 . *COSPAR*: 1987-082A. *Apogee*: 355 km (220 mi). *Perigee*: 295 km (183 mi). *Inclination*: 51.6000 deg. *Period*: 91.00 min.

  Unmanned resupply vessel to Mir. Delivered 850 kg propellants, 315 kg food, 2,000 kg total. Docked with Mir on 26 Sep 1987 01:08:15 GMT. Undocked on 10 Nov 1987 04:09:10 GMT. Redocked from 2,500 m on 10 Nov 1987 05:47 GMT. Undocked again 17 Nov 1998 19:25 GMT. Destroyed in reentry on 19 Nov 1987 00:58:00 GMT. Total free-flight time 3.17 days. Total docked time 52.82 days.

1987 September 29 - . 12:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1887** - . *Payload*: Bion no. 8. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 13.00 days. *Decay Date*: 1987-10-12 . *USAF Sat Cat*: 18380 . *COSPAR*: 1987-083A. *Apogee*: 382 km (237 mi). *Perigee*: 214 km (132 mi). *Inclination*: 62.8000 deg. *Period*: 90.50 min. Biological research. Carried monkeys Drema and Erosha. Continued investigations of the influence of space flight factors on living organisms and radiation physics research. Capsule recovered 62 deg 47 min

N, 112 deg 26 min E (?).. *Additional Details*: here....

1987 October 9 - . 08:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1889** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1987-10-23 . *USAF Sat Cat*: 18394 . *COSPAR*: 1987-085A. *Apogee*: 371 km (230 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.0000 deg. *Period*: 90.30 min. Military cartographic satellite; returned film capsule..

1987 October 22 - . 14:25 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1893** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 55.00 days. *Decay Date*: 1987-12-16 . *USAF Sat Cat*: 18432 . *COSPAR*: 1987-089A. *Apogee*: 323 km (200 mi). *Perigee*: 162 km (100 mi). *Inclination*: 67.2000 deg. *Period*: 89.40 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1987 November 11 - . 09:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1895** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 15.00 days. *Decay Date*: 1987-11-26 . *USAF Sat Cat*: 18491 . *COSPAR*: 1987-092A. *Apogee*: 283 km (175 mi). *Perigee*: 224 km (139 mi). *Inclination*: 70.4000 deg. *Period*: 89.60 min. Military cartographic satellite; returned film capsule..

1987 November 14 - . 09:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1896** - . *Payload*: Yantar-1KFT no. 8. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 41.00 days. *Decay Date*: 1987-12-25 . *USAF Sat Cat*: 18535 . *COSPAR*: 1987-093A. *Apogee*: 263 km (163 mi). *Perigee*: 206 km (128 mi). *Inclination*: 64.8000 deg. *Period*: 89.20 min. Military topographic / cartographic satellite..

1987 November 20 - . 23:47 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 33** - . *Payload*: Progress s/n 140. *Mass*: 6,895 kg (15,200 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-2 Mir LD-1, Soyuz TM-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 28.58 days. *Completed Operations Date*: 1987-12-20 13:36:48 . *Decay Date*: 1987-12-20 13:36:48 . *USAF Sat Cat*: 18568 . *COSPAR*: 1987-094A. *Apogee*: 343 km (213 mi). *Perigee*: 326 km (202 mi). *Inclination*: 51.6000 deg. *Period*: 91.20 min.

  Unmanned resupply vessel to Mir. Space station orbit at rendezvous was 326 km x 343 km. Docked on 23 Nov 1987 01:39:13 GMT. Undocked on 19 Dec 1987 08:15:46 GMT. Destroyed in reentry on 19 Dec 1987 13:37:00 GMT. Total free-flight time 2.30 days. Total docked time 26.28 days.

1987 December 7 - . 08:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1899** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1987-12-21 . *USAF Sat Cat*: 18625 . *COSPAR*: 1987-099A. *Apogee*: 277 km (172 mi). *Perigee*: 225 km (139 mi). *Inclination*: 70.4000 deg. *Period*: 89.50 min. Military cartographic satellite; returned film capsule..

1987 December 14 - . 11:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1901** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 51.00 days. *Decay Date*: 1988-02-03 . *USAF Sat Cat*: 18666 . *COSPAR*: 1987-102A. *Apogee*: 343 km (213 mi). *Perigee*: 172 km (106 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1987 December 21 - . 11:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-4** - . *Call Sign*: Okean (Ocean). *Crew*: Levchenko, Manarov, Titov, Vladimir. *Backup Crew*: Kaleri, Shchukin, Volkov, Aleksandr. *Payload*: Soyuz TM s/n 54. *Mass*: 7,070 kg (15,580 lb). *Nation*: Russia. *Related Persons*: Kaleri, Levchenko, Manarov, Shchukin, Titov, Vladimir, Volkov, Aleksandr. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-2 Mir LD-1, Soyuz TM-3, Soyuz TM-4, Soyuz TM-4 LII-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 178.95 days. *Decay Date*: 1988-06-17 . *USAF Sat Cat*: 18699 . *COSPAR*: 1987-104A. *Apogee*: 357 km (221 mi). *Perigee*: 337 km (209

mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min. Mir Expedition EO-03. Carried Musa Manarov, Anatoly Levchenko, Vladimir Titov to Mir; returned crew of Soyuz TM-5 to Earth. Orbits 168 x 243 km, 255 x 296 km, 333 x 359 km. Docked with Mir 12:51 GMT 23 December. 30 December moved to forward port..

1987 December 21 - . 22:35 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1903** - . *Payload*: Oko #55. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 18701 . *COSPAR*: 1987-105A. *Apogee*: 33,733 km (20,960 mi). *Perigee*: 6,634 km (4,122 mi). *Inclination*: 67.7000 deg. *Period*: 718.00 min. Covered Oko constellation plane 8 - 196 degree longitude of ascending node. It was reported that prior to this, on 8 November 1987 a Molniya booster was prepared for launch in a record four days at Plesetsk..

1987 December 25 - . 08:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1905** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-01-08 . *USAF Sat Cat*: 18711 . *COSPAR*: 1987-107A. *Apogee*: 277 km (172 mi). *Perigee*: 226 km (140 mi). *Inclination*: 70.4000 deg. *Period*: 89.50 min. Military cartographic satellite; returned film capsule..

1987 December 26 - . 11:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1906** - . *Payload*: Resurs F2 s/n 1. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 65.00 days. *Decay Date*: 1988-02-29 . *USAF Sat Cat*: 18713 . *COSPAR*: 1987-108A. *Apogee*: 273 km (169 mi). *Perigee*: 253 km (157 mi). *Inclination*: 82.6000 deg. *Period*: 89.80 min. Also performed earth resources tasks. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1987 December 29 - . 11:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1907** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-01-12 . *USAF Sat Cat*: 18720 . *COSPAR*: 1987-110A. *Apogee*: 412 km (256 mi). *Perigee*: 353 km (219 mi). *Inclination*:

72.8000 deg. *Period*: 92.20 min. Military cartographic satellite; returned film capsule..

1988 January 20 - . 22:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 34** - . *Payload*: Progress s/n 142. *Mass*: 7,078 kg (15,604 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 43.36 days. *Completed Operations Date*: 1988-03-05 07:29:36 . *Decay Date*: 1988-03-05 07:29:36 . *USAF Sat Cat*: 18795 . *COSPAR*: 1988-003A. *Apogee*: 347 km (215 mi). *Perigee*: 329 km (204 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min. Unmanned resupply vessel to Mir. Docked on 23 Jan 1988 00:09:09 GMT. Undocked on 4 Mar 1988 03:40:09 GMT. Destroyed in reentry on 4 Mar 1988 07:29:30 GMT. Total free-flight time 2.21 days. Total docked time 41.15 days..

1988 January 26 - . 11:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1915** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-02-09 . *USAF Sat Cat*: 18809 . *COSPAR*: 1988-004A. *Apogee*: 372 km (231 mi). *Perigee*: 190 km (110 mi). *Inclination*: 73.0000 deg. *Period*: 90.20 min. Military cartographic satellite; returned film capsule..

1988 February 3 - . 12:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1916** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 24.00 days. *Decay Date*: 1988-02-29 . *USAF Sat Cat*: 18823 . *COSPAR*: 1988-007A. *Apogee*: 352 km (218 mi). *Perigee*: 168 km (104 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. High resolution photo reconnaissance. Spacecraft failed. Blown up in orbit on February 27..

1988 February 18 - . 09:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1920** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F40. *Duration*: 20.00 days. *Decay Date*: 1988-03-09 . *USAF Sat Cat*: 18860 . *COSPAR*: 1988-010A. *Apogee*: 232 km (144 mi). *Perigee*: 185 km (114 mi). *Inclination*: 82.6000 deg. *Period*: 88.70 min. Investigation of the natural resources of the earth in the interests of various branches

of the national economy of the USSR and international cooperation. .

1988 February 19 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1921** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-03-04 . *USAF Sat Cat*: 18875 . *COSPAR*: 1988-011A. *Apogee*: 375 km (233 mi). *Perigee*: 202 km (125 mi). *Inclination*: 70.0000 deg. *Period*: 90.30 min. Military cartographic satellite; returned film capsule..

1988 February 26 - . 09:31 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1922** - . *Payload*: Oko #56. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 18881 . *COSPAR*: 1988-013A. *Apogee*: 34,181 km (21,239 mi). *Perigee*: 6,225 km (3,868 mi). *Inclination*: 67.6000 deg. *Period*: 718.80 min. Covered Oko constellation plane 5 - 75 degree longitude of ascending node..

1988 March 10 - . 10:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1923** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 12.00 days. *Decay Date*: 1988-03-22 . *USAF Sat Cat*: 18931 . *COSPAR*: 1988-015A. *Apogee*: 302 km (187 mi). *Perigee*: 190 km (110 mi). *Inclination*: 72.9000 deg. *Period*: 89.40 min. Military cartographic satellite; returned film capsule..

1988 March 11 - . 06:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-71** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 18946 . *COSPAR*: 1988-017A. *Apogee*: 39,149 km (24,326 mi). *Perigee*: 1,199 km (745 mi). *Inclination*: 63.8000 deg. *Period*: 717.70 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1988 March 17 - . 06:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **IRS-1A** - . *Payload*: IRS 1A. *Mass*: 975 kg (2,149 lb). *Nation*: India. *Agency*: ISRO. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft*: IRS. *USAF Sat Cat*: 18960 . *COSPAR*: 1988-021A. *Apogee*: 917 km (569 mi). *Perigee*: 897 km (557 mi). *Inclination*: 99.0000 deg. *Period*: 103.10 min.

  Indian remote sensing; 1st Soviet commercial launch. Indian Remote Sensing Satellite (IRS-1A). Operational remote sensing of the Earth for natural resources management applications. Also registered by the USSR as object no. 2387 in ST/SG/SER.E/182 and orbital parameters 102.7 min, 863 x 917 km x 99.01 deg.

1988 March 17 - . 20:55 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-72** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2001-07-04 . *USAF Sat Cat*: 18980 . *COSPAR*: 1988-022A. *Apogee*: 38,228 km (23,753 mi). *Perigee*: 2,121 km (1,317 mi). *Inclination*: 64.8000 deg. *Period*: 717.70 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1988 March 23 - . 21:05 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 35** - . *Payload*: Progress s/n 143. *Mass*: 7,037 kg (15,513 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 42.41 days. *Completed Operations Date*: 1988-05-06 06:56:07 . *Decay Date*: 1988-05-06 06:56:07 . *USAF Sat Cat*: 18992 . *COSPAR*: 1988-024A. *Apogee*: 262 km (162 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min. Unmanned resupply vessel to Mir. Docked on 25 Mar 1988 22:21:35 GMT. Undocked on 5 May 1988 01:36:03 GMT. Destroyed in reentry on 5 May 1988 06:56:19 GMT. Total free-flight time 2.28 days. Total docked time 40.14 days..

1988 March 24 - . 14:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1935** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 15.00 days. *Decay Date*: 1988-04-08 . *USAF Sat Cat*: 19011 . *COSPAR*: 1988-025A. *Apogee*: 330 km (200 mi). *Perigee*: 166 km (103 mi). *Inclination*: 67.2000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1988 March 30 - . 12:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1936** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 49.00 days. *Decay Date*: 1988-05-18 . *USAF Sat Cat*: 19015 . *COSPAR*: 1988-027A. *Apogee*: 266 km (165 mi). *Perigee*: 182 km (113 mi). *Inclination*: 64.8000 deg. *Period*: 89.00 min. Photo/digital surveillance..

1988 April 11 - . 11:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1938** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-04-25 . *USAF Sat Cat*: 19041 . *COSPAR*: 1988-030A. *Apogee*: 287 km (178 mi). *Perigee*: 194 km (120 mi). *Inclination*: 72.9000 deg. *Period*: 89.30 min. Military cartographic satellite; returned film capsule..

1988 April 14 - . 17:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton 4** - . *Payload*: Foton s/n 4L. *Mass*: 6,200 kg (13,600 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 13.62 days. *Decay Date*: 1988-04-28 . *USAF Sat Cat*: 19043 . *COSPAR*: 1988-031A. *Apogee*: 372 km (231 mi). *Perigee*: 215 km (133 mi). *Inclination*: 62.8000 deg. *Period*: 90.40 min. 218 orbits. Materials processing experiments; extremely pure and semiconductor materials. Research in material science in space (production of semiconductor materials with improved properties and very pure biologically active substances).

1988 April 20 - . 05:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **Cosmos 1939** - . *Payload*: Resurs-O1 no. 2. *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Resurs-O1. *Decay Date*: 2014-10-29 . *USAF Sat Cat*: 19045 . *COSPAR*: 1988-032A. *Apogee*: 602 km (374 mi). *Perigee*: 570 km (350 mi). *Inclination*: 97.7000 deg. *Period*: 96.40 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. Stayed in operation for six years, six months, far beyond its rated life of 3 to 5 years..

1988 April 27 - . 09:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1941** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-05-11 . *USAF Sat Cat*: 19079 . *COSPAR*: 1988-035A. *Apogee*: 266 km (165 mi). *Perigee*: 205 km (127 mi). *Inclination*: 70.3000 deg. *Period*: 89.20 min. Military cartographic satellite; returned film capsule..

1988 May 12 - . 14:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1942** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 53.00 days. *Decay Date*: 1988-07-04 . *USAF Sat Cat*: 19115 . *COSPAR*: 1988-037A. *Apogee*: 356 km (221 mi). *Perigee*: 166 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.70 min.

1988 May 13 - . 00:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 36** - . *Payload*: Progress s/n 144. *Mass*: 7,077 kg (15,602 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 23.87 days. *Completed Operations Date*: 1988-06-05 21:18:15 . *Decay Date*: 1988-06-05 21:18:15 . *USAF Sat Cat*: 19117 . *COSPAR*: 1988-038A. *Apogee*: 246 km (152 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.7000 deg. *Period*: 88.80 min.

  Unmanned resupply vessel to Mir. Rendezvous transfer orbits 185x246 km, 51. 66 deg; 223x334 km; 331x357 km. Docked with Mir on 15 May 1988 02:13:26 GMT. Undocked on 5 Jun 1988 11:11:55 GMT. Destroyed in reentry on 5 Jun 1988 21:18:40 GMT. Total free-flight time 2.49 days. Total docked time 21.37 days.

1988 May 18 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1944** - . *Payload*: Yantar-1KFT no. 9. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 36.00 days. *Decay Date*: 1988-06-23 . *USAF Sat Cat*: 19123 . *COSPAR*: 1988-041A. *Apogee*: 288 km (178 mi). *Perigee*: 196 km (121 mi). *Inclination*: 64.8000 deg. *Period*: 89.30 min. Military topographic / cartographic satellite..

1988 May 19 - . 09:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1945** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 12.00 days. *Decay Date*: 1988-05-31 . *USAF Sat Cat*: 19131 . *COSPAR*: 1988-042A. *Apogee*: 364 km (226 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.4000 deg. *Period*: 90.20 min. Military cartographic satellite; returned film capsule..

1988 May 26 - . 15:27 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-32** - . *Payload*: Molniya-3 s/n 49. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2002-03-15 . *USAF Sat Cat*: 19189 . *COSPAR*: 1988-044A. *Apogee*: 38,104 km (23,676 mi). *Perigee*: 2,066 km (1,283 mi). *Inclination*: 64.6000 deg. *Period*: 714.10 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1988 May 31 - . 07:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1951** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 14.00 days. *Decay Date*: 1988-06-14 . *USAF Sat Cat*: 19197 . *COSPAR*: 1988-047A. *Apogee*: 241 km (149 mi). *Perigee*: 173 km (107 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1988 June 7 - . 14:03 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-5** - . *Call Sign*: Rodnik (Spring - water spring). *Crew*: Aleksandrov, Aleksandr, Savinykh, Solovyov. *Backup Crew*: Lyakhov, Serebrov, Stoyanov. *Payload*: Soyuz TM s/n 55. *Mass*: 7,000 kg (15,400 lb). *Nation*: Russia. *Related Persons*: Aleksandrov, Aleksandr, Lyakhov, Savinykh, Serebrov, Solovyov, Stoyanov. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-4, Soyuz TM-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 91.45 days. *Decay Date*: 1988-09-07 . *USAF Sat Cat*: 19204 . *COSPAR*: 1988-048A. *Apogee*: 216 km (134 mi). *Perigee*: 196 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 88.60 min.

  Transported to the Mir orbital station a Soviet/Bulgarian crew comprising

cosmonauts A Y Solovyev, V P Savinykh and A P Aleksandrov (Bulgaria) to conduct joint research and experiments with cosmonauts V G Titov and M K Manarov. Interim orbit 343 x 282 km. Maneuvered to Mir's 355 x 349 km orbit. Docked 15:57 GMT 9 June to Mir's aft port. Moved to forward port 18 June.

1988 June 11 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1952** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-06-25 . *USAF Sat Cat*: 19206 . *COSPAR*: 1988-049A. *Apogee*: 269 km (167 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.0000 deg. *Period*: 89.20 min. Military cartographic satellite; returned film capsule..

1988 June 22 - . 13:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1955** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1988-08-20 . *USAF Sat Cat*: 19258 . *COSPAR*: 1988-054A. *Apogee*: 357 km (221 mi). *Perigee*: 171 km (106 mi). *Inclination*: 64.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1988 June 23 - . 07:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1956** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-07-07 . *USAF Sat Cat*: 19263 . *COSPAR*: 1988-055A. *Apogee*: 234 km (145 mi). *Perigee*: 180 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min. Military cartographic satellite; returned film capsule..

1988 July 7 - . 08:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1957** - . *Payload*: Resurs-F1 14F43 s/n 29. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Decay Date*: 1988-07-21 . *USAF Sat Cat*: 19276 . *COSPAR*: 1988-057A. *Apogee*: 225 km (139 mi). *Perigee*: 179 km (111 mi). *Inclination*: 82.6000 deg. *Period*: 88.50 min. Investigation of the natural resources of the earth in the interests of various branches

of the national economy of the USSR and international cooperation. .

1988 July 9 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Failure. *Failed Stage*: U.

- **Yantar-4KS1** - . *Mass*: 6,620 kg (14,590 lb). *Nation*: Russia. *Agency*: UNKS. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1.

1988 July 18 - . 21:13 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 37** - . *Payload*: Progress s/n 145. *Mass*: 7,065 kg (15,575 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 24.69 days. *Completed Operations Date*: 1988-08-13 13:45:31 . *Decay Date*: 1988-08-13 13:45:31 . *USAF Sat Cat*: 19322 . *COSPAR*: 1988-061A. *Apogee*: 256 km (159 mi). *Perigee*: 189 km (117 mi). *Inclination*: 51.6000 deg. *Period*: 89.00 min.

  Unmanned resupply vessel to Mir. Rendezvous transfer orbits 187x256 km, 51. 62 deg; 235 x 319 km; 343 x 347 km. Docked with Mir on 20 Jul 1988 22:33:40 GMT. Refuelling operations on 7,8, and 9 August 1998. Undocked on 12 Aug 1988 08:31:54 GMT. Destroyed in reentry on 12 Aug 1988 13:45:40 GMT. Total free-flight time 2.27 days. Total docked time 22.42 days.

1988 July 27 - . 09:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Failure. *Failed Stage*: U.

- **Resurs-F1 14F43** - . *Payload*: Resurs-F1 14F43 No. 30. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: UNKS. *Program*: Resurs. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43.

1988 August 8 - . 09:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1962** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-08-22 . *USAF Sat Cat*: 19372 . *COSPAR*: 1988-068A. *Apogee*: 265 km (164 mi). *Perigee*: 205 km (127 mi). *Inclination*: 70.0000 deg. *Period*: 89.20 min. Military cartographic satellite; returned film capsule..

1988 August 12 - . 12:53 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-73** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1999-12-16 . *USAF Sat Cat*: 19377 . *COSPAR*: 1988-069A. *Apogee*: 38,629 km (24,002 mi). *Perigee*: 1,726 km (1,072 mi). *Inclination*: 64.8000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1988 August 16 - . 13:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1963** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 47.00 days. *Decay Date*: 1988-10-02 . *USAF Sat Cat*: 19384 . *COSPAR*: 1988-070A. *Apogee*: 350 km (210 mi). *Perigee*: 176 km (109 mi). *Inclination*: 64.8000 deg. *Period*: 89.80 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1988 August 23 - . 09:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1964** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 15.00 days. *Decay Date*: 1988-09-07 . *USAF Sat Cat*: 19412 . *COSPAR*: 1988-072A. *Apogee*: 271 km (168 mi). *Perigee*: 206 km (128 mi). *Inclination*: 70.0000 deg. *Period*: 89.30 min. Military cartographic satellite; returned film capsule..

1988 August 23 - . 11:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1965** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 30.00 days. *Decay Date*: 1988-09-22 . *USAF Sat Cat*: 19414 . *COSPAR*: 1988-073A. *Apogee*: 228 km (141 mi). *Perigee*: 179 km (111 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1988 August 29 - . 04:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-6** - . *Call Sign*: Proton (Proton). *Crew*: Lyakhov, Mohmand, Polyakov.

Backup Crew: Arzamazov, Berezovoi, Masum. *Payload*: Soyuz TM s/n 56. *Mass*: 7,070 kg (15,580 lb). *Nation*: Russia. *Related Persons*: Arzamazov, Berezovoi, Lyakhov, Masum, Mohmand, Polyakov. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-4, Soyuz TM-6, Soyuz TM-6 Mir LD-2. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 114.23 days. *Decay Date*: 1988-12-21 . *USAF Sat Cat*: 19443 . *COSPAR*: 1988-075A. *Apogee*: 228 km (141 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

Transported to the Mir orbital station a Soviet-Afghan crew comprising the cosmonauts V A Lyakhov, V V Polyakov and A A Momand (Afghanistan) to conduct joint research and experiments with the cosmonauts V G Titov and M K Manarov. Returned Manarov, Titov (Soyuz TM-4), Chretien (Soyuz TM-7) to Earth. Initial orbit 195 X 228 km at 51. 57 deg. Maneuvered to a 235 x 259 km orbit, then docked with Mir at 05:41 GMT on 31 August at its 339 x 366 km orbit. Moved from aft to forward port 8 Sept 88.

1988 August 30 - . 14:14 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1966** - . *Payload*: Oko #57. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2005-11-10 . *USAF Sat Cat*: 19445 . *COSPAR*: 1988-076A. *Apogee*: 37,970 km (23,590 mi). *Perigee*: 2,436 km (1,513 mi). *Inclination*: 67.2000 deg. *Period*: 718.80 min. Covered Oko constellation plane 3 - 355 degree longitude of ascending node..

1988 September 6 - . 07:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1967** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 9.00 days. *Decay Date*: 1988-09-15 . *USAF Sat Cat*: 19462 . *COSPAR*: 1988-079A. *Apogee*: 380 km (230 mi). *Perigee*: 191 km (118 mi). *Inclination*: 72.9000 deg. *Period*: 90.20 min. Military cartographic satellite; returned film capsule..

1988 September 9 - . 10:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1968** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 14.00 days. *Decay Date*: 1988-09-23 . *USAF Sat Cat*: 19488 . *COSPAR*: 1988-082A. *Apogee*: 230 km (140 mi). *Perigee*: 177 km (109 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min. Investigation of the natural resources of the earth in the interests of various branches

of the national economy of the USSR and international cooperation. .

1988 September 9 - . 23:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 38** - . *Payload*: Progress s/n 146. *Mass*: 7,027 kg (15,491 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-4, Soyuz TM-6 Mir LD-2. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 74.81 days. *Completed Operations Date*: 1988-11-24 19:07:18 . *Decay Date*: 1988-11-24 19:07:18 . *USAF Sat Cat*: 19486 . *COSPAR*: 1988-083A. *Apogee*: 248 km (154 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.90 min.

  Unmanned resupply vessel to Mir. During launch first test of Buran ejection seat was made during ascent to orbit. The K-36M.11F35 seat was installed in an 'experimental droppable compartment' installed in place of the Launch Escape Tower engine on top of the shroud. Rendezvous orbits 186 X 246 km, 51. 63 deg; 234 X 332 km, 337 X 363 km. Docked with Mir on 12 Sep 1988 01:22:28 GMT. Delivered 2,000 kg supplies including 300 kg of food. Refuelled Mir. Undocked on 23 Nov 1988 12:12:46 GMT. Destroyed in reentry on 23 Nov 1988 19:06:58 GMT. Total free-flight time 2.36 days. Total docked time 72.45 days.

1988 September 15 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1969** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1988-11-13 . *USAF Sat Cat*: 19495 . *COSPAR*: 1988-084A. *Apogee*: 344 km (213 mi). *Perigee*: 165 km (102 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1988 September 22 - . 10:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1973** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 18.00 days. *Decay Date*: 1988-10-10 . *USAF Sat Cat*: 19521 . *COSPAR*: 1988-088A. *Apogee*: 359 km (223 mi). *Perigee*: 192 km (119 mi). *Inclination*: 72.8000 deg. *Period*: 90.00 min. Military cartographic satellite; returned film capsule..

1988 September 29 - . 09:07 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-33** - . *Payload*: Molniya-3 s/n 51. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2002-02-04 . *USAF Sat Cat*: 19541 . *COSPAR*: 1988-090A. *Apogee*: 38,414 km (23,869 mi). *Perigee*: 1,867 km (1,160 mi). *Inclination*: 65.0000 deg. *Period*: 716.30 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1988 October 3 - . 22:23 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1974** - . *Payload*: Oko #58. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 19554 . *COSPAR*: 1988-092A. *Apogee*: 33,413 km (20,761 mi). *Perigee*: 6,942 km (4,313 mi). *Inclination*: 68.0000 deg. *Period*: 717.80 min. Covered Oko constellation plane 7 - 157 degree longitude of ascending node..

1988 October 13 - . 11:19 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1976** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-10-27 . *USAF Sat Cat*: 19582 . *COSPAR*: 1988-094A. *Apogee*: 366 km (227 mi). *Perigee*: 190 km (110 mi). *Inclination*: 72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule..

1988 October 25 - . 18:02 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 1977** - . *Payload*: Oko #59. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 19608 . *COSPAR*: 1988-096A. *Apogee*: 33,805 km (21,005 mi). *Perigee*: 6,559 km (4,075 mi). *Inclination*: 67.7000 deg. *Period*: 718.00 min. Covered Oko constellation plane 6 - 116 degree longitude of ascending node..

1988 October 27 - . 11:31 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1978** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-11-10 . *USAF Sat Cat*: 19612 . *COSPAR*: 1988-097A. *Apogee*: 364 km (226 mi). *Perigee*: 190 km (110 mi). *Inclination*:

72.9000 deg. *Period*: 90.10 min. Military cartographic satellite; returned film capsule..

1988 November 11 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Failure. *Failed Stage*: U.

- **Yantar-4KS1** - . *Mass*: 6,620 kg (14,590 lb). *Nation*: Russia. *Agency*: UNKS. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1.

1988 November 24 - . 14:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1981** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-12-08 . *USAF Sat Cat*: 19651 . *COSPAR*: 1988-103A. *Apogee*: 353 km (219 mi). *Perigee*: 237 km (147 mi). *Inclination*: 62.8000 deg. *Period*: 90.40 min. Military cartographic satellite; returned film capsule..

1988 November 26 - . 15:49 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-7** - . *Call Sign*: Donbass (Donbass - River Don basin). *Crew*: Chretien, Krikalyov, Volkov, Aleksandr. *Backup Crew*: Serebrov, Tognini, Viktorenko. *Payload*: Soyuz TM s/n 57. *Mass*: 7,000 kg (15,400 lb). *Nation*: Russia. *Related Persons*: Chretien, Krikalyov, Serebrov, Tognini, Viktorenko, Volkov, Aleksandr. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-4, Soyuz TM-6 Mir LD-2, Soyuz TM-7, Soyuz TM-7 Aragatz. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 151.47 days. *Decay Date*: 1989-04-27 . *USAF Sat Cat*: 19660 . *COSPAR*: 1988-104A. *Apogee*: 235 km (146 mi). *Perigee*: 194 km (120 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Mir Expedition EO-04. Carried Alexander Volkov, Sergei Krikalev, Jean-Loup Chretien to Mir; returned Volkov, Krikalev to Earth. Initial Orbit: 194 X 235 km. Thereafter maneuvered to rendezvous orbit 256 X 291 km before docking with Mir in 337 X 369 km at 17:16 GMT 28 November.

1988 November 30 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1982** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-12-14 . *USAF Sat Cat*: 19662 . *COSPAR*: 1988-105A. *Apogee*: 377 km (234 mi). *Perigee*: 204 km (126 mi). *Inclination*:

70.0000 deg. *Period*: 90.30 min. Military cartographic satellite; returned film capsule..

1988 December 8 - . 14:50 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1983** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1988-12-22 . *USAF Sat Cat*: 19672 . *COSPAR*: 1988-107A. *Apogee*: 256 km (159 mi). *Perigee*: 243 km (150 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. Military cartographic satellite; returned film capsule..

1988 December 16 - . 19:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1984** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1989-02-13 . *USAF Sat Cat*: 19705 . *COSPAR*: 1988-110A. *Apogee*: 323 km (200 mi). *Perigee*: 186 km (115 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1988 December 22 - . 14:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-34** - . *Payload*: Molniya-3 s/n 52. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2007-05-27 . *USAF Sat Cat*: 19713 . *COSPAR*: 1988-112A. *Apogee*: 39,481 km (24,532 mi). *Perigee*: 899 km (558 mi). *Inclination*: 63.9000 deg. *Period*: 718.30 min.

  Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. First launch from LC43/3 since it was damaged by a booster accident in June 1987.

1988 December 25 - . 04:11 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 39** - . *Payload*: Progress s/n 147. *Mass*: 7,015 kg (15,465 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-6 Mir LD-2, Soyuz TM-7. *Spacecraft Bus*: Soyuz.

Spacecraft: Progress. *Duration*: 44.40 days. *Completed Operations Date*: 1989-02-07 13:49:23 . *Decay Date*: 1989-02-07 13:49:23 . *USAF Sat Cat*: 19728 . *COSPAR*: 1988-114A. *Apogee*: 238 km (147 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

Unmanned resupply vessel to Mir. Made second test of Buran ejection seat during ascent to orbit. The K-36M.11F35 seat was installed in an 'experimental droppable compartment' installed in place of the Launch Escape Tower engine on top of the shroud. Rendezvous orbits 187 X 237 km, 51.63 deg; 236 X 338 km; 325 X 353 km at Mir. Delivered 1,300 kg cargo. Docked with Mir on 27 Dec 1988 05:35:10 GMT. Undocked on 7 Feb 1989 06:45:34 GMT. Destroyed in reentry on 7 Feb 1989 13:49:00 GMT. Total free-flight time 2.35 days. Total docked time 42.05 days.

1988 December 28 - . 05:27 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-74** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 1998-07-31 . *USAF Sat Cat*: 19730 . *COSPAR*: 1988-115A. *Apogee*: 39,002 km (24,234 mi). *Perigee*: 1,358 km (843 mi). *Inclination*: 64.9000 deg. *Period*: 717.90 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1988 December 29 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1986** - . *Payload*: Yantar-1KFT no. 10. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 44.00 days. *Decay Date*: 1989-02-11 . *USAF Sat Cat*: 19734 . *COSPAR*: 1988-116A. *Apogee*: 289 km (179 mi). *Perigee*: 193 km (119 mi). *Inclination*: 64.8000 deg. *Period*: 89.30 min. Topographic mapping for the Army General Staff..

1989 January 12 - . 11:29 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1990** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 30.00 days. *Decay Date*: 1989-02-11 . *USAF Sat Cat*: 19756 . *COSPAR*: 1989-002A. *Apogee*: 227 km (141 mi). *Perigee*: 177 km (109 mi). *Inclination*: 82.6000 deg. *Period*: 88.50 min.

Investigation of the natural resources of the earth in the interests of the national

economy of the USSR and international cooperation; survey of seismically active regions of the country, including the Armenian SSR, in the interests of industrial and non -industrial construction.

1989 January 18 - . 08:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1991** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1989-02-01 . *USAF Sat Cat*: 19758 . *COSPAR*: 1989-003A. *Apogee*: 375 km (233 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.0000 deg. *Period*: 90.30 min. Military cartographic satellite; returned film capsule..

1989 January 28 - . 12:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 1993** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 58.00 days. *Decay Date*: 1989-03-27 . *USAF Sat Cat*: 19774 . *COSPAR*: 1989-007A. *Apogee*: 347 km (215 mi). *Perigee*: 171 km (106 mi). *Inclination*: 64.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1989 February 10 - . 08:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 40** - . *Payload*: Progress s/n 148. *Mass*: 7,022 kg (15,480 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-6 Mir LD-2, Soyuz TM-7. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 22.71 days. *Completed Operations Date*: 1989-03-05 01:59:08 . *Decay Date*: 1989-03-05 01:59:08 . *USAF Sat Cat*: 19783 . *COSPAR*: 1989-008A. *Apogee*: 244 km (151 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Unmanned resupply vessel to Mir. Conducted third test of Buran ejection seat during ascent to orbit. The K-36M.11F35 seat was installed in an 'experimental droppable compartment' installed in place of the Launch Escape Tower engine on top of the shroud. Docked with Mir on 12 Feb 1989 10:29:38 GMT. Undocked on 3 Mar 1989 01:45:52 GMT. Unfurled experimental space mirror petal structure on undocking. Destroyed in reentry on 5 Mar 1989 01:59:00 GMT. Total free-flight time 4.08 days. Total docked time 18.64 days.

1989 February 10 - . 16:55 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch*

Vehicle: Soyuz-U-PVB.

- **Cosmos 2000** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 20.00 days. *Decay Date*: 1989-03-02 . *USAF Sat Cat*: 19792 . *COSPAR*: 1989-010A. *Apogee*: 243 km (150 mi). *Perigee*: 175 km (108 mi). *Inclination*: 82.3000 deg. *Period*: 88.70 min.

  Investigation of the natural resources of the Earth in the interests of various branches of the Soviet economy and international cooperation; space-based survey of the central part of Antarctica for purposes of mapping inaccessible regions of that continent.

1989 February 14 - . 04:21 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2001** - . *Payload*: Oko #60. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2008-09-22 . *USAF Sat Cat*: 19796 . *COSPAR*: 1989-011A. *Apogee*: 37,951 km (23,581 mi). *Perigee*: 2,441 km (1,516 mi). *Inclination*: 66.9000 deg. *Period*: 718.50 min. Covered Oko constellation plane 4 - 32 degree longitude of ascending node..

1989 February 15 - . 11:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-75** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 19807 . *COSPAR*: 1989-014A. *Apogee*: 38,249 km (23,766 mi). *Perigee*: 2,111 km (1,311 mi). *Inclination*: 63.5000 deg. *Period*: 717.90 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1989 February 17 - . 14:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2003** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1989-03-03 . *USAF Sat Cat*: 19818 . *COSPAR*: 1989-015A. *Apogee*: 255 km (158 mi). *Perigee*: 244 km (151 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. Military cartographic satellite; returned film capsule..

1989 March 2 - . 18:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2005** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 54.00 days. *Decay Date*: 1989-04-25 . *USAF Sat Cat*: 19862 . *COSPAR*: 1989-019A. *Apogee*: 324 km (201 mi). *Perigee*: 188 km (116 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1989 March 16 - . 14:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2006** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 15.00 days. *Decay Date*: 1989-03-31 . *USAF Sat Cat*: 19893 . *COSPAR*: 1989-022A. *Apogee*: 380 km (230 mi). *Perigee*: 240 km (140 mi). *Inclination*: 62.8000 deg. *Period*: 90.70 min. Military cartographic satellite; returned film capsule..

1989 March 16 - . 18:54 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 41** - . *Payload*: Progress s/n 149. *Mass*: 6,995 kg (15,421 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-6 Mir LD-2, Soyuz TM-7. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 39.72 days. *Completed Operations Date*: 1989-04-25 12:11:45 . *Decay Date*: 1989-04-25 12:11:45 . *USAF Sat Cat*: 19895 . *COSPAR*: 1989-023A. *Apogee*: 243 km (150 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Unmanned resupply vessel to Mir. Conducted fourth test of Buran ejection seat during ascent to orbit. The K-36M.11F35 seat was installed in an 'experimental droppable compartment' installed in place of the Launch Escape Tower engine on top of the shroud. Delivered Bulgarian Spektr 256 spectrometer, power supplies for failed equipment. Docked with Mir on 18 Mar 1989 20:50:46 GMT. Between April 9 and 17 boosted Mir into a 373 X 416 km storage orbit after the decision was made to delay remanning the station. However these maneuvers resulted in the spacecraft running out of fuel. Undocked on 21 Apr 1989 01:46:15 GMT. Destroyed in uncontrolled decay of orbit on 25 Apr 1989 12:12:00 GMT. Total free-flight time 6.52 days. Total docked time 33.21 days.

1989 March 23 - . 12:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2007** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 180.00 days. *Decay Date*: 1989-09-22 . *USAF Sat Cat*: 19900 . *COSPAR*: 1989-024A. *Apogee*: 262 km (162 mi). *Perigee*: 224 km (139 mi). *Inclination*: 64.7000 deg. *Period*: 89.40 min. Photo/digital surveillance..

1989 April 6 - . 14:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2017** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 13.00 days. *Decay Date*: 1989-04-19 . *USAF Sat Cat*: 19923 . *COSPAR*: 1989-029A. *Apogee*: 260 km (160 mi). *Perigee*: 244 km (151 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. Military cartographic satellite; returned film capsule..

1989 April 20 - . 18:29 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2018** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 60.00 days. *Decay Date*: 1989-06-19 . *USAF Sat Cat*: 19938 . *COSPAR*: 1989-031A. *Apogee*: 327 km (203 mi). *Perigee*: 185 km (114 mi). *Inclination*: 62.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1989 April 26 - . 17:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton 5** - . *Payload*: Foton s/n 5L. *Mass*: 6,200 kg (13,600 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 14.35 days. *Decay Date*: 1989-05-11 . *USAF Sat Cat*: 19941 . *COSPAR*: 1989-032A. *Apogee*: 377 km (234 mi). *Perigee*: 220 km (130 mi). *Inclination*: 62.8000 deg. *Period*: 90.50 min. 234 orbits. Materials processing. Space materials research (production of enhanced performance semiconductors and especially pure biologically active substances in microgravity conditions). Jointly with France..

1989 May 5 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2019** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 13.00 days. *Decay Date*: 1989-05-18 . *USAF Sat Cat*: 19972 . *COSPAR*:

1989-034A. *Apogee*: 256 km (159 mi). *Perigee*: 241 km (149 mi). *Inclination*: 62.9000 deg. *Period*: 89.50 min. Military cartographic satellite; returned film capsule..

1989 May 17 - . 13:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2020** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1989-07-15 . *USAF Sat Cat*: 19986 . *COSPAR*: 1989-036A. *Apogee*: 280 km (170 mi). *Perigee*: 178 km (110 mi). *Inclination*: 64.8000 deg. *Period*: 89.10 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1989 May 24 - . 10:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2021** - . *Payload*: Yantar-1KFT no. 11. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 43.00 days. *Decay Date*: 1989-07-06 . *USAF Sat Cat*: 20000 . *COSPAR*: 1989-037A. *Apogee*: 280 km (170 mi). *Perigee*: 204 km (126 mi). *Inclination*: 69.9000 deg. *Period*: 89.40 min. Topographic mapping for the Army General Staff..

1989 May 25 - . 08:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-01** - . *Payload*: Resurs-F1 14F43 s/n 45. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 23.00 days. *Decay Date*: 1989-06-17 . *USAF Sat Cat*: 20006 . *COSPAR*: 1989-038A. *Apogee*: 232 km (144 mi). *Perigee*: 174 km (108 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min.

  Deployed Pion 1 & 2. Resurs-F: Investigation of the natural resources of the earth in the interests of various branches of the Soviet economy and international cooperation. Satellite carries two passive separable 'Pion' probes to investigate upper atmospheric density.

- **Pion** - . *Payload*: Pion-2. *Mass*: 78 kg (171 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Atmosphere satellite. *Spacecraft*: Pion. *Decay Date*: 1989-07-24 . *USAF Sat Cat*: 20060 . *COSPAR*: 1989-038D. *Apogee*: 147 km (91 mi). *Perigee*: 140 km (80 mi). *Inclination*: 82.3000 deg. *Period*: 87.40 min.

  Deployed from Resurs F1 6/9/89; passive atmosphere research. Resurs-F:

Investigation of the natural resources of the earth in the interests of various branches of the Soviet economy and international cooperation. Satellite carries two passive separable 'Pion' probes to investigate upper atmospheric density.

- **Pion** - . *Payload*: Pion-1. *Mass*: 78 kg (171 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Atmosphere satellite. *Spacecraft*: Pion. *Decay Date*: 1989-07-23 . *USAF Sat Cat*: 20056 . *COSPAR*: 1989-038C. *Apogee*: 144 km (89 mi). *Perigee*: 132 km (82 mi). *Inclination*: 82.3000 deg. *Period*: 87.30 min.

  Deployed from Resurs F1 6/9/89; passive atmosphere research. Resurs-F: Investigation of the natural resources of the earth in the interests of various branches of the Soviet economy and international cooperation. Satellite carries two passive separable 'Pion' probes to investigate upper atmospheric density.

1989 June 1 - . 12:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2025** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1989-06-15 . *USAF Sat Cat*: 20035 . *COSPAR*: 1989-040A. *Apogee*: 256 km (159 mi). *Perigee*: 236 km (146 mi). *Inclination*: 62.8000 deg. *Period*: 89.40 min. Military cartographic satellite; returned film capsule..

1989 June 8 - . 17:09 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-35** - . *Payload*: Molniya-3 s/n 45. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2001-12-14 . *USAF Sat Cat*: 20052 . *COSPAR*: 1989-043A. *Apogee*: 38,918 km (24,182 mi). *Perigee*: 1,436 km (892 mi). *Inclination*: 64.8000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1989 June 16 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2028** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 20.00 days. *Decay Date*: 1989-07-06 . *USAF Sat Cat*: 20073 . *COSPAR*: 1989-047A. *Apogee*: 243 km (150 mi). *Perigee*: 204 km (126 mi). *Inclination*: 70.0000 deg. *Period*: 89.00 min. Military cartographic satellite; returned film capsule..

1989 June 27 - . 08:04 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-02** - . *Payload*: Resurs-F1 14F43 s/n 46. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 14.00 days. *Decay Date*: 1989-07-11 . *USAF Sat Cat*: 20095 . *COSPAR*: 1989-049A. *Apogee*: 269 km (167 mi). *Perigee*: 255 km (158 mi). *Inclination*: 82.6000 deg. *Period*: 89.80 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1989 July 5 - . 08:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2029** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1989-07-19 . *USAF Sat Cat*: 20105 . *COSPAR*: 1989-051A. *Apogee*: 238 km (147 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.70 min. Military cartographic satellite; returned film capsule. Also investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation..

1989 July 12 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2030** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 16.00 days. *Decay Date*: 1989-07-29 . *USAF Sat Cat*: 20124 . *COSPAR*: 1989-054A. *Apogee*: 349 km (216 mi). *Perigee*: 162 km (100 mi). *Inclination*: 67.2000 deg. *Period*: 89.60 min. High resolution photo reconnaissance. Spacecraft failed. Blown up in orbit on July 28..

1989 July 18 - . 09:44 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-03** - . *Payload*: Resurs-F1 14F43 s/n 47. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 21.00 days. *Decay Date*: 1989-08-08 . *USAF Sat Cat*: 20134 . *COSPAR*: 1989-055A. *Apogee*: 214 km (132 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.6000 deg. *Period*: 88.40 min.

  Deployed Pion 3 & 4. Resurs-F: Investigation of the natural resources of the earth in

the interests of various branches of the Soviet economy and international cooperation. Satellite carries two passive separable 'Pion' probes to investigate upper atmospheric density.

- **Pion** - . *Payload*: Pion-3. *Mass*: 67 kg (147 lb). *Nation*: Russia. *Agency*: MOM. *Spacecraft*: Pion. *Decay Date*: 1989-09-19 . *USAF Sat Cat*: 20160 . *COSPAR*: 1989-055C. *Apogee*: 271 km (168 mi). *Perigee*: 254 km (157 mi). *Inclination*: 82.5000 deg. *Period*: 89.76 min.

- **Pion** - . *Payload*: Pion-4. *Mass*: 78 kg (171 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Atmosphere satellite. *Spacecraft*: Pion. *Decay Date*: 1989-09-19 . *USAF Sat Cat*: 20161 . *COSPAR*: 1989-055D. *Apogee*: 271 km (168 mi). *Perigee*: 254 km (157 mi). *Inclination*: 82.5000 deg. *Period*: 89.76 min.

  Deployed from Resurs F3 8/7/89; passive atmospheric research. Resurs-F: Investigation of the natural resources of the earth in the interests of various branches of the Soviet economy and international cooperation. Satellite carries two passive separable 'Pion' probes to investigate upper atmospheric density.

1989 July 18 - . 12:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2031** - . *Payload*: Orlets-1 no. 1. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Orlets. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Orlets-1. *Duration*: 44.00 days. *Decay Date*: 1989-09-15 . *USAF Sat Cat*: 20136 . *COSPAR*: 1989-056A. *Apogee*: 264 km (164 mi). *Perigee*: 211 km (131 mi). *Inclination*: 50.4000 deg. *Period*: 89.30 min. First launch of Orlets-1 long duration film return military reconnaissance satellite. After returning multiple film capsules, the spacecraft was deorbited..

1989 July 20 - . 08:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2032** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1989-08-03 . *USAF Sat Cat*: 20145 . *COSPAR*: 1989-057A. *Apogee*: 241 km (149 mi). *Perigee*: 179 km (111 mi). *Inclination*: 82.3000 deg. *Period*: 88.70 min. Military cartographic satellite; returned film capsule..

1989 August 2 - . 11:29 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2035** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1989-08-16 . *USAF Sat Cat*: 20151 . *COSPAR*:

1989-060A. *Apogee*: 236 km (146 mi). *Perigee*: 176 km (109 mi). *Inclination*: 82.6000 deg. *Period*: 88.60 min. Military cartographic satellite; returned film capsule..

1989 August 15 - . 10:29 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-04** - . *Payload*: Resurs-F2 17F42 s/n 4. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 30.00 days. *Decay Date*: 1989-09-14 . *USAF Sat Cat*: 20175 . *COSPAR*: 1989-063A. *Apogee*: 226 km (140 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.50 min. Investigation of the natural resources of the earth in the interests of various branches of the national economy of the USSR and international cooperation. .

1989 August 22 - . 12:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2036** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1989-09-05 . *USAF Sat Cat*: 20188 . *COSPAR*: 1989-065A. *Apogee*: 259 km (160 mi). *Perigee*: 244 km (151 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. Military cartographic satellite; returned film capsule..

1989 August 23 - . 03:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-1** - . *Payload*: Progress M s/n 201. *Mass*: 7,270 kg (16,020 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-8. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 100.34 days. *Completed Operations Date*: 1989-12-01 11:21:28 . *Decay Date*: 1989-12-01 11:21:28 . *USAF Sat Cat*: 20191 . *COSPAR*: 1989-066A. *Apogee*: 217 km (134 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.50 min.

  Unmanned supply vehicle to Mir; first flight of new vehicle design. Tested on-board systems under different conditions and delivered expendable materials and sundry cargo to the Mir manned space station. Docked with Mir on 25 Aug 1989 05:19:02 GMT. Undocked on 1 Dec 1989 09:02:23 GMT. Destroyed in reentry on 1 Dec 1989 11:21:00 GMT. Total free-flight time 2.19 days. Total docked time 98.16 days.

1989 September 5 - . 21:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-8** - . *Call Sign*: Vityaz (Knight). *Crew*: Serebrov, Viktorenko. *Backup Crew*: Balandin, Solovyov. *Payload*: Soyuz TM s/n 58. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Balandin, Serebrov, Solovyov, Viktorenko. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-8. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 166.29 days. *Decay Date*: 1990-02-19 . *USAF Sat Cat*: 20218 . *COSPAR*: 1989-071A. *Apogee*: 392 km (243 mi). *Perigee*: 390 km (240 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

  Manned two crew. Mir Expedition EO-05. Docked with Mir 8 September. Transported to the Mir orbital station a team consisting of A S Viktorenko, commander of the spacecraft, and A A Serebrov, on-board engineer, to carry out scientific and technological research and experiments. Flight cost 80 million rubles. Expected return 25 million rubles net profit.

1989 September 6 - . 10:49 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-05** - . *Payload*: Resurs-F1 14F43 s/n 48. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 16.00 days. *Decay Date*: 1989-09-22 . *USAF Sat Cat*: 20222 . *COSPAR*: 1989-073A. *Apogee*: 229 km (142 mi). *Perigee*: 176 km (109 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min.

  Carried W. German microgravity experiment. Investigation of the natural resources of the Earth in the interests of the Soviet economy and international cooperation; and the conduct of biotechnological experiments under a commercial agreement with the firm Interspace (Federal Republic of Germany).

1989 September 15 - . 06:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC41/1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2044** - . *Payload*: Bion no. 9. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 14.00 days. *Decay Date*: 1989-09-29 . *USAF Sat Cat*: 20242 . *COSPAR*: 1989-075A. *Apogee*: 264 km (164 mi). *Perigee*: 203 km (126 mi). *Inclination*: 82.3000 deg. *Period*: 89.20 min.

  29 US/USSR life science experiments conducted on monkeys, insects, plants, fish, rats. Carried monkeys Zhankonya and Zabiyaka. Cosmos 2044 was the seventh Soviet Biosatellite to orbit the Earth with joint U.S./U.S.S.R. experiments onboard. Hungary, the German Democratic Republic, Canada, Poland, Britain, Romania, Czechoslovakia and the European Space Agency also participated in the mission. The joint U.S./U.S.S.R. experiments were conducted on two rhesus monkeys and ten rats that were flown onboard the Biosatellite. The biological payload on the spacecraft also included fish, amphibians, insects, worms, protozoans, cell cultures and plants.

Last launch from LC41. *Additional Details*: here....

1989 September 22 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2045** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 10.00 days. *Decay Date*: 1989-10-02 . *USAF Sat Cat*: 20244 . *COSPAR*: 1989-076A. *Apogee*: 295 km (183 mi). *Perigee*: 205 km (127 mi). *Inclination*: 70.0000 deg. *Period*: 89.50 min. Military cartographic satellite; returned film capsule..

1989 September 27 - . 14:38 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-76** - . *Payload*: Molniya-1T. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2000-11-11 . *USAF Sat Cat*: 20255 . *COSPAR*: 1989-078A. *Apogee*: 39,572 km (24,588 mi). *Perigee*: 783 km (486 mi). *Inclination*: 64.8000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1989 October 3 - . 14:59 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2047** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 49.00 days. *Decay Date*: 1989-11-21 . *USAF Sat Cat*: 20279 . *COSPAR*: 1989-082A. *Apogee*: 330 km (200 mi). *Perigee*: 165 km (102 mi). *Inclination*: 67.1000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1989 October 17 - . 13:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2048** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 9.00 days. *Decay Date*: 1989-10-26 . *USAF Sat Cat*: 20292 . *COSPAR*: 1989-083A. *Apogee*: 269 km (167 mi). *Perigee*: 253 km (157 mi). *Inclination*: 62.6000 deg. *Period*: 89.70 min. Military cartographic photo-surveillance satellite; also studied fluxes of heavy nuclei..

1989 November 17 - . 10:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2049** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 214.00 days. *Decay Date*: 1990-06-19 . *USAF Sat Cat*: 20320 . *COSPAR*: 1989-088A. *Apogee*: 251 km (155 mi). *Perigee*: 232 km (144 mi). *Inclination*: 64.8000 deg. *Period*: 89.30 min. Photo/digital surveillance..

1989 November 23 - . 20:35 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2050** - . *Payload*: Oko #61. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 20330 . *COSPAR*: 1989-091A. *Apogee*: 34,182 km (21,239 mi). *Perigee*: 6,185 km (3,843 mi). *Inclination*: 67.5000 deg. *Period*: 718.00 min. Covered Oko constellation plane 9 - 233 degree longitude of ascending node..

1989 November 28 - . 10:02 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-36** - . *Payload*: Molniya-3 s/n 46. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2000-05-19 . *USAF Sat Cat*: 20338 . *COSPAR*: 1989-094A. *Apogee*: 39,655 km (24,640 mi). *Perigee*: 698 km (433 mi). *Inclination*: 64.8000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1989 November 30 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2052** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 55.00 days. *Decay Date*: 1990-01-24 . *USAF Sat Cat*: 20350 . *COSPAR*: 1989-095A. *Apogee*: 320 km (190 mi). *Perigee*: 174 km (108 mi). *Inclination*: 67.1000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1989 December 20 - . 03:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-2** - . *Payload*: Progress M s/n 202. *Mass*: 7,300 kg (16,000 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-8. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 51.18 days. *Completed Operations Date*: 1990-02-09 07:56:10 . *Decay Date*: 1990-02-09 07:56:10 . *USAF Sat Cat*: 20373 . *COSPAR*: 1989-099A. *Apogee*: 392 km (243 mi). *Perigee*: 390 km (240 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

  Unmanned resupply vessel to Mir; carried US microgravity payload. Delivered various cargoes to the Mir orbital station, including scientific apparatus produced in the United States of America and intended, pursuant to a commercial agreement, for the conduct of experiments on space biotechnology. Docked with Mir on 22 Dec 1989 05:41:21 GMT. Undocked on 9 Feb 1990 02:33:07 GMT. Destroyed in reentry on 9 Feb 1990 07:56:00 GMT. Total free-flight time 2.31 days. Total docked time 48.87 days.

1990 January 17 - . 14:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2055** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 12.00 days. *Decay Date*: 1990-01-29 . *USAF Sat Cat*: 20426 . *COSPAR*: 1990-003A. *Apogee*: 260 km (160 mi). *Perigee*: 248 km (154 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. Military cartographic satellite; returned film capsule..

1990 January 23 - . 02:51 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-37** - . *Payload*: Molniya-3 s/n 53. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2003-06-23 . *USAF Sat Cat*: 20444 . *COSPAR*: 1990-006A. *Apogee*: 39,367 km (24,461 mi). *Perigee*: 982 km (610 mi). *Inclination*: 64.9000 deg. *Period*: 717.70 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1990 January 25 - . 17:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2057** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 53.00 days. *Decay Date*: 1990-03-19 . *USAF Sat*

Cat: 20457 . *COSPAR*: 1990-009A. *Apogee*: 330 km (200 mi). *Perigee*: 183 km (113 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1990 February 11 - . 06:16 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-9** - . *Call Sign*: Rodnik (Spring - water spring). *Crew*: Balandin, Solovyov. *Backup Crew*: Manakov, Strekalov. *Payload*: Soyuz TM s/n 60. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Balandin, Manakov, Solovyov, Strekalov. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-8, Soyuz TM-9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 179.05 days. *Decay Date*: 1990-08-09 . *USAF Sat Cat*: 20494 . *COSPAR*: 1990-014A. *Apogee*: 387 km (240 mi). *Perigee*: 373 km (231 mi). *Inclination*: 51.6000 deg. *Period*: 92.20 min.

  Manned two crew. Mir Expedition EO-06. Docked with Mir. Transported to the Mir orbital station a crew comprising the cosmonauts A Y Solovyov and A N Balandin to conduct an extensive programme of geophysical and astrophysical research, experiments on biology and biotechnology and work on space materials science.

1990 February 28 - . 23:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-3** - . *Payload*: Progress M s/n 203. *Mass*: 7,249 kg (15,981 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 58.07 days. *Completed Operations Date*: 1990-04-29 00:52:03 . *Decay Date*: 1990-04-29 00:52:03 . *USAF Sat Cat*: 20513 . *COSPAR*: 1990-020A. *Apogee*: 218 km (135 mi). *Perigee*: 183 km (113 mi). *Inclination*: 51.6000 deg. *Period*: 88.50 min. Unmanned resupply vessel to Mir. Docked with Mir on 3 Mar 1990 01:04:32 GMT. Undocked on 27 Apr 1990 20:24:43 GMT. Destroyed in reentry on 28 Apr 1990 00:52:00 GMT. Total free-flight time 2.26 days. Total docked time 55.81 days..

1990 March 22 - . 07:20 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2062** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1990-04-05 . *USAF Sat Cat*: 20529 . *COSPAR*: 1990-024A. *Apogee*: 221 km (137 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.50 min. Military cartographic satellite; returned film capsule..

1990 March 27 - . 16:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2063** - . *Payload*: Oko #62. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 20536 . *COSPAR*: 1990-026A. *Apogee*: 35,210 km (21,870 mi). *Perigee*: 5,329 km (3,311 mi). *Inclination*: 67.8000 deg. *Period*: 721.50 min. Covered Oko constellation plane 2 - 317 degree longitude of ascending node..

1990 April 3 - . 12:02 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *Launch Pad*: LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Failure. *Failed Stage*: U.

- **Yantar-4K1** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: UNKS. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. High resolution photo reconnaissance mission..

1990 April 11 - . 17:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton 6** - . *Payload*: Foton s/n 6L. *Mass*: 6,200 kg (13,600 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 15.17 days. *Decay Date*: 1990-04-27 . *USAF Sat Cat*: 20566 . *COSPAR*: 1990-032A. *Apogee*: 374 km (232 mi). *Perigee*: 216 km (134 mi). *Inclination*: 62.8000 deg. *Period*: 90.40 min.

  250 orbits. In addition to Russian materials science experiments, Foton 6 carried out the French Gezon experiment using the Russian Zona-4M electric furnace (Foton spacecraft have also flown the Zona 1, Zona 4, Splav 2, and Konstanta 2 electric furnaces as well as the Kashtan electrophoresis unit). Foton 6, which also carried the European Biopan life sciences experiments, was successfully recovered on the 15th day.

1990 April 13 - . 18:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2072** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 225.00 days. *Decay Date*: 1990-11-21 . *USAF Sat Cat*: 20568 . *COSPAR*: 1990-033A. *Apogee*: 270 km (160 mi). *Perigee*: 232 km (144 mi). *Inclination*: 64.7000 deg. *Period*: 89.50 min. Photo/digital surveillance..

1990 April 17 - . 08:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2073** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 11.00 days. *Decay Date*: 1990-04-28 . *USAF Sat Cat*: 20573 . *COSPAR*: 1990-035A. *Apogee*: 239 km (148 mi). *Perigee*: 173 km (107 mi). *Inclination*: 82.4000 deg. *Period*: 88.60 min. Military cartographic satellite; returned film capsule..

1990 April 26 - . 01:37 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-77** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2005-02-25 . *USAF Sat Cat*: 20583 . *COSPAR*: 1990-039A. *Apogee*: 39,625 km (24,621 mi). *Perigee*: 724 km (449 mi). *Inclination*: 64.4000 deg. *Period*: 717.70 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1990 April 28 - . 11:37 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB.

- **Cosmos 2076** - . *Payload*: Oko #63. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 20596 . *COSPAR*: 1990-040A. *Apogee*: 34,572 km (21,482 mi). *Perigee*: 5,748 km (3,571 mi). *Inclination*: 68.0000 deg. *Period*: 717.10 min. Covered Oko constellation plane 1 - 277 degree longitude of ascending node..

1990 May 5 - . 20:44 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress 42** - . *Payload*: Progress s/n 150. *Mass*: 7,011 kg (15,456 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress. *Duration*: 21.66 days. *Completed Operations Date*: 1990-05-28 12:27:29 . *Decay Date*: 1990-05-28 12:27:29 . *USAF Sat Cat*: 20602 . *COSPAR*: 1990-041A. *Apogee*: 243 km (150 mi). *Perigee*: 188 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Unmanned resupply vessel to Mir; last of original design Progress spacecraft. Conducted fifth and final test of Buran ejection seat during ascent to orbit. The K-36M.11F35 seat was installed in an 'experimental droppable compartment' installed in place of the Launch Escape Tower engine on top of the shroud. Docked with Mir on 7 May 1990 22:45:03 GMT. Undocked on 27 May 1990 07:08:58 GMT. Destroyed in reentry on 27 May 1990 12:27:30 GMT. Total free-flight time 2.31 days.

Total docked time 19.35 days.

1990 May 7 - . 18:39 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2077** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 58.00 days. *Decay Date*: 1990-07-04 . *USAF Sat Cat*: 20604 . *COSPAR*: 1990-042A. *Apogee*: 328 km (203 mi). *Perigee*: 182 km (113 mi). *Inclination*: 62.9000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1990 May 15 - . 09:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2078** - . *Payload*: Yantar-1KFT no. 12. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 44.00 days. *Decay Date*: 1990-06-28 . *USAF Sat Cat*: 20615 . *COSPAR*: 1990-044A. *Apogee*: 280 km (170 mi). *Perigee*: 196 km (121 mi). *Inclination*: 70.0000 deg. *Period*: 89.30 min. Topographic mapping for the Army General Staff..

1990 May 29 - . 07:19 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-06** - . *Payload*: Resurs-F1 14F43 s/n 50. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 16.00 days. *Decay Date*: 1990-06-14 . *USAF Sat Cat*: 20632 . *COSPAR*: 1990-047A. *Apogee*: 231 km (143 mi). *Perigee*: 175 km (108 mi). *Inclination*: 82.4000 deg. *Period*: 88.60 min.

  Also carried German microgravity experiment. Investigation of the natural resources of the Earth in the interests of various branches of the national economy of the USSR; solution of problems relating to ecology and international cooperation. In accordance with a commercial agreement, apparatus belo nging to the Federal Republic of Germany is also being carried for the purpose of conducting biotechnological experiments.

1990 June 13 - . 01:07 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-38** - . *Payload*: Molniya-3 s/n 47. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military

communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2006-02-26 . *USAF Sat Cat*: 20646 . *COSPAR*: 1990-052A. *Apogee*: 39,778 km (24,716 mi). *Perigee*: 571 km (354 mi). *Inclination*: 63.5000 deg. *Period*: 717.70 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1990 June 19 - . 08:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2083** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1990-07-03 . *USAF Sat Cat*: 20657 . *COSPAR*: 1990-053A. *Apogee*: 220 km (130 mi). *Perigee*: 175 km (108 mi). *Inclination*: 82.6000 deg. *Period*: 88.50 min. Military cartographic satellite; returned film capsule..

1990 June 21 - . 20:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB. *FAILURE*: Fourth stage failure.. *Failed Stage*: U.

- **Cosmos 2084** - . *Payload*: Oko #64. *Mass*: 1,800 kg (3,900 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 1990-06-21 . *USAF Sat Cat*: 20663 . *COSPAR*: 1990-055A. *Apogee*: 666 km (413 mi). *Perigee*: 582 km (361 mi). *Inclination*: 62.8000 deg. *Period*: 97.20 min. Launched into an erroneous orbit. There was no communication with the satellite. Covered Oko constellation plane 6 - 115 degree longitude of ascending node..

1990 July 3 - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Failure. *Failed Stage*: U.

- **Yantar-4K1** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: UNKS. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. High resolution photo reconnaissance mission..

1990 July 11 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Gamma** - . *Payload*: Gamma s/n 1L. *Mass*: 7,350 kg (16,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Astronomy. *Type*: X-ray astronomy satellite. *Spacecraft*: Gamma. *Duration*: 1,388.41 days. *Decay Date*: 1992-02-28 . *USAF Sat Cat*: 20683 . *COSPAR*: 1990-058A. *Apogee*: 387 km (240 mi). *Perigee*: 382 km (237 mi). *Inclination*: 51.6000 deg. *Period*: 92.30 min.

Spacecraft mission was research in the field of high-energy (gamma/x-ray) astrophysics conducted jointly with France and Poland. The satellite was based on the Soyuz manned spacecraft and had an extremely long gestation - conceived in 1965, authorised in 1976, scheduled originally for launch in 1984, but further severe technical delays resulted in a 1990 launch.

1990 July 17 - . 09:29 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-07** - . *Payload*: Resurs-F2 17F42 s/n 5. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 30.00 days. *Decay Date*: 1990-08-16 . *USAF Sat Cat*: 20687 . *COSPAR*: 1990-060A. *Apogee*: 236 km (146 mi). *Perigee*: 177 km (109 mi). *Inclination*: 82.3000 deg. *Period*: 88.60 min. Investigation of the natural resources of the Earth in the interests of various branches of the national economy of the USSR; solution of problems relating to ecology and international cooperation. .

1990 July 20 - . 08:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2086** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1990-08-03 . *USAF Sat Cat*: 20702 . *COSPAR*: 1990-062A. *Apogee*: 220 km (130 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.50 min. Military cartographic satellite; returned film capsule..

1990 July 25 - . 18:13 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB.

- **Cosmos 2087** - . *Payload*: Oko #65. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 20707 . *COSPAR*: 1990-064A. *Apogee*: 36,991 km (22,985 mi). *Perigee*: 3,357 km (2,085 mi). *Inclination*: 67.5000 deg. *Period*: 717.60 min. Replaced Cosmos 2084. Covered Oko constellation plane 6 - 117 degree longitude of ascending node..

1990 August 1 - . 09:32 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-10** - . *Call Sign*: Vulkan (Volcano). *Crew*: Manakov, Strekalov. *Backup Crew*: Afanasyev, Manarov. *Payload*: Soyuz TM s/n 61A. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Afanasyev, Manakov, Manarov, Strekalov. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz

TM-10, Soyuz TM-9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 130.86 days. *Decay Date*: 1990-12-10 . *USAF Sat Cat*: 20722 . *COSPAR*: 1990-067A. *Apogee*: 219 km (136 mi). *Perigee*: 198 km (123 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

Manned two crew. Docked with Mir. Mir Expedition EO-07. Transported to the Mir manned orbital station the crew consisting of the cosmonauts G M Manakov and G M Strekalov for the purpose of carrying out a programme of geophysical and astrophysical research, biological and biotechnological experiments, and work on space-materials science.

1990 August 3 - . 19:45 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2089** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1990-10-01 . *USAF Sat Cat*: 20732 . *COSPAR*: 1990-069A. *Apogee*: 320 km (190 mi). *Perigee*: 187 km (116 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1990 August 10 - . 20:18 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-78** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2007-07-06 . *USAF Sat Cat*: 20742 . *COSPAR*: 1990-071A. *Apogee*: 39,251 km (24,389 mi). *Perigee*: 1,099 km (682 mi). *Inclination*: 63.8000 deg. *Period*: 717.70 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1990 August 15 - . 04:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-4** - . *Payload*: Progress M s/n 204. *Mass*: 7,294 kg (16,080 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 36.32 days. *Completed Operations Date*: 1990-09-20 11:43:08 . *Decay Date*: 1990-09-20 11:43:08 . *USAF Sat Cat*: 20752 . *COSPAR*: 1990-072A. *Apogee*: 219 km (136 mi). *Perigee*: 184 km (114 mi). *Inclination*: 51.6000 deg. *Period*: 88.50 min.

Unmanned resupply vessel to Mir. Delivered cables for rewiring operations and equipment for Soyuz TM-11 Japanese journalist flight. Docked with Mir on 17 Aug 1990 05:26:13 GMT. Undocked on 17 Sep 1990 12:42:43 GMT. Destroyed in reentry on 20 Sep 1990 11:42:49 GMT. Total free-flight time 5.02 days. Total docked time 31.30 days.

1990 August 16 - . 09:54 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-08** - . *Payload*: Resurs-F1 14F43 s/n 49. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 16.00 days. *Decay Date*: 1990-09-01 . *USAF Sat Cat*: 20754 . *COSPAR*: 1990-073A. *Apogee*: 229 km (142 mi). *Perigee*: 176 km (109 mi). *Inclination*: 82.3000 deg. *Period*: 88.50 min. Investigation of the natural resources of the Earth in the interests of various branches of the national economy of the USSR; solution of problems relating to ecology and international cooperation. .

1990 August 28 - . 07:49 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB.

- **Cosmos 2097** - . *Payload*: Oko #66. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2014-12-28 . *USAF Sat Cat*: 20767 . *COSPAR*: 1990-076A. *Apogee*: 37,021 km (23,003 mi). *Perigee*: 3,383 km (2,102 mi). *Inclination*: 66.5000 deg. *Period*: 718.80 min. Covered Oko constellation plane 3 - 357 degree longitude of ascending node..

1990 August 31 - . 08:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2099** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1990-09-14 . *USAF Sat Cat*: 20779 . *COSPAR*: 1990-080A. *Apogee*: 226 km (140 mi). *Perigee*: 175 km (108 mi). *Inclination*: 82.3000 deg. *Period*: 88.50 min. Military cartographic satellite; returned film capsule..

1990 September 7 - . 11:59 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-09** - . *Payload*: Resurs-F1 14F43 s/n 51. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 14.00 days. *Decay Date*: 1990-09-21 . *USAF Sat Cat*: 20794 . *COSPAR*: 1990-082A.

Apogee: 238 km (147 mi). *Perigee*: 177 km (109 mi). *Inclination*: 82.5000 deg. *Period*: 88.70 min. Carried German microgravity experiment. Investigation of the natural resources of the Earth in the interests of various branches of the national economy of the USSR; solution of problems relating to ecology and international cooperation. .

1990 September 20 - . 20:16 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-39** - . *Payload*: Molniya-3 s/n 54. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2009-07-08 . *USAF Sat Cat*: 20813 . *COSPAR*: 1990-084A. *Apogee*: 39,142 km (24,321 mi). *Perigee*: 1,209 km (751 mi). *Inclination*: 63.2000 deg. *Period*: 717.70 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1990 September 27 - . 10:37 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-5** - . *Payload*: Progress M s/n 206. *Mass*: 7,320 kg (16,130 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 62.02 days. *Completed Operations Date*: 1990-11-28 10:59:23 . *Decay Date*: 1990-11-28 10:59:23 . *USAF Sat Cat*: 20824 . *COSPAR*: 1990-085A. *Apogee*: 229 km (142 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. *Period*: 88.70 min.

  Unmanned resupply vessel to Mir. Included first Progress recoverable capsule for return of 150 kg of payload to earth. Docked with Mir on 29 Sep 1990 12:26:50 GMT. Undocked on 28 Nov 1990 06:15:46 GMT. After deorbit burn, capsule separated for reentry with an expected landing in Kazakhstan at 28 Nov 1990 11:04:05 GMT. However the recoverable capsule's beacon signal was never received after reentry. All experimental data and materials in capsule lost. Total free-flight time 2.28 days. Total docked time 59.74 days.

- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: UNKS. *Program*: Mir. *Flight*: Soyuz TM-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Decay Date*: 1990-11-28 . *USAF Sat Cat*: 20824 . *COSPAR*: 1990-085xx. *Apogee*: 406 km (252 mi). *Perigee*: 361 km (224 mi). *Inclination*: 51.6000 deg. *Period*: 92.20 min.

1990 October 1 - . 11:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Cosmos 2101** - . *Payload*: Orlets-1 no. 2. *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Orlets. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Orlets-1. *Duration*: 60.00 days. *Decay Date*: 1990-11-30 . *USAF Sat Cat*: 20828 . *COSPAR*: 1990-087A. *Apogee*: 304 km (188 mi). *Perigee*: 162 km (100 mi). *Inclination*: 64.8000 deg. *Period*: 89.20 min. Long duration film return military reconnaissance satellite. After returning multiple film capsules, the spacecraft was deorbited..

1990 October 16 - . 19:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2102** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 57.00 days. *Decay Date*: 1990-12-12 . *USAF Sat Cat*: 20909 . *COSPAR*: 1990-092A. *Apogee*: 340 km (210 mi). *Perigee*: 184 km (114 mi). *Inclination*: 62.9000 deg. *Period*: 89.80 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1990 November 16 - . 16:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2104** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 18.00 days. *Decay Date*: 1990-12-04 . *USAF Sat Cat*: 20936 . *COSPAR*: 1990-098A. *Apogee*: 364 km (226 mi). *Perigee*: 240 km (140 mi). *Inclination*: 62.8000 deg. *Period*: 90.60 min. Military cartographic satellite; returned film capsule..

1990 November 20 - . 02:33 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB.

- **Cosmos 2105** - . *Payload*: Oko #67. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2008-01-21 . *USAF Sat Cat*: 20941 . *COSPAR*: 1990-099A. *Apogee*: 38,453 km (23,893 mi). *Perigee*: 1,936 km (1,202 mi). *Inclination*: 65.0000 deg. *Period*: 718.50 min. Covered Oko constellation planes 3/4 - 12 degree longitude of ascending node..

1990 November 23 - . 03:51 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-79** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia.

Agency: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2005-08-30 . *USAF Sat Cat*: 20949 . *COSPAR*: 1990-101A. *Apogee*: 39,211 km (24,364 mi). *Perigee*: 1,126 km (699 mi). *Inclination*: 62.9000 deg. *Period*: 717.40 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1990 December 2 - . 08:13 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-11** - . *Call Sign*: Derbent (Derbent - Russian city). *Crew*: Afanasyev, Akiyama, Manarov. *Backup Crew*: Artsebarsky, Kikuchi, Krikalyov. *Payload*: Soyuz TM s/n 61. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Afanasyev, Akiyama, Artsebarsky, Kikuchi, Krikalyov, Manarov. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-10, Soyuz TM-11, Soyuz TM-11 Kosmoreporter. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 175.08 days. *Decay Date*: 1991-05-26 . *USAF Sat Cat*: 20981 . *COSPAR*: 1990-107A. *Apogee*: 400 km (240 mi). *Perigee*: 367 km (228 mi). *Inclination*: 51.6000 deg. *Period*: 92.20 min.

  Docked with Mir. Mir Expedition EO-08. Transported to the Mir manned orbital station the international crew consisting of the cosmonauts V M Afanasyev, M Kh Manarov, and T Akiyami (Japan) for the purpose of carrying out joint work with the cosmonauts G M Manakov and G M Strekalov. Launched jointly with the private Japanese company TBS. The Japanese television network ended up paying $ 28 million for the first commercial flight to Mir to put Akiyama, the first journalist in space aboard Soyuz TM-11. Akiyama made daily television broadcasts.

1990 December 4 - . 18:30 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2108** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 55.00 days. *Decay Date*: 1991-01-28 . *USAF Sat Cat*: 21000 . *COSPAR*: 1990-109A. *Apogee*: 289 km (179 mi). *Perigee*: 164 km (101 mi). *Inclination*: 62.8000 deg. *Period*: 89.00 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1990 December 21 - . 06:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1 or LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2113** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar.

Spacecraft: Yantar-4KS1. *Duration*: 172.00 days. *Decay Date*: 1991-06-11 . *USAF Sat Cat*: 21026 . *COSPAR*: 1990-113A. *Apogee*: 261 km (162 mi). *Perigee*: 225 km (139 mi). *Inclination*: 64.8000 deg. *Period*: 89.40 min. Photo/digital surveillance..

1990 December 26 - . 11:10 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2120** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 22.00 days. *Decay Date*: 1991-01-17 . *USAF Sat Cat*: 21035 . *COSPAR*: 1990-115A. *Apogee*: 336 km (208 mi). *Perigee*: 231 km (143 mi). *Inclination*: 82.6000 deg. *Period*: 90.20 min. Military cartographic satellite; returned film capsule..

1991 January 14 - . 14:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-6** - . *Payload*: Progress M s/n 205. *Mass*: 7,125 kg (15,707 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-11. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 60.14 days. *Completed Operations Date*: 1991-03-15 18:06:59 . *Decay Date*: 1991-03-15 18:06:59 . *USAF Sat Cat*: 21053 . *COSPAR*: 1991-002A. *Apogee*: 205 km (127 mi). *Perigee*: 188 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.40 min.

  Unmanned resupply vessel to Mir. Delivered new life support equipment to replace life-expired equipment aboard. Docked with Mir on 16 Jan 1991 16:35:25 GMT. Undocked on 15 Mar 1991 12:46:41 GMT. Destroyed in reentry on 15 Mar 1991 18:07:26 GMT. Total free-flight time 2.30 days. Total docked time 57.84 days.

1991 January 17 - . 10:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2121** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 24.00 days. *Decay Date*: 1991-02-10 . *USAF Sat Cat*: 21059 . *COSPAR*: 1991-004A. *Apogee*: 247 km (153 mi). *Perigee*: 165 km (102 mi). *Inclination*: 82.6000 deg. *Period*: 88.60 min. Military cartographic satellite; returned film capsule..

1991 February 7 - . 18:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2124** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar.

Spacecraft: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1991-04-07 . *USAF Sat Cat*: 21092 . *COSPAR*: 1991-008A. *Apogee*: 316 km (196 mi). *Perigee*: 186 km (115 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1991 February 15 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *Launch Pad*: LC1/LC31?. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2134** - . *Payload*: Yantar-1KFT no. 13. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 45.00 days. *Decay Date*: 1991-04-01 . *USAF Sat Cat*: 21116 . *COSPAR*: 1991-011A. *Apogee*: 306 km (190 mi). *Perigee*: 190 km (110 mi). *Inclination*: 64.7000 deg. *Period*: 89.50 min. Topographic mapping for the Army General Staff..

1991 February 15 - . 15:19 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-80** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 21118 . *COSPAR*: 1991-012A. *Apogee*: 37,317 km (23,187 mi). *Perigee*: 3,029 km (1,882 mi). *Inclination*: 64.4000 deg. *Period*: 717.60 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1991 March 6 - . 15:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2136** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1991-03-20 . *USAF Sat Cat*: 21143 . *COSPAR*: 1991-016A. *Apogee*: 314 km (195 mi). *Perigee*: 250 km (150 mi). *Inclination*: 62.8000 deg. *Period*: 90.20 min. Military cartographic satellite; returned film capsule..

1991 March 19 - . 13:05 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-7** - . *Payload*: Progress M s/n 208. *Mass*: 7,307 kg (16,109 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-11. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 49.18 days. *Completed Operations Date*: 1991-05-07 17:21:50 . *Decay*

Date: 1991-05-07 17:21:50 . *USAF Sat Cat*: 21188 . *COSPAR*: 1991-020A. *Apogee*: 213 km (132 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. *Period*: 88.50 min.

Unmanned resupply vessel to Mir. Attempted to dock with Mir on 21 March 1998 14:28 GMT, but missed the station by 500 m. Docking attempted again on 23 March but at 50 meters the docking was aborted; the Progress missed hitting the station by five meters. Thereafter it was placed in a station-keeping co-orbit with Mir while the problem was diagnosed. Finally docked with Mir on 28 Mar 1991 12:02:28 GMT. On 12 and 14 Apr 1998 two burns of the engine of Progress M-7 raised the station's orbit from a 360 x 377 km orbit to a 370 x 382 km orbit. Undocked on 6 May 1991 22:59:36 GMT. Destroyed in reentry on 7 May 1991 17:20:05 GMT. Total free-flight time 9.72 days. Total docked time 39.46 days.

- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: UNKS. *Program*: Mir. *Flight*: Soyuz TM-11. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *COSPAR*: 1991-020xx.

1991 March 22 - . 12:19 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-40** - . *Payload*: Molniya-3 s/n 55. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 21196 . *COSPAR*: 1991-022A. *Apogee*: 37,374 km (23,223 mi). *Perigee*: 2,948 km (1,831 mi). *Inclination*: 64.5000 deg. *Period*: 717.10 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network and within the framework of international cooperation. .

1991 March 26 - . 13:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2138** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1991-05-24 . *USAF Sat Cat*: 21203 . *COSPAR*: 1991-023A. *Apogee*: 343 km (213 mi). *Perigee*: 161 km (100 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1991 May 18 - . 12:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-12** - . *Call Sign*: Ozon (Ozone). *Crew*: Artsebarsky, Krikalyov, Sharman. *Backup Crew*: Kaleri, Mace, Timothy, Volkov, Aleksandr. *Payload*: Soyuz TM s/n 62.

Mass: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Artsebarsky, Kaleri, Krikalyov, Mace, Timothy, Sharman, Volkov, Aleksandr. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-11, Soyuz TM-12, Soyuz TM-12 Juno, Soyuz TM-12 Mir LD-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 144.64 days. *Decay Date*: 1991-10-10 . *USAF Sat Cat*: 21311 . *COSPAR*: 1991-034A. *Apogee*: 397 km (246 mi). *Perigee*: 389 km (241 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

Docked with Mir. Mir Expedition EO-09. Carried Anatoli Artsebarski, Sergei Krikalev, Helen Sharman to Mir; returned Artsebarski, crew of Soyuz TM 8 to Earth. Second commercial flight with paying British passenger. Sponsoring British consortium was not quite able to come up with money, however. Flight continued at Soviet expense with very limited UK experiments.

1991 May 21 - . 09:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-10** - . *Payload*: Resurs-F2 17F42 s/n 6. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 30.00 days. *Decay Date*: 1991-06-20 . *USAF Sat Cat*: 21313 . *COSPAR*: 1991-035A. *Apogee*: 242 km (150 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.70 min.

  Also carried microgravity experiments. Investigation of the natural resources of the earth in the interests of the various branches of the national economy of the USSR, and solution of problems relating to the environment and to international cooperation.

1991 May 24 - . 15:29 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2149** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 41.00 days. *Decay Date*: 1991-07-04 . *USAF Sat Cat*: 21315 . *COSPAR*: 1991-036A. *Apogee*: 285 km (177 mi). *Perigee*: 173 km (107 mi). *Inclination*: 67.1000 deg. *Period*: 89.10 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1991 May 30 - . 08:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-8** - . *Payload*: Progress M s/n 207. *Mass*: 7,296 kg (16,084 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-12, Soyuz TM-12 Mir LD-3. *Spacecraft Bus*: Soyuz.

Spacecraft: Progress M. *Duration*: 77.95 days. *Completed Operations Date*: 1991-08-16 07:02:29 . *Decay Date*: 1991-08-16 07:02:29 . *USAF Sat Cat*: 21395 . *COSPAR*: 1991-038A. *Apogee*: 396 km (246 mi). *Perigee*: 390 km (240 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min. Unmanned resupply vessel to Mir. Docked with Mir on 1 Jun 1991 09:44:37 GMT. Undocked on 15 Aug 1991 22:16:59 GMT. Destroyed in reentry on 16 Aug 1991 06:56:32 GMT. Total free-flight time 2.43 days. Total docked time 75.52 days..

- **Naduvaniy gazovoy ballon** - . *Payload*: Balloon subsatellite. *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Flight*: Soyuz TM-12, Soyuz TM-12 Mir LD-3. *Spacecraft*: NGB. *Decay Date*: 1991-08-29 . *USAF Sat Cat*: 21661 . *COSPAR*: 1986-017FJ. *Apogee*: 198 km (123 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.5000 deg. *Period*: 88.34 min. Balloon subsatellite..

1991 June 18 - . 09:09 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-81** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 21426 . *COSPAR*: 1991-043A. *Apogee*: 38,094 km (23,670 mi). *Perigee*: 2,262 km (1,405 mi). *Inclination*: 63.6000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1991 June 28 - . 08:09 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-11** - . *Payload*: Resurs-F1 14F43 s/n 52. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 23.00 days. *Decay Date*: 1991-07-21 . *USAF Sat Cat*: 21524 . *COSPAR*: 1991-044A. *Apogee*: 268 km (166 mi). *Perigee*: 253 km (157 mi). *Inclination*: 82.3000 deg. *Period*: 89.70 min. Investigation of the natural resources of the Earth in the interests of various branches of the national economy of the USSR; solution of problems relating to ecology and international cooperation. .

1991 July 9 - . 09:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2152** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1991-07-23 . *USAF Sat Cat*: 21558 . *COSPAR*: 1991-048A. *Apogee*: 234 km (145 mi). *Perigee*: 174 km (108 mi). *Inclination*:

82.4000 deg. *Period*: 88.60 min. Military cartographic satellite; returned film capsule..

1991 July 10 - . 14:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2153** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 247.00 days. *Decay Date*: 1992-03-13 . *USAF Sat Cat*: 21560 . *COSPAR*: 1991-049A. *Apogee*: 267 km (165 mi). *Perigee*: 182 km (113 mi). *Inclination*: 64.9000 deg. *Period*: 89.00 min. Photo/digital surveillance..

1991 July 23 - . 09:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-12** - . *Payload*: Resurs-F1 14F43 s/n 53. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 16.00 days. *Decay Date*: 1991-08-08 . *USAF Sat Cat*: 21611 . *COSPAR*: 1991-052A. *Apogee*: 230 km (140 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.4000 deg. *Period*: 88.60 min. Investigation of the natural resources of the earth in the interests of the various branches of the national economy of the USSR, and solution of problems relating to the environment and to international cooperation. .

1991 August 1 - . 11:53 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-82** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2004-10-09 . *USAF Sat Cat*: 21630 . *COSPAR*: 1991-053A. *Apogee*: 39,591 km (24,600 mi). *Perigee*: 763 km (474 mi). *Inclination*: 64.5000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita network. .

1991 August 20 - . 22:54 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-9** - . *Payload*: Progress M s/n 210. *Mass*: 7,311 kg (16,117 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-12, Soyuz TM-12 Mir LD-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 40.39 days. *Completed Operations Date*: 1991-10-01 08:24:38 . *Decay Date*: 1991-10-01 08:24:38 . *USAF Sat Cat*: 21662 . *COSPAR*: 1991-057A. *Apogee*: 230 km (140 mi). *Perigee*: 186 km (115 mi).

Inclination: 51.6000 deg. *Period*: 88.70 min.

Unmanned resupply vessel to Mir; carried reentry capsule for return of 150 kg of experiment results. Docked with Mir on 23 Aug 1991 00:54:17 GMT. Undocked on 30 Sep 1991 01:53:00 GMT. 350 kg return capsule detached from the Propess' orbital module at an altitude of 110 to 130 km. The capsule underwent a ballistic descent to 15 km, followed by a parachute descent from there to surface. The capsule's beacon began transmitting at 4.5 km. Landed in Kazakhstan on 30 Sep 1991 08:16:24 GMT. Total free-flight time 2.35 days. Total docked time 38.04 days.

- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: UNKS. *Program*: Mir. *Flight*: Soyuz TM-12, Soyuz TM-12 Mir LD-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *COSPAR*: 1991-057xx.

1991 August 21 - . 10:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-13** - . *Payload*: Resurs-F2 17F42 s/n 7. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 30.00 days. *Decay Date*: 1991-09-20 . *USAF Sat Cat*: 21664 . *COSPAR*: 1991-058A. *Apogee*: 240 km (140 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.3000 deg. *Period*: 88.70 min. Investigation of the natural resources of the earth in the interests of the various branches of the national economy of the USSR, and solution of problems relating to the environment and to international cooperation. .

1991 August 29 - . 06:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Vostok 8A92M.

- **IRS-1B** - . *Payload*: IRS 1B. *Mass*: 980 kg (2,160 lb). *Nation*: India. *Agency*: ISRO. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft*: IRS. *USAF Sat Cat*: 21688 . *COSPAR*: 1991-061A. *Apogee*: 919 km (571 mi). *Perigee*: 892 km (554 mi). *Inclination*: 99.0000 deg. *Period*: 103.10 min. Remote sensing; launched commercially by USSR. Operational remote sensing satellite for natural resources management. .

1991 September 17 - . 20:01 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-41** - . *Payload*: Molniya-3 s/n 48. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 21706 . *COSPAR*: 1991-065A. *Apogee*: 39,145 km (24,323 mi). *Perigee*: 1,209 km (751 mi). *Inclination*: 63.1000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system in the USSR; transmission of USSR Central Television programmes to stations in the Orbita

network and within the framework of international cooperation. .

1991 September 19 - . 16:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2156** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1991-11-17 . *USAF Sat Cat*: 21713 . *COSPAR*: 1991-066A. *Apogee*: 345 km (214 mi). *Perigee*: 160 km (90 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1991 October 2 - . 05:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-13** - . *Call Sign*: Donbass (Donbass - River Don basin). *Crew*: Aubakirov, Viehboeck, Volkov, Aleksandr. *Backup Crew*: Lothaller, Musabayev, Viktorenko. *Payload*: Soyuz TM s/n 63. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Aubakirov, Lothaller, Musabayev, Viehboeck, Viktorenko, Volkov, Aleksandr. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-12, Soyuz TM-12 Mir LD-3, Soyuz TM-13, Soyuz TM-13 Austromir. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 175.12 days. *Decay Date*: 1992-03-25 . *USAF Sat Cat*: 21735 . *COSPAR*: 1991-069A. *Apogee*: 232 km (144 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.7000 deg. *Period*: 88.80 min.

  Manned three crew. Docked with Mir. Mir Expedition EO-10. Transported to the Mir manned orbital station an international crew comprising the cosmonauts A Volkov (USSR), T Aubakirov (USSR) and F. Viehbock (Austria), to conduct joint scientific and technical research with the cosmonauts A. Artsebarsky and S Krikalev. Austria paid $ 7 million for mission. Kazakh cosmonaut added at last minute.

1991 October 4 - . 18:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton 7** - . *Payload*: Foton s/n 7L. *Mass*: 6,200 kg (13,600 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 15.54 days. *Decay Date*: 1991-10-20 . *USAF Sat Cat*: 21737 . *COSPAR*: 1991-070A. *Apogee*: 394 km (244 mi). *Perigee*: 214 km (132 mi). *Inclination*: 62.8000 deg. *Period*: 90.60 min. Materials research; carried German, French experiments. Continuation of space materials research conducted jointly with Germany and France. .

1991 October 9 - . 13:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Cosmos 2163** - . *Payload*: Orlets-1 no. 3. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Orlets. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Orlets-1. *Duration*: 58.00 days. *Decay Date*: 1991-12-07 . *USAF Sat Cat*: 21741 . *COSPAR*: 1991-071A. *Apogee*: 308 km (191 mi). *Perigee*: 169 km (105 mi). *Inclination*: 64.8000 deg. *Period*: 89.30 min. Long duration film return military reconnaissance satellite. After returning multiple film capsules, the spacecraft was deorbited..

1991 October 17 - . 00:05 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-10** - . *Payload*: Progress M s/n 211. *Mass*: 7,306 kg (16,106 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-12 Mir LD-3, Soyuz TM-13. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 95.50 days. *Completed Operations Date*: 1992-01-20 12:03:05 . *Decay Date*: 1992-01-20 12:03:05 . *USAF Sat Cat*: 21746 . *COSPAR*: 1991-073A. *Apogee*: 217 km (134 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.7000 deg. *Period*: 88.50 min.

  Unmanned resupply vessel to Mir. First attempted to dock with Mir on 19 October 1991. The docking was automatically aborted at a distance of 150 m from the station. Successfully docked with the forward port of Mir on on 21 Oct 1991 03:40:50 GMT. Unloading began next day. Undocked on 20 Jan 1992 07:13:44 GMT. Destroyed in reentry on 20 Jan 1992 12:03:30 GMT. Total free-flight time 4.35 days. Total docked time 91.15 days.

- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: UNKS. *Program*: Mir. *Flight*: Soyuz TM-12 Mir LD-3, Soyuz TM-13. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Decay Date*: 1992-01-20 . *USAF Sat Cat*: 21746 . *COSPAR*: 1991-073xx. *Apogee*: 378 km (234 mi). *Perigee*: 376 km (233 mi). *Inclination*: 51.6000 deg. *Period*: 92.10 min.

1991 November 20 - . 19:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2171** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1992-01-17 . *USAF Sat Cat*: 21787 . *COSPAR*: 1991-078A. *Apogee*: 321 km (199 mi). *Perigee*: 187 km (116 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1991 December 17 - . 11:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2174** - . *Payload*: Yantar-1KFT no. 14. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 44.00 days. *Decay Date*: 1992-01-30 . *USAF Sat Cat*: 21816 . *COSPAR*: 1991-085A. *Apogee*: 306 km (190 mi). *Perigee*: 193 km (119 mi). *Inclination*: 64.9000 deg. *Period*: 89.50 min. Topographic mapping for the Army General Staff..

1992 January 21 - . 15:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2175** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1992-03-20 . *USAF Sat Cat*: 21844 . *COSPAR*: 1992-001A. *Apogee*: 347 km (215 mi). *Perigee*: 158 km (98 mi). *Inclination*: 67.1000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1992 January 24 - . 01:18 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2176** - . *Payload*: Oko #68. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2012-01-17 . *USAF Sat Cat*: 21847 . *COSPAR*: 1992-003A. *Apogee*: 37,349 km (23,207 mi). *Perigee*: 3,058 km (1,900 mi). *Inclination*: 66.1000 deg. *Period*: 718.80 min. Covered Oko constellation plane 6 - 119 degree longitude of ascending node..

1992 January 25 - . 07:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-11** - . *Payload*: Progress M s/n 212. *Mass*: 7,320 kg (16,130 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-12 Mir LD-3, Soyuz TM-13. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 48.33 days. *Completed Operations Date*: 1992-03-13 13:13:31 . *Decay Date*: 1992-03-13 13:13:31 . *USAF Sat Cat*: 21851 . *COSPAR*: 1992-004A. *Apogee*: 227 km (141 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.6000 deg. *Period*: 88.60 min. Unmanned resupply vessel to Mir. Docked with Mir on 27 Jan 1992 09:30:43 GMT. Undocked on 13 Mar 1992 08:43:40 GMT. Destroyed in reentry on 13 Mar 1992 15:47:00 GMT. Total free-flight time 2.36 days. Total docked time 45.97 days..

1992 March 4 - . 04:27 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-83** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2007-07-01 . *USAF Sat Cat*: 21897 . *COSPAR*: 1992-011A. *Apogee*: 39,530 km (24,560 mi). *Perigee*: 823 km (511 mi). *Inclination*: 63.2000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio-communications system and transmission of Central Television programmes. .

1992 March 17 - . 10:54 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-14** - . *Call Sign*: Vityaz (Knight). *Crew*: Flade, Kaleri, Viktorenko. *Backup Crew*: Avdeyev, Ewald, Solovyov. *Payload*: Soyuz TM s/n 64. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Avdeyev, Ewald, Flade, Kaleri, Solovyov, Viktorenko. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-12 Mir LD-3, Soyuz TM-13, Soyuz TM-14, Soyuz TM-14 Mir 92. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 145.59 days. *Decay Date*: 1992-08-10 . *USAF Sat Cat*: 21908 . *COSPAR*: 1992-014A. *Apogee*: 394 km (244 mi). *Perigee*: 373 km (231 mi). *Inclination*: 51.6000 deg. *Period*: 92.20 min. Mir Expedition EO-11. Joint flight with Germany. Docked at the Kvant rear port at 12:33 GMT on March 19..

1992 April 1 - . 14:18 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2182** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1992-05-30 . *USAF Sat Cat*: 21920 . *COSPAR*: 1992-016A. *Apogee*: 284 km (176 mi). *Perigee*: 166 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.00 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1992 April 8 - . 12:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2183** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 314.00 days. *Decay Date*: 1993-02-16 . *USAF Sat Cat*: 21928 . *COSPAR*: 1992-018A. *Apogee*: 289 km (179 mi). *Perigee*: 237 km (147 mi). *Inclination*: 64.9000 deg. *Period*: 89.80 min. Photo/digital surveillance..

1992 April 19 - . 21:29 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-12** - . *Payload*: Progress M s/n 213. *Mass*: 7,320 kg (16,130 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-14. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 69.11 days. *Decay Date*: 1992-06-27 . *USAF Sat Cat*: 21946 . *COSPAR*: 1992-022A. *Apogee*: 394 km (244 mi). *Perigee*: 373 km (231 mi). *Inclination*: 51.6000 deg. *Period*: 92.20 min. Unmanned resupply vessel to Mir. Docked with Mir on 21 Apr 1992 23:21:59 GMT. Undocked on 27 Jun 1992 21:34:44 GMT. Destroyed in reentry on 28 Jun 1992 00:02:51 GMT. Total free-flight time 2.18 days. Total docked time 66.93 days..

- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: UNKS. *Program*: Mir. *Flight*: Soyuz TM-14. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *COSPAR*: 1992-022xx.

1992 April 29 - . 09:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-14** - . *Payload*: Resurs-F2 17F42 s/n 8. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 30.00 days. *Decay Date*: 1992-05-29 . *USAF Sat Cat*: 21951 . *COSPAR*: 1992-024A. *Apogee*: 230 km (140 mi). *Perigee*: 225 km (139 mi). *Inclination*: 82.1000 deg. *Period*: 89.10 min. Investigation of the natural resources of the Earth for the various branches of the national economy, the solution of environmental problems, and international cooperation. .

1992 April 29 - . 10:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2185** - . *Payload*: Yantar-1KFT no. 15. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 43.00 days. *Decay Date*: 1992-06-11 . *USAF Sat Cat*: 21953 . *COSPAR*: 1992-025A. *Apogee*: 274 km (170 mi). *Perigee*: 209 km (129 mi). *Inclination*: 70.0000 deg. *Period*: 89.30 min. Topographic mapping for the Army General Staff..

1992 May 28 - . 19:09 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2186** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 57.00 days. *Decay Date*: 1992-07-24 . *USAF Sat Cat*: 21973 . *COSPAR*: 1992-029A. *Apogee*: 327 km (203 mi). *Perigee*: 187 km (116 mi). *Inclination*: 62.8000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and

with the main capsule at completion of the mission..

1992 June 23 - . 08:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-15** - . *Payload*: Resurs-F1 14F43 s/n 55. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 16.00 days. *Decay Date*: 1992-07-09 . *USAF Sat Cat*: 21998 . *COSPAR*: 1992-033A. *Apogee*: 226 km (140 mi). *Perigee*: 177 km (109 mi). *Inclination*: 82.3000 deg. *Period*: 88.50 min. Capsule reentered 7/9/92. Investigation of the natural resources of the Earth in the interests of the various branches of the national economy. .

1992 June 30 - . 16:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-13** - . *Payload*: Progress M s/n 214. *Mass*: 7,320 kg (16,130 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-14. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 23.64 days. *Completed Operations Date*: 1992-07-24 08:08:22 . *Decay Date*: 1992-07-24 08:08:22 . *USAF Sat Cat*: 22004 . *COSPAR*: 1992-035A. *Apogee*: 226 km (140 mi). *Perigee*: 185 km (114 mi). *Inclination*: 51.6000 deg. *Period*: 88.60 min.

  Unmanned resupply vessel to Mir. An initial docking attempt on 2 Jul 1992 was a failure. Docked with Mir on 4 Jul 1992 16:55:13 GMT. Undocked on 24 Jul 1992 04:14:00 GMT. Destroyed in reentry on 24 Jul 1992 08:03:35 GMT. Total free-flight time 4.17 days. Total docked time 19.47 days. It was docked to Mir for only a few weeks, since on 26 Jul the Soyuz TM-15 was to be launched with a replacement crew and would need to use the same docking port.

1992 July 8 - . 09:53 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB.

- **Cosmos 2196** - . *Payload*: Oko #69. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2016-09-27 . *USAF Sat Cat*: 22017 . *COSPAR*: 1992-040A. *Apogee*: 36,915 km (22,937 mi). *Perigee*: 3,433 km (2,133 mi). *Inclination*: 67.1000 deg. *Period*: 717.70 min. Covered Oko constellation plane 5 - 75 degree longitude of ascending node..

1992 July 24 - . 19:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2203** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 60.00 days. *Decay Date*: 1992-09-22 . *USAF Sat Cat*: 22052 . *COSPAR*: 1992-045A. *Apogee*: 311 km (193 mi). *Perigee*: 189 km (117 mi). *Inclination*: 62.8000 deg. *Period*: 89.50 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1992 July 27 - . 06:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-15** - . *Call Sign*: Rodnik (Spring - water spring). *Crew*: Avdeyev, Solovyov, Tognini. *Backup Crew*: Haignere, Manakov, Poleshchuk. *Payload*: Soyuz TM s/n 65. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Avdeyev, Haignere, Manakov, Poleshchuk, Solovyov, Tognini. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-14, Soyuz TM-15, Soyuz TM-15 Antares. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 188.90 days. *Decay Date*: 1993-02-01 . *USAF Sat Cat*: 22054 . *COSPAR*: 1992-046A. *Apogee*: 216 km (134 mi). *Perigee*: 196 km (121 mi). *Inclination*: 51.6000 deg. *Period*: 88.60 min.

  Mir Expedition EO-12. Russian astronauts Solovyov and Avdeev and French astronaut Tognini were inserted into an initial 190 x 200 km orbit inclined 51.6 deg. Later on July 27 they maneuvered to a 223 x 343 km orbit, and on July 28 docked with Mir in its 405 x 410 km orbit.

1992 July 30 - . 11:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2207** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1992-08-13 . *USAF Sat Cat*: 22062 . *COSPAR*: 1992-048A. *Apogee*: 233 km (144 mi). *Perigee*: 180 km (110 mi). *Inclination*: 82.4000 deg. *Period*: 88.60 min. Military cartographic satellite; returned film capsule..

1992 August 6 - . 19:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-84** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2008-04-04 . *USAF Sat Cat*: 22068 . *COSPAR*: 1992-050A. *Apogee*: 39,294 km (24,416 mi). *Perigee*: 1,060 km (650 mi). *Inclination*: 63.0000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system, transmission of television programmes to stations in the

Orbita network. .

1992 August 15 - . 22:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-14** - . *Payload*: Progress M s/n 209. *Mass*: 7,176 kg (15,820 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 67.04 days. *Completed Operations Date*: 1992-10-22 23:12:40 . *Decay Date*: 1992-10-22 23:12:40 . *USAF Sat Cat*: 22090 . *COSPAR*: 1992-055A. *Apogee*: 221 km (137 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.5000 deg. *Period*: 88.60 min.

  Unmanned resupply vessel to Mir. Progress M-38 was specially modified to carry the first VDU (Vynosnaya Dvigatel'naya Ustanovka, External Engine Unit) propulsion unit. The VDU was mounted externally on a special structure between the cargo module and the service module, replacing the OKD fuel section present on normal Progress vehicles. The crew spacewalked to extract the VDU from Progress and place it on the end of the Sofora boom extending from the Kvant module. The VDU was used to provide attitude control capability for the Mir station. Docked with Mir on 18 Aug 1992 00:20:48 GMT. Undocked on 21 Oct 1992 16:46:01 GMT. Destroyed in reentry on 21 Oct 1992 23:12:00 GMT. Total free-flight time 2.35 days. Total docked time 64.68 days.

- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: VKS. *Program*: Mir. *Flight*: Soyuz TM-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *COSPAR*: 1992-055xx.

1992 August 19 - . 10:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-16** - . *Payload*: Resurs-F1 14F43 s/n 54. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 16.00 days. *Decay Date*: 1992-09-04 . *USAF Sat Cat*: 22093 . *COSPAR*: 1992-056A. *Apogee*: 226 km (140 mi). *Perigee*: 178 km (110 mi). *Inclination*: 82.6000 deg. *Period*: 88.60 min.

  Carried US Dept. of Defense experiment. Investigation of the natural resources of the Earth in the interests of the various branches of the national economy and solution of problems relating to the environment and to international cooperation (the satellite's equipment included two Pion passive satellites for the investigation of the upper atmosphere).

- **Pion 2** - . *Payload*: Pion-Germes-2. *Mass*: 50 kg (110 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Atmosphere satellite. *Spacecraft*: Pion. *Decay Date*:

1992-09-24 . *USAF Sat Cat*: 22100 . *COSPAR*: 1992-056D. *Apogee*: 229 km (142 mi). *Perigee*: 218 km (135 mi). *Inclination*: 82.6000 deg. *Period*: 89.00 min. Deployed from Resurs F16; examined how upper atmosphere affects spacecraft reentries. .

- **Pion 1** - . *Payload*: Pion-Germes-1. *Mass*: 50 kg (110 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Atmosphere satellite. *Spacecraft*: Pion. *Decay Date*: 1992-09-25 . *USAF Sat Cat*: 22099 . *COSPAR*: 1992-056C. *Apogee*: 229 km (142 mi). *Perigee*: 219 km (136 mi). *Inclination*: 82.6000 deg. *Period*: 89.00 min. Deployed from Resurs F16; examined how upper atmosphere affects spacecraft reentries. .

1992 September 22 - . 16:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2210** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1992-11-20 . *USAF Sat Cat*: 22133 . *COSPAR*: 1992-062A. *Apogee*: 353 km (219 mi). *Perigee*: 160 km (90 mi). *Inclination*: 67.2000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1992 October 8 - . 19:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton 8** - . *Payload*: Foton s/n 8L. *Mass*: 6,200 kg (13,600 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 15.60 days. *Decay Date*: 1992-10-24 . *USAF Sat Cat*: 22173 . *COSPAR*: 1992-065A. *Apogee*: 359 km (223 mi). *Perigee*: 218 km (135 mi). *Inclination*: 62.8000 deg. *Period*: 90.30 min. 250 orbits. Microgravity research. Space materials research (conducted jointly with Germany)..

1992 October 14 - . 19:58 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB.

- **Molniya 3-42** - . *Payload*: Molniya-3 s/n 50. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 22178 . *COSPAR*: 1992-067A. *Apogee*: 38,190 km (23,730 mi). *Perigee*: 2,167 km (1,346 mi). *Inclination*: 64.0000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system, transmission of television programmes to stations in the Orbita network and international cooperation. .

1992 October 21 - . 10:21 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB.

- **Cosmos 2217** - . *Payload*: Oko #70. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2010-11-07 . *USAF Sat Cat*: 22189 . *COSPAR*: 1992-069A. *Apogee*: 36,700 km (22,800 mi). *Perigee*: 3,642 km (2,263 mi). *Inclination*: 67.1000 deg. *Period*: 717.50 min. Covered Oko constellation plane 8 - 201 degree longitude of ascending node..

1992 October 27 - . 17:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-15** - . *Payload*: Progress M s/n 215. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 102.56 days. *Completed Operations Date*: 1993-02-07 06:54:51 . *Decay Date*: 1993-02-07 06:54:51 . *USAF Sat Cat*: 22203 . *COSPAR*: 1992-071A. *Apogee*: 205 km (127 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.40 min.

  Unmanned resupply vessel to Mir. Docked with Mir on 29 Oct 1992 19:05:51 GMT. Undocked on 4 Feb 1993 00:44:53 GMT. After completion of the Znamya and autonomous operation experiments, destroyed in reentry on 7 Feb 1993 06:43:20 GMT. Total free-flight time 5.32 days. Total docked time 97.24 days.

- **Znamya-2** - . *Payload*: Znamya-2. *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Flight*: Soyuz TM-15. *Spacecraft*: Znamya. *Decay Date*: 1993-02-05 . *USAF Sat Cat*: 22449 . *COSPAR*: 1992-071C. *Apogee*: 393 km (244 mi). *Perigee*: 389 km (241 mi). *Inclination*: 51.6000 deg. *Period*: 92.38 min. Reflector mirror, deployed from Progress M-15 after separation from Mir space station..

- **Mak 2** - . *Payload*: Mak. *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Earth. *Type*: Atmosphere satellite. *Flight*: Soyuz TM-15. *Spacecraft*: Mak. *Decay Date*: 1993-04-01 . *USAF Sat Cat*: 22225 . *COSPAR*: 1986-017GX. *Apogee*: 398 km (247 mi). *Perigee*: 394 km (244 mi). *Inclination*: 51.6000 deg. *Period*: 92.50 min. Deployed from MIR on 11/20/92. Launched from Mir airlock. Conduct of experiments to study physical processes in the Earth's ionosphere. Small satellite launched from the Mir station. .

1992 November 15 - . 21:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs-500** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 6.00 days. *Decay Date*: 1992-11-22 . *USAF Sat Cat*: 22217 . *COSPAR*: 1992-075A. *Apogee*: 237 km (147 mi). *Perigee*: 177 km (109 mi). *Inclination*: 82.6000 deg. *Period*: 88.60 min.

Carried descent module with greetings to American people. Delivery of a humanitarian cargo (messages to the American people, promotional materials of Russian and foreign firms, etc.) to the United States of America in connection with the 500th anniversary of the discovery of America by Columbus.

1992 November 20 - . 15:29 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2220** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 59.00 days. *Decay Date*: 1993-01-18 . *USAF Sat Cat*: 22226 . *COSPAR*: 1992-077A. *Apogee*: 341 km (211 mi). *Perigee*: 164 km (101 mi). *Inclination*: 67.2000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1992 November 25 - . 12:18 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB.

- **Cosmos 2222** - . *Payload*: Oko #71. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 22238 . *COSPAR*: 1992-081A. *Apogee*: 35,026 km (21,764 mi). *Perigee*: 5,330 km (3,310 mi). *Inclination*: 67.1000 deg. *Period*: 717.80 min. Covered Oko constellation plane 1 - 270 degree longitude of ascending node..

1992 December 2 - . 01:57 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M-PVB.

- **Molniya 3-43** - . *Payload*: Molniya-3 s/n 56. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2008-11-08 . *USAF Sat Cat*: 22255 . *COSPAR*: 1992-085A. *Apogee*: 39,109 km (24,301 mi). *Perigee*: 1,169 km (726 mi). *Inclination*: 64.2000 deg. *Period*: 716.20 min. Operation of the long-range telephone and telegraph radio communications system, transmission of television programmes to stations in the Orbita network and international cooperation. .

1992 December 9 - . 11:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2223** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 372.00 days. *Decay Date*: 1993-12-16 . *USAF Sat Cat*: 22260 . *COSPAR*: 1992-087A. *Apogee*: 271 km (168 mi). *Perigee*: 238 km (147 mi). *Inclination*: 64.6000 deg. *Period*: 89.60 min. Photo/digital surveillance..

1992 December 22 - . 12:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2225** - . *Payload*: Orlets-1 no. 4. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Orlets. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Orlets-1. *Duration*: 58.00 days. *Decay Date*: 1993-02-18 . *USAF Sat Cat*: 22280 . *COSPAR*: 1992-091A. *Apogee*: 313 km (194 mi). *Perigee*: 169 km (105 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. Long duration film return military reconnaissance satellite. After returning multiple film capsules, the spacecraft was deorbited..

1992 December 29 - . 13:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2229** - . *Payload*: Bion no. 10. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 12.00 days. *Decay Date*: 1993-01-10 . *USAF Sat Cat*: 22300 . *COSPAR*: 1992-095A. *Apogee*: 372 km (231 mi). *Perigee*: 216 km (134 mi). *Inclination*: 62.8000 deg. *Period*: 90.40 min.

  Biological research; carried monkeys Ivasha and Krosha. International study of the adaptation of living organisms to conditions of space flight. After 12 days in Earth orbit, the capsule was recovered 50 deg 46 min N, 73 deg 08 min E, about 100 kilometers north of the city of Karaganda. The Cosmos 2229 mission was also referred to as Bion 10, because it was the tenth in a series of Soviet/Russian unmanned satellites carrying biological experiments. *Additional Details*: here....

1993 January 13 - . 01:49 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-85** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2005-11-15 . *USAF Sat Cat*: 22309 . *COSPAR*: 1993-002A. *Apogee*: 39,822 km (24,744 mi). *Perigee*: 528 km (328 mi). *Inclination*: 63.4000 deg. *Period*: 717.70 min. Operation of the long-range telephone and telegraph radio communications system, transmission of television programmes to stations in the Orbita network. Replaced Molniya 1-78..

1993 January 19 - . 14:49 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2231** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 65.00 days. *Decay Date*: 1993-03-25 . *USAF Sat*

Cat: 22317 . *COSPAR*: 1993-004A. *Apogee*: 342 km (212 mi). *Perigee*: 163 km (101 mi). *Inclination*: 67.2000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1993 January 24 - . 05:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-16** - . *Call Sign*: Vulkan (Volcano). *Crew*: Manakov, Poleshchuk. *Backup Crew*: Serebrov, Tsibliyev. *Payload*: Soyuz TM s/n 101. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Manakov, Poleshchuk, Serebrov, Tsibliyev. *Agency*: RAKA. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-15, Soyuz TM-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 179.03 days. *Decay Date*: 1993-07-22 . *USAF Sat Cat*: 22319 . *COSPAR*: 1993-005A. *Apogee*: 394 km (244 mi). *Perigee*: 393 km (244 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

  Manned two crew. Mir Expedition EO-13. Transported to the Mir manned orbital station a crew of the thirteenth main expedition comprising the cosmonauts G M Manakov and A F Poleschuk.The Soyuz carried the APAS androgynous docking system instead of the usual probe system.

1993 January 26 - . 15:55 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2232** - . *Payload*: Oko #72. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 22321 . *COSPAR*: 1993-006A. *Apogee*: 35,870 km (22,280 mi). *Perigee*: 4,502 km (2,797 mi). *Inclination*: 67.6000 deg. *Period*: 718.10 min. Covered Oko constellation plane 4 - 34 degree longitude of ascending node..

1993 February 21 - . 18:32 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-16** - . *Payload*: Progress M s/n 216. *Mass*: 7,338 kg (16,177 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 33.65 days. *Completed Operations Date*: 1993-03-27 10:05:12 . *Decay Date*: 1993-03-27 10:05:12 . *USAF Sat Cat*: 22530 . *COSPAR*: 1993-012A. *Apogee*: 234 km (145 mi). *Perigee*: 189 km (117 mi). *Inclination*: 51.7000 deg. *Period*: 88.70 min.

  Unmanned resupply vessel to Mir. Docked with Mir on 23 Feb 1993 20:17:57 GMT. Undocked on 26 Mar 1993 06:50:00 GMT. Redocked with Mir on 1993-03-26 07:06:03 GMT. Final undocking on 1993-03-27 04:21:00 GMT. Destroyed in reentry on 27 Mar 1993 10:25:00 GMT. Total free-flight time 2.33 days. Total docked time

31.32 days.

1993 March 31 - . 03:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-17** - . *Payload*: Progress M s/n 217. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 337.00 days. *Completed Operations Date*: 1994-03-03 03:29:47 . *Decay Date*: 1994-03-03 03:29:47 . *USAF Sat Cat*: 22588 . *COSPAR*: 1993-019A. *Apogee*: 365 km (226 mi). *Perigee*: 362 km (224 mi). *Inclination*: 51.6000 deg. *Period*: 91.80 min.

  Unmanned resupply vessel to Mir. Conducted docked and undocked longevity spacecraft longevity tests. Docked with Mir on 1 Apr 1993 05:16:18 GMT. Undocked on 11 Aug 1993 15:36:42 GMT. Destroyed in reentry over the South Atlantic on 3 Mar 1994 03:28:00 GMT. Total free-flight time 204.56 days. Total docked time 132.43 days.

1993 April 2 - . 14:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2240** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 66.00 days. *Decay Date*: 1993-06-07 . *USAF Sat Cat*: 22592 . *COSPAR*: 1993-021A. *Apogee*: 320 km (190 mi). *Perigee*: 188 km (116 mi). *Inclination*: 62.8000 deg. *Period*: 89.60 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1993 April 6 - . 19:07 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2241** - . *Payload*: Oko #73. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 22594 . *COSPAR*: 1993-022A. *Apogee*: 36,804 km (22,868 mi). *Perigee*: 3,564 km (2,214 mi). *Inclination*: 66.0000 deg. *Period*: 718.00 min. Covered Oko constellation plane 7 - 161 degree longitude of ascending node..

1993 April 21 - . 00:23 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-44** - . *Payload*: Molniya-3 s/n 57. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay*

Date: 2004-01-25 . *USAF Sat Cat*: 22633 . *COSPAR*: 1993-025A. *Apogee*: 39,603 km (24,608 mi). *Perigee*: 744 km (462 mi). *Inclination*: 62.9000 deg. *Period*: 717.70 min. Operation of the long-range telephone and telegraph radio communications system, transmission of television programmes to stations in the Orbita network and international cooperation. Replaced Molniya 3-41..

1993 April 27 - . 10:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2243** - . *Payload*: Yantar-1KFT no. 16. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 9.00 days. *Decay Date*: 1993-05-06 . *USAF Sat Cat*: 22641 . *COSPAR*: 1993-028A. *Apogee*: 233 km (144 mi). *Perigee*: 189 km (117 mi). *Inclination*: 70.4000 deg. *Period*: 88.70 min. Topographic mapping for the Army General Staff. Mission normally would have run 44 days..

1993 May 21 - . 09:15 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-17** - . *Payload*: Resurs-F2 17F42 s/n 9. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 30.00 days. *Decay Date*: 1993-06-20 . *USAF Sat Cat*: 22663 . *COSPAR*: 1993-033A. *Apogee*: 255 km (158 mi). *Perigee*: 176 km (109 mi). *Inclination*: 82.6000 deg. *Period*: 88.80 min. Investigation of the natural resources of the Earth for the various branches of the national economy, the solution of environmental problems, and international cooperation. .

1993 May 22 - . 06:41 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-18** - . *Payload*: Progress M s/n 218. *Mass*: 7,348 kg (16,199 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 43.44 days. *Completed Operations Date*: 1993-07-04 17:14:25 . *Decay Date*: 1993-07-04 17:14:25 . *USAF Sat Cat*: 22666 . *COSPAR*: 1993-034A. *Apogee*: 240 km (140 mi). *Perigee*: 188 km (116 mi). *Inclination*: 51.6000 deg. *Period*: 88.80 min.

  Unmanned resupply vessel to Mir. Last launch using Soyuz-U2 launch vehicle. Docked with Mir's front port on 24 May 1993 08:24:44 GMT. In addition to other supplies, carried repair equipment for a spacewalk device damaged a month before. Undocked on 3 Jul 1993 15:58:16 GMT, with Soyuz TM-17 docking at the same port only minutes later at 17:45 GMT. Meanwhile, Progress M-17 remained docked to the Kvant rear port on a longevity test. Progress M-18 was destroyed in reentry on 4 Jul

1993 17:13:00 GMT. Total free-flight time 3.12 days. Total docked time 40.31 days.

- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: VKS. *Program*: Mir. *Flight*: Soyuz TM-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *COSPAR*: 1993-034xx.

1993 May 26 - . 03:23 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-86** - . *Payload*: Molniya-1T s/n 81. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 22671 . *COSPAR*: 1993-035A. *Apogee*: 38,681 km (24,035 mi). *Perigee*: 1,676 km (1,041 mi). *Inclination*: 64.1000 deg. *Period*: 717.80 min. Operation of the long-range telephone and telegraph radio communications system, transmission of television programmes to stations in the Orbita network. Replaced Molniya 1-81..

1993 June 25 - . 08:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-18** - . *Payload*: Resurs-F1 14F43 s/n 57. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 17.00 days. *Decay Date*: 1993-07-12 . *USAF Sat Cat*: 22696 . *COSPAR*: 1993-040A. *Apogee*: 240 km (140 mi). *Perigee*: 173 km (107 mi). *Inclination*: 82.6000 deg. *Period*: 88.60 min. Investigation of the natural resources of the Earth in the interests of various branches of the national economy; solution of problems relating to ecology and international cooperation. .

1993 July 1 - . 14:32 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-17** - . *Call Sign*: Sirius (Sirius). *Crew*: Haignere, Serebrov, Tsibliyev. *Backup Crew*: Afanasyev, Andre-Deshays, Usachyov. *Payload*: Soyuz TM s/n 66. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Afanasyev, Andre-Deshays, Haignere, Serebrov, Tsibliyev, Usachyov. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-16, Soyuz TM-17, Soyuz TM-17 Altair. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 196.74 days. *Decay Date*: 1994-02-14 . *USAF Sat Cat*: 22704 . *COSPAR*: 1993-043A. *Apogee*: 397 km (246 mi). *Perigee*: 388 km (241 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

  Mir Expedition EO-14. Carried Vasili Tsibliyev, Alexander Serebrov, Jean-Pierre Haignere to Mir; returned Serebrov, Tsibliyev to Earth. Progress M-18 undocked from Mir's front port at around 17:25 GMT on July 3, and Soyuz TM-17 docked at the same port only 20 minutes later at 17:45 GMT.

1993 July 14 - . 16:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2259** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 11.00 days. *Decay Date*: 1993-07-25 . *USAF Sat Cat*: 22716 . *COSPAR*: 1993-045A. *Apogee*: 349 km (216 mi). *Perigee*: 168 km (104 mi). *Inclination*: 67.1000 deg. *Period*: 89.70 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1993 July 22 - . 08:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2260** - . *Payload*: Zenit-8 / Oblik no. 3. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 14.00 days. *Decay Date*: 1993-08-05 . *USAF Sat Cat*: 22721 . *COSPAR*: 1993-047A. *Apogee*: 224 km (139 mi). *Perigee*: 177 km (109 mi). *Inclination*: 82.3000 deg. *Period*: 88.50 min.

  Military cartographic satellite; returned film capsule. Also photography of the earth's surface for the purpose of the natural resource mapping and area monitoring on behalf of various branches of the Russian economy and in the interests of international cooperation. Alternate name: Resurs-T.

1993 August 4 - . 00:52 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-45** - . *Payload*: Molniya-3 s/n 58. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2013-12-31 . *USAF Sat Cat*: 22729 . *COSPAR*: 1993-049A. *Apogee*: 37,920 km (23,560 mi). *Perigee*: 2,500 km (1,500 mi). *Inclination*: 64.4000 deg. *Period*: 719.10 min. Operation of the long range telephone and telegraph radio-communications system. Replaced Molniya 3-37..

1993 August 10 - . 14:53 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2261** - . *Payload*: Oko #74. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2012-12-31 . *USAF Sat Cat*: 22741 . *COSPAR*: 1993-051A. *Apogee*: 35,967 km (22,348 mi). *Perigee*: 4,370 km (2,710 mi). *Inclination*: 66.6000 deg. *Period*: 717.40 min. Covered Oko constellation plane 9 - 235 degree longitude of ascending node..

1993 August 10 - . 22:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-19** - . *Payload*: Progress M s/n 219. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-17. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 69.08 days. *Completed Operations Date*: 1993-10-20 00:17:41 . *Decay Date*: 1993-10-20 00:17:41 . *USAF Sat Cat*: 22745 . *COSPAR*: 1993-052A. *Apogee*: 223 km (138 mi). *Perigee*: 179 km (111 mi). *Inclination*: 51.8000 deg. *Period*: 88.50 min. Unmanned resupply vessel to Mir. Docked with Mir at the Kvant rear port on 13 Aug 1993 00:00:06 GMT. Undocked on 13 Oct 1993 17:59:06 GMT. Destroyed in reentry on 19 Oct 1993 00:22:14 GMT. Total free-flight time 7.33 days. Total docked time 61.75 days..
- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: VKS. *Program*: Mir. *Flight*: Soyuz TM-17. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *COSPAR*: 1993-052xx.

1993 August 24 - . 10:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-19** - . *Payload*: Resurs-F1 14F43 s/n 56. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1-14F43. *Duration*: 17.00 days. *Decay Date*: 1993-09-10 . *USAF Sat Cat*: 22777 . *COSPAR*: 1993-053A. *Apogee*: 236 km (146 mi). *Perigee*: 174 km (108 mi). *Inclination*: 82.6000 deg. *Period*: 88.60 min. Investigation of the natural resources of the Earth in the interests of various branches of the national economy; solution of problems relating to ecology and international cooperation. .

1993 September 7 - . 13:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Cosmos 2262** - . *Payload*: Orlets-1 no. 5. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Orlets. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Orlets-1. *Duration*: 102.00 days. *Decay Date*: 1993-12-18 . *USAF Sat Cat*: 22789 . *COSPAR*: 1993-057A. *Apogee*: 261 km (162 mi). *Perigee*: 182 km (113 mi). *Inclination*: 64.9000 deg. *Period*: 88.90 min. Long duration film return military reconnaissance satellite. After returning multiple film capsules, the spacecraft was deorbited. First launch that demonstrated doubled operational life..

1993 October 11 - . 21:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-20** - . *Payload*: Progress M s/n 220. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-17. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 40.48 days. *Decay Date*: 1993-11-21 . *USAF Sat Cat*: 22867 . *COSPAR*: 1993-064A. *Apogee*: 226 km (140 mi). *Perigee*: 187 km (116 mi). *Inclination*: 51.8000 deg. *Period*: 88.60 min.

  Unmanned resupply vessel to Mir, carried a Raduga reentry capsule for return of experimental materials to earth. Docked with Mir on 13 Oct 1993 23:24:46 GMT. Undocked on 21 Nov 1993 02:38:43 GMT. Capsule landed in Kazakhstan on 21 Nov 1993 09:06:00 GMT. Total free-flight time 2.35 days. Total docked time 38.13 days.

- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: VKS. *Program*: Mir. *Flight*: Soyuz TM-17. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *COSPAR*: 1993-064xx.

1993 November 5 - . 08:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2267** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 418.00 days. *Decay Date*: 1994-12-28 . *USAF Sat Cat*: 22904 . *COSPAR*: 1993-071A. *Apogee*: 281 km (174 mi). *Perigee*: 228 km (141 mi). *Inclination*: 70.4000 deg. *Period*: 89.60 min. Photo/digital surveillance..

1993 December 22 - . 20:37 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-87** - . *Payload*: Molniya-1T. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 22949 . *COSPAR*: 1993-079A. *Apogee*: 38,716 km (24,056 mi). *Perigee*: 1,668 km (1,036 mi). *Inclination*: 64.5000 deg. *Period*: 718.40 min. Operation of the long range telephone and telegraph radio-communications system. Replaced Molniya 1-77..

1994 January 8 - . 10:05 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-18** - . *Call Sign*: Derbent (Derbent - Russian city). *Crew*: Afanasyev, Polyakov, Usachyov. *Backup Crew*: Arzamazov, Malenchenko, Strekalov. *Payload*: Soyuz TM s/n 67. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Afanasyev, Arzamazov, Malenchenko, Polyakov, Strekalov, Usachyov. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-17, Soyuz TM-18, Soyuz TM-18 Mir LD-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 182.02 days. *Decay Date*: 1994-07-09 . *USAF Sat Cat*: 22957 .

COSPAR: 1994-001A. *Apogee*: 335 km (208 mi). *Perigee*: 244 km (151 mi). *Inclination*: 51.6000 deg. *Period*: 90.10 min. Mir Expedition EO-15. Docked at the Kvant module on January 10 at 11:15 GMT. Transported to the Mir orbital station of a crew comprising the cosmonauts V M Afanasev, Y V Usachev, and V V Polyakov for the fifteenth main expedition..

1994 January 28 - . 02:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-21** - . *Payload*: Progress M s/n 221. *Mass*: 7,130 kg (15,710 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-18, Soyuz TM-18 Mir LD-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 54.13 days. *Completed Operations Date*: 1994-03-21 05:24:50 . *Decay Date*: 1994-03-21 05:24:50 . *USAF Sat Cat*: 22975 . *COSPAR*: 1994-005A. *Apogee*: 236 km (146 mi). *Perigee*: 194 km (120 mi). *Inclination*: 51.6000 deg. *Period*: 88.50 min. Unmanned resupply vessel to Mir. Docked with Mir on 30 Jan 1994 03:56:13 GMT. Undocked on 23 Mar 1994 01:20:29 GMT. Destroyed in reentry on 23 Mar 1994 05:13:00 GMT. Total free-flight time 2.23 days. Total docked time 51.89 days..

1994 March 17 - . 16:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *Launch Pad*: LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2274** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 65.00 days. *Decay Date*: 1994-05-21 . *USAF Sat Cat*: 23033 . *COSPAR*: 1994-018A. *Apogee*: 372 km (231 mi). *Perigee*: 176 km (109 mi). *Inclination*: 67.0000 deg. *Period*: 89.70 min.

  This space object is intended for assignments on behalf of the Ministry of Defense of the Russian Federation. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission.

1994 March 22 - . 04:54 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-22** - . *Payload*: Progress M s/n 222. *Mass*: 7,103 kg (15,659 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-18, Soyuz TM-18 Mir LD-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 61.99 days. *Completed Operations Date*: 1994-05-23 04:48:12 . *Decay Date*: 1994-05-23 04:48:12 . *USAF Sat Cat*: 23035 . *COSPAR*: 1994-019A. *Apogee*: 335 km (208 mi). *Perigee*: 260 km (160 mi). *Inclination*: 51.7000 deg. *Period*: 90.20 min.

  Unmanned resupply vessel to Mir. Launched into an initial 192 x 238 x 51.6 km

orbit. Docked with Mir on 24 Mar 1994 06:39:37 GMT. Fired its engine around 15 May to raise the orbit of the Mir station from 381 x 400 km to 398 x 399 km. Undocked on 23 May 1994 00:58:38 GMT. Destroyed in reentry on 23 May 1994 04:40:00 GMT. Total free-flight time 2.23 days. Total docked time 59.76 days.

1994 April 28 - . 17:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2280** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 316.00 days. *Decay Date*: 1995-03-10 . *USAF Sat Cat*: 23095 . *COSPAR*: 1994-025A. *Apogee*: 283 km (175 mi). *Perigee*: 233 km (144 mi). *Inclination*: 70.4000 deg. *Period*: 89.70 min. Photo/digital surveillance..

1994 May 22 - . 04:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Progress M-23** - . *Payload*: Progress M s/n 223. *Mass*: 7,117 kg (15,690 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-18, Soyuz TM-18 Mir LD-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 41.44 days. *Decay Date*: 1994-07-02 . *USAF Sat Cat*: 23114 . *COSPAR*: 1994-031A. *Apogee*: 399 km (247 mi). *Perigee*: 397 km (246 mi). *Inclination*: 51.6000 deg. *Period*: 92.52 min.

  Unmanned resupply vessel to Mir, with Raduga return capsule. Docked with Mir on 24 May 1994 06:18:35 GMT. Undocked on 2 Jul 1994 08:46:49 GMT. The braking engine was ignited at 14:44 GMT, and the Raduga VBK reentry capsule was ejected at 14:55:45 GMT. The Progress burnt up in the atmosphere at 14:57 GMT. The Raduga deployed its parachute after reentry and landed on 2 Jul 1994 15:09:00 GMT at 51 deg 41 min N, 59 deg 21 min E, in the Orenburg region. Total free-flight time 2.34 days. Total docked time 39.10 days.

- **VBK Raduga** - . *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: VKS. *Program*: Mir. *Flight*: Soyuz TM-18, Soyuz TM-18 Mir LD-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *COSPAR*: 1994-031xx.

1994 June 7 - . 07:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2281** - . *Payload*: Zenit-8 / Oblik no. 4. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Zenit-8. *Duration*: 22.00 days. *Decay Date*: 1994-07-29 . *USAF Sat Cat*: 23119 . *COSPAR*: 1994-032A. *Apogee*: 293 km (182 mi). *Perigee*: 236 km (146 mi). *Inclination*: 82.5000 deg. *Period*: 89.80 min.

  Military cartographic satellite; returned film capsule. Also photography of the earth's

surface for the purpose of the natural resource mapping and area monitoring on behalf of various branches of the Russian economy and in the interests of international cooperation. Landed July 29.

1994 June 14 - . 16:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton 9** - . *Payload*: Foton s/n 9. *Mass*: 6,200 kg (13,600 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 17.56 days. *Decay Date*: 1994-07-02 . *USAF Sat Cat*: 23122 . *COSPAR*: 1994-033A. *Apogee*: 358 km (222 mi). *Perigee*: 220 km (130 mi). *Inclination*: 62.8000 deg. *Period*: 90.30 min. Microgravity experiments. Landed July 2..

1994 July 1 - . 12:24 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-19** - . *Call Sign*: Agat (Agate). *Crew*: Malenchenko, Musabayev. *Backup Crew*: Dezhurov, Strekalov. *Payload*: Soyuz TM s/n 68. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Dezhurov, Malenchenko, Musabayev, Strekalov. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-18, Soyuz TM-18 Mir LD-4, Soyuz TM-19. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 125.95 days. *Decay Date*: 1994-11-04 . *USAF Sat Cat*: 23139 . *COSPAR*: 1994-036A. *Apogee*: 397 km (246 mi). *Perigee*: 396 km (246 mi). *Inclination*: 51.6000 deg. *Period*: 92.49 min. Mir Expedition EO-16. Soyuz TM-19 docked at the rear port of the Kvant module (vacated by Progress M-23 on July 2) at 13:55:01 GMT on July 3..

1994 July 20 - . 17:35 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *Launch Pad*: LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2283** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 71.00 days. *Decay Date*: 1994-09-29 . *USAF Sat Cat*: 23182 . *COSPAR*: 1994-042A. *Apogee*: 313 km (194 mi). *Perigee*: 179 km (111 mi). *Inclination*: 67.1000 deg. *Period*: 89.42 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1994 July 29 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2284** - . *Payload*: Yantar-1KFT no. 17. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 44.00 days. *Decay Date*:

1994-09-11 . *USAF Sat Cat*: 23187 . *COSPAR*: 1994-044A. *Apogee*: 274 km (170 mi). *Perigee*: 211 km (131 mi). *Inclination*: 70.3000 deg. *Period*: 89.35 min. Topographic mapping for the Army General Staff. Landed September 11 1994..

1994 August 5 - . 01:12 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2286** - . *Payload*: Oko #75. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 23194 . *COSPAR*: 1994-048A. *Apogee*: 36,384 km (22,607 mi). *Perigee*: 3,982 km (2,474 mi). *Inclination*: 67.5000 deg. *Period*: 718.00 min. Covered Oko constellation plane 5 - 78 degree longitude of ascending node..

1994 August 23 - . 14:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *Launch Pad*: LC43/4?. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-3-46** - . *Payload*: Molniya-3 s/n 60. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2009-02-10 . *USAF Sat Cat*: 23211 . *COSPAR*: 1994-051A. *Apogee*: 38,837 km (24,132 mi). *Perigee*: 1,518 km (943 mi). *Inclination*: 64.9000 deg. *Period*: 717.80 min. Replaced Molniya 3-40. As of 1994, the Molniya 3 constellation consisted of Molniya 3-36, 3-38, 3-39, 3-42, 3-43, 3-44, 3-45, and 3-46..

1994 August 25 - . 14:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-24** - . *Payload*: Progress M s/n 224. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-18 Mir LD-4, Soyuz TM-19. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 40.35 days. *Completed Operations Date*: 1994-10-04 22:41:48 . *Decay Date*: 1994-10-04 22:41:48 . *USAF Sat Cat*: 23215 . *COSPAR*: 1994-052A. *Apogee*: 397 km (246 mi). *Perigee*: 394 km (244 mi). *Inclination*: 51.6000 deg. *Period*: 92.47 min.

  Unmanned resupply vessel to Mir. Failed to dock with Mir on 27 Aug 1994. A second automatic docking attempt on 30 Aug 1994 also failed and the Progress collided with the Kvant module. A third and final attempt, manually controlled by Mir commander Yuriy Malenchenko, was successful on 2 Sep 1994 13:30:28 GMT. The Mir commander and flight engineer, Yuriy Malenchenko and Talgat Musabaev, made a spacewalk on 9 Sep 1994 to inspect the damage to the Kvant module made when the Progress collided with Kvant. Undocked on 4 Oct 1994 18:55:52 GMT, leaving the rear docking port free for Soyuz TM-20. Destroyed in reentry over the Pacific at 38.4 deg S, 137.4 deg W,on 4 Oct 1994 22:43:00 GMT. Total free-flight time 8.12 days. Total docked time 32.23 days.

1994 October 3 - . 22:42 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-20** - . *Call Sign*: Vityaz (Knight). *Crew*: Kondakova, Merbold, Viktorenko. *Backup Crew*: Budarin, Reiter, Solovyov. *Payload*: Soyuz TM s/n 69. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Budarin, Kondakova, Merbold, Reiter, Solovyov, Viktorenko. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-18 Mir LD-4, Soyuz TM-19, Soyuz TM-20, Soyuz TM-20 Euromir 94. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 169.22 days. *Decay Date*: 1995-03-02 . *USAF Sat Cat*: 23288 . *COSPAR*: 1994-063A. *Apogee*: 395 km (245 mi). *Perigee*: 392 km (243 mi). *Inclination*: 51.6000 deg. *Period*: 92.43 min.

  Mir Expedition EO-17. Docked at the Mir forward port at 00:28 on 1994 October 6. The Mir crew of Viktorenko, Kondakova and Polyakov boarded Soyuz TM-20 on January 11, and undocked from Mir's front port at 09:00 GMT. The spacecraft withdrew to about two hundred metres from Mir and then redocked in a test of the automatic Kurs system, which had failed in Progress M-24's attempted docking. Redocking came at 09:25 GMT.

1994 November 11 - . 07:21 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-25** - . *Payload*: Progress M s/n 225. *Mass*: 7,125 kg (15,707 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-18 Mir LD-4, Soyuz TM-20. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 97.39 days. *Decay Date*: 1995-02-16 . *USAF Sat Cat*: 23348 . *COSPAR*: 1994-075A. *Apogee*: 394 km (244 mi). *Perigee*: 391 km (242 mi). *Inclination*: 51.6000 deg. *Period*: 92.41 min. Unmanned resupply vessel to Mir. Docked with Mir on 13 Nov 1994 09:04:29 GMT. Undocked on 16 Feb 1995 13:03:00 GMT. Destroyed in reentry on 16 Feb 1995 16:45:00 GMT. Total free-flight time 2.23 days. Total docked time 95.17 days..

1994 December 14 - . 14:21 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-1-88** - . *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 23420 . *COSPAR*: 1994-081A. *Apogee*: 38,562 km (23,961 mi). *Perigee*: 1,795 km (1,115 mi). *Inclination*: 64.1000 deg. *Period*: 717.80 min. Molniya 188, relieved Molniya 1-82 of its duties. At the end of 1994, operational Molniya satellites were 1-79, 1-80, and 1-83 through 1-88..

1994 December 29 - . 11:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2305** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 354.00 days. *Decay Date*: 1995-12-18 . *USAF Sat Cat*: 23453 . *COSPAR*: 1994-088A. *Apogee*: 288 km (178 mi). *Perigee*: 231 km (143 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. Photo/digital surveillance..

1995 February 15 - . 16:48 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-26** - . *Payload*: Progress M s/n 226. *Mass*: 7,139 kg (15,738 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-18 Mir LD-4, Soyuz TM-20. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 27.56 days. *Completed Operations Date*: 1995-03-15 06:14:32 . *Decay Date*: 1995-03-15 06:14:32 . *USAF Sat Cat*: 23477 . *COSPAR*: 1995-005A. *Apogee*: 396 km (246 mi). *Perigee*: 391 km (242 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min. Unmanned resupply vessel to Mir. Docked with Mir on 17 Feb 1995 18:21:34 GMT. Undocked on 15 Mar 1995 02:26:38 GMT. Destroyed in reentry over the Pacific Ocean on 15 Mar 1995 06:15:00 GMT. Total free-flight time 2.22 days. Total docked time 25.34 days..

1995 February 16 - . 17:39 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *Launch Pad*: LC43/4?. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton 10** - . *Payload*: Foton s/n 10. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 14.62 days. *Decay Date*: 1995-03-03 . *USAF Sat Cat*: 23497 . *COSPAR*: 1995-006A. *Apogee*: 355 km (220 mi). *Perigee*: 218 km (135 mi). *Inclination*: 62.8000 deg. *Period*: 90.30 min. 234 orbits. Carried Russian, French, German micro-gravity experiments. Landed in Russia Mar 3.

1995 March 14 - . 06:11 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-21** - . *Call Sign*: Uragan (Hurricane). *Crew*: Dezhurov, Strekalov, Thagard. *Backup Crew*: Avdeyev, Dunbar, Gidzenko. *Payload*: Soyuz TM s/n 70. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Avdeyev, Dezhurov, Dunbar, Gidzenko, Strekalov, Thagard. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-18 Mir LD-4, Soyuz TM-20, Soyuz TM-21. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 181.03 days. *Decay Date*: 1995-09-11 . *USAF Sat Cat*: 23519 . *COSPAR*: 1995-010A. *Apogee*: 398 km (247 mi). *Perigee*: 392 km (243 mi). *Inclination*: 51.6000 deg. *Period*: 92.50 min.

  Mir Expedition EO-18. Soyuz TM-21 carried the EO-18 Mir crew and American

Norman Thagard. Thagard was the first American to be launched in a Soyuz. Soyuz docked with Mir at 07:45:26 GMT on March 16 . On July 4 Soyuz TM-21 undocked and backed off to a distance of 100 m from Mir. The US space shuttle Atlantis, with the EO-18 crew aboard, then undocked and began a flyaround at a distance of 210 m, while the EO-19 crew aboard Soyuz took pictures before redocking with the station. Soyuz TM-21 again undocked with the EO-19 crew on September 11 from the Kvant rear port on Mir and landed at 50 deg 41'N 68 deg 15'E, 108 km northeast of Arkalyk in Kazakhstan, at 06:52:40 GMT .

1995 March 22 - . 16:44 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2311** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 70.00 days. *Decay Date*: 1995-05-31 . *USAF Sat Cat*: 23530 . *COSPAR*: 1995-014A. *Apogee*: 316 km (196 mi). *Perigee*: 178 km (110 mi). *Inclination*: 67.1000 deg. *Period*: 89.40 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1995 April 9 - . 19:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-27** - . *Payload*: Progress M s/n 227. *Mass*: 7,170 kg (15,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-21. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 43.33 days. *Completed Operations Date*: 1995-05-23 03:27:40 . *Decay Date*: 1995-05-23 03:27:40 . *USAF Sat Cat*: 23555 . *COSPAR*: 1995-020A. *Apogee*: 399 km (247 mi). *Perigee*: 396 km (246 mi). *Inclination*: 51.6000 deg. *Period*: 92.50 min.

  Unmanned resupply vessel to Mir; carried GFZ-1 German sub-satellite to Mir. Docked with Mir on 11 Apr 1995 21:00:44 GMT. Undocked on 22 May 1995 23:42:37 GMT. Destroyed in reentry on 23 May 1995 03:27:52 GMT. Total free-flight time 2.22 days. Total docked time 41.11 days.

- **GFZ-1** - . *Mass*: 20 kg (44 lb). *Nation*: Germany. *Agency*: GFZ. *Program*: Mir. *Class*: Earth. *Type*: Geodetic satellite. *Flight*: Soyuz TM-21. *Spacecraft*: GFZ-1. *Decay Date*: 1999-06-23 . *USAF Sat Cat*: 23558 . *COSPAR*: 1986-017JE. *Apogee*: 387 km (240 mi). *Perigee*: 380 km (230 mi). *Inclination*: 51.6000 deg. Geodetic; carried retroreflectors for ground laser ranging; delivered to Mir on Progress M-27 and deployed from Mir 4/19/95 ..

1995 May 24 - . 20:10 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2312** - . *Payload*: Oko #76. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2013-09-23 . *USAF Sat Cat*: 23584 . *COSPAR*: 1995-026A. *Apogee*: 36,472 km (22,662 mi). *Perigee*: 3,890 km (2,410 mi). *Inclination*: 67.0000 deg. *Period*: 717.90 min. Covered Oko constellation planes 2/3 - 332 degree longitude of ascending node..

1995 June 28 - . 18:25 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2314** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 70.00 days. *Decay Date*: 1995-09-06 . *USAF Sat Cat*: 23601 . *COSPAR*: 1995-031A. *Apogee*: 316 km (196 mi). *Perigee*: 175 km (108 mi). *Inclination*: 67.1000 deg. *Period*: 89.40 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1995 July 20 - . 03:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-28** - . *Payload*: Progress M s/n 228. *Mass*: 7,125 kg (15,707 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-71 Mir EO-19. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 46.25 days. *Completed Operations Date*: 1995-09-04 08:58:14 . *Decay Date*: 1995-09-04 08:58:14 . *USAF Sat Cat*: 23617 . *COSPAR*: 1995-036A. *Apogee*: 398 km (247 mi). *Perigee*: 393 km (244 mi). *Inclination*: 51.7000 deg. *Period*: 92.50 min.

  Unmanned resupply vessel to Mir. Docked with Mir's front port on 22 Jul 1995 04:39:37 GMT. Undocked on 4 Sep 1995 05:09:53 GMT. Destroyed in reentry on 4 Sep 1995 08:58:55 GMT. Total free-flight time 2.22 days. Total docked time 44.02 days. Two Icons of Saint Anastasia were taken into space aboard the craft and transferred to the Mir station where they remained for about seven months. They were returned to earth, apparently aboard Soyuz TM-22, and later shown in diffent shrines around the world.

1995 August 2 - . 23:59 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Interbol 1** - . *Payload*: SO-M2 s/n 511. *Mass*: 1,250 kg (2,750 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz-M. *Decay Date*: 2000-10-16 . *USAF Sat Cat*: 23632 . *COSPAR*: 1995-039A. *Apogee*: 188,331 km (117,023 mi). *Perigee*: 4,426 km (2,750 mi). *Inclination*: 68.2000 deg. *Period*: 5,461.60 min. Particles and fields research. Paired with Magion 4

subsatellite..

- **Magion 4** - . *Payload*: S2. *Mass*: 50 kg (110 lb). *Nation*: Czech Republic. *Agency*: VKS. *Program*: Intercosmos. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Magion. *USAF Sat Cat*: 23646 . *COSPAR*: 1995-039F. *Apogee*: 175,449 km (109,018 mi). *Perigee*: 17,068 km (10,605 mi). *Inclination*: 70.3000 deg. *Period*: 5,454.00 min. Deployed from Interbol-1 on 8/3/95; solar wind studies in conjunction with Interbol-1..

1995 August 9 - . 01:21 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-3-47** - . *Payload*: Molniya-3 s/n 59. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 23642 . *COSPAR*: 1995-042A. *Apogee*: 39,142 km (24,321 mi). *Perigee*: 1,216 km (755 mi). *Inclination*: 64.2000 deg. *Period*: 717.80 min. Voice and TV coverage..

1995 September 3 - . 09:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz TM-22** - . *Call Sign*: Uran (Uranus). *Crew*: Avdeyev, Gidzenko, Reiter. *Backup Crew*: Duque, Kaleri, Korzun. *Payload*: Soyuz TM s/n 71. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Avdeyev, Duque, Gidzenko, Kaleri, Korzun, Reiter. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-22, STS-71 Mir EO-19. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 179.07 days. *Decay Date*: 1996-02-29 . *USAF Sat Cat*: 23665 . *COSPAR*: 1995-047A. *Apogee*: 398 km (247 mi). *Perigee*: 391 km (242 mi). *Inclination*: 51.7000 deg. *Period*: 92.50 min.

  Mir Expedition EO-20. Crew commander was Yuriy Pavlovich Gidzenko of the Russian Air Force. Flight engineer was Sergey Vasilyevich Avdeev of RKK Energiya, and cosmonaut-researcher was Thomas Reiter of the European Space Agency. Soyuz TM-22 docked with Mir's front (-X) port at 10:29:54 GMT on September 5 and the hatch was opened at 11:01:23.

1995 September 26 - . 11:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F2 N.10** - . *Payload*: Resurs-F2 s/n 10. *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F2. *Duration*: 30.00 days. *Decay Date*: 1995-10-26 . *USAF Sat Cat*: 23672 . *COSPAR*: 1995-050A. *Apogee*: 277 km (172 mi). *Perigee*: 255 km (158 mi). *Inclination*: 82.3000 deg. *Period*: 89.80 min. Natural resources; photo capsule recovered in Russia on 10/26/95..

1995 September 29 - . 04:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2320** - . *Mass*: 7,000 kg (15,400 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Duration*: 365.00 days. *Decay Date*: 1996-09-28 . *USAF Sat Cat*: 23674 . *COSPAR*: 1995-051A. *Apogee*: 372 km (231 mi). *Perigee*: 235 km (146 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. Photo/digital surveillance..

1995 October 8 - . 18:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-29** - . *Payload*: Progress M s/n 229. *Mass*: 7,122 kg (15,701 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-22. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 71.89 days. *Completed Operations Date*: 1995-12-19 16:15:20 . *Decay Date*: 1995-12-19 16:15:20 . *USAF Sat Cat*: 23678 . *COSPAR*: 1995-053A. *Apogee*: 400 km (240 mi). *Perigee*: 391 km (242 mi). *Inclination*: 51.6000 deg. *Period*: 92.50 min.

  Unmanned resupply vessel to Mir. Launched into an initial 194 x 242 km x 51.7 deg orbit. Docked with Mir's rear of the Kvant module port on 10 Oct 1995 20:32:40 GMT (Soyuz TM-22 was docked to the front port). Undocked on 19 Dec 1995 09:15:05 GMT. Destroyed in reentry on 19 Dec 1995 16:15:00 GMT. Total free-flight time 2.36 days. Total docked time 69.53 days.

1995 December 18 - . 14:31 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-30** - . *Payload*: Progress M s/n 230. *Mass*: 7,068 kg (15,582 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-22. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 65.85 days. *Decay Date*: 1996-02-22 . *USAF Sat Cat*: 23744 . *COSPAR*: 1995-070A. *Apogee*: 409 km (254 mi). *Perigee*: 391 km (242 mi). *Inclination*: 51.7000 deg. *Period*: 92.60 min. Unmanned resupply vessel to Mir. Docked with Mir on 20 Dec 1995 16:10:15 GMT. Undocked on 22 Feb 1996 07:30:02 GMT. Destroyed in reentry on 22 Feb 1996 11:02:36 GMT. Total free-flight time 2.22 days. Total docked time 63.64 days..

1995 December 28 - . 06:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **IRS-1C** - . *Mass*: 1,250 kg (2,750 lb). *Nation*: India. *Agency*: ISRO. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft*: IRS. *USAF Sat Cat*: 23751 . *COSPAR*: 1995-072A. *Apogee*: 820 km (500 mi). *Perigee*: 819 km (508 mi). *Inclination*:

98.6000 deg. *Period*: 101.30 min. Indian Remote Sensing Satellite..

- **Skipper** - . *Mass*: 250 kg (550 lb). *Nation*: Russia. *Agency*: BMDO. *Class*: Technology. *Type*: Navigation technology satellite. *Spacecraft*: Skipper. *USAF Sat Cat*: 23752 . *COSPAR*: 1995-072B. *Apogee*: 813 km (505 mi). *Perigee*: 804 km (499 mi). *Inclination*: 98.6000 deg. *Period*: 101.10 min. Aerobraking investigation; satellite provided by Russia, instruments by Utah State University; solar array shorted immediately following deployment and ended mission..

1996 - . *LV Family*: R-7. *Launch Vehicle*: Soyuz-U2.

- **Soyuz 11A511U2 booster abandoned due to Sintin production stoppage** - . *Nation*: Russia. Soyuz 11A511U2 used synthetic kerosene ('Sintin') in the first stage for launch of premium reconnaisance satellite and manned payloads requiring just a bit more payload than the standard 11A511..

1996 February 21 - . 12:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-23** - . *Call Sign*: Skif (Roman-age tribe). *Crew*: Onufrienko, Usachyov. *Backup Crew*: Lazutkin, Tsibliyev. *Payload*: Soyuz TM s/n 72. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Lazutkin, Onufrienko, Tsibliyev, Usachyov. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-22, Soyuz TM-23. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 193.80 days. *Decay Date*: 1996-09-02 . *USAF Sat Cat*: 23798 . *COSPAR*: 1996-011A. *Apogee*: 390 km (240 mi). *Perigee*: 375 km (233 mi). *Inclination*: 51.7000 deg. *Period*: 92.20 min. Mir Expedition EO-21. Soyuz TM-23 docked with Mir at 14:20:35 on February 23..

1996 March 14 - . 17:40 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2331** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MOM. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 89.00 days. *Decay Date*: 1996-06-11 . *USAF Sat Cat*: 23818 . *COSPAR*: 1996-016A. *Apogee*: 291 km (180 mi). *Perigee*: 159 km (98 mi). *Inclination*: 67.1000 deg. *Period*: 89.00 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission..

1996 May 5 - . 07:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-31** - . *Payload*: Progress M s/n 231. *Mass*: 7,140 kg (15,740 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics

spacecraft. *Flight*: Soyuz TM-23, STS-76 Mir NASA-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 88.56 days. *Completed Operations Date*: 1996-08-01 20:32:45 . *Decay Date*: 1996-08-01 20:32:45 . *USAF Sat Cat*: 23860 . *COSPAR*: 1996-028A. *Apogee*: 390 km (240 mi). *Perigee*: 376 km (233 mi). *Inclination*: 51.7000 deg. *Period*: 92.20 min.

Unmanned resupply vessel to Mir. Delivered 1,140 kg of fuel and 1,700 kg of cargo to the Mir complex. Docked with Mir on 7 May 1996 08:54:19 GMT. Undocked on 1 Aug 1996 16:44:54 GMT. Destroyed in reentry over the Pacific on 1 Aug 1996 20:33:03 GMT. Total free-flight time 2.23 days. Total docked time 86.33 days.

1996 May 14 - . 08:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Shroud broke up at T+49 seconds.. *Failed Stage*: S.

- **Kometa** - . *Payload*: Yantar-1KFT no. 18. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: VKS. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. Topographic mapping satellite failed to reach orbit..

1996 June 20 - . 18:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Shroud broke up at T+50seconds.. *Failed Stage*: S.

- **Yantar-4K1** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: VKS. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. High resolution photo reconnaissance mission..

1996 July 31 - . 20:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-32** - . *Payload*: Progress M s/n 232. *Mass*: 7,130 kg (15,710 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-23, STS-76 Mir NASA-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 96.11 days. *Completed Operations Date*: 1996-11-04 22:47:04 . *Decay Date*: 1996-11-04 22:47:04 . *USAF Sat Cat*: 24071 . *COSPAR*: 1996-043A. *Apogee*: 390 km (240 mi). *Perigee*: 371 km (230 mi). *Inclination*: 51.7000 deg. *Period*: 92.20 min.

  Unmanned resupply vessel to Mir. This was the first successful launch of a Soyuz-U after two failures. Docked with Mir at the forward docking port on 2 Aug 1996 22:03:40 GMT. Undocked on 18 Aug 1996 09:33:45 GMT in order to free up the docking port. By 29 August 1994 Mir was in a 375 x 390 km x 51.6 deg orbit; the Progress M-32 cargo ship, flying separately, was in a 375 x 392 km x 51.6 deg orbit. Redocked with Mir on 3 Sep 1996 09:35:00 GMT at the rear port of the Kvant module. Finally undocked from Mir on 20 Nov 1996 19:51:20 GMT. Destroyed in

reentry on 20 Nov 1996 22:42:25 GMT. Total free-flight time 2.20 days. Total docked time 93.91 days.

1996 August 14 - . 22:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-1T** - . *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2012-04-07 . *USAF Sat Cat*: 24273 . *COSPAR*: 1996-045A. *Apogee*: 39,391 km (24,476 mi). *Perigee*: 968 km (601 mi). *Inclination*: 64.1000 deg. *Period*: 717.90 min.

1996 August 17 - . 13:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-24** - . *Call Sign*: Fregat (Frigate). *Crew*: Andre-Deshays, Kaleri, Korzun. *Backup Crew*: Eyharts, Lazutkin, Tsibliyev. *Payload*: Soyuz TM s/n 73. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Related Persons*: Andre-Deshays, Eyharts, Kaleri, Korzun, Lazutkin, Tsibliyev. *Agency*: RAKA. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-23, Soyuz TM-24, Soyuz TM-24 Cassiopee, STS-76 Mir NASA-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 196.73 days. *Decay Date*: 1997-03-02 . *USAF Sat Cat*: 24280 . *COSPAR*: 1996-047A. *Apogee*: 394 km (244 mi). *Perigee*: 378 km (234 mi). *Inclination*: 51.7000 deg. *Period*: 92.30 min.

  Mir Expedition EO-22. Valeriy Korzun and Aleksandr Kaleri of the Russian Space Agency (RKA) Claudie Andre-Deshays of the French space agency CNES. This launch was the first of the Soyuz-U booster with a crew aboard following two launch failures of on unmanned flights. Soyuz docked with Mir's front port at 14:50:21 GMT on August 19; Mir was in a 375 x 390 km x 51.6 deg orbit.

  On Feb 7 at 16:28:01 GMT the EO-22 crew and American astronaut Linenger undocked the Soyuz TM-24 ferry from the front docking port, flew it around to the far side of the complex and redocked at the rear Kvant port at 16:51:27 GMT. This cleared the forward port for the arrival of the EO-23 crew, who brought with them German astronaut Reinhold Ewald on Feb 12.

1996 August 29 - . 05:22 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Microsat** - . *Payload*: Victor. *Mass*: 32 kg (70 lb). *Nation*: Argentina. *Agency*: Cordoba. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: MuSat. *Decay Date*: 1999-11-12 . *USAF Sat Cat*: 24291 . *COSPAR*: 1996-050A. *Apogee*: 19,176 km (11,915 mi). *Perigee*: 804 km (499 mi). *Inclination*: 62.8000 deg. *Period*: 94.70 min.

  MuSat-1 Victor separated from the launch vehicle at 05:31 GMT, becoming the first

Argentine-built satellite. Measuring 340 x 340 x 450mm."Victor " was an experimental vehicle, intended to evaluate in-orbit behaviour of low-cost space technologies. It carried two video cameras, oriented for earth-imaging, as well as transceivers in both UHF and S bands. The beacon could be heard every 90 seconds at 137.95 MHz as a brief burst of CW ("Hi hi de MUSAT"). Electrical power was provided by four 88-Si cells solar panels, with an end-of-life electrical power of 8 W. Its position was determined by means of a 3-axis, flux-gate magnetometer, as well as both solar and horizon sensors, while its attitude was 3-axis controlled by magnetic coils and reaction wheels, with a pointing precision of 0.5 deg. MuSat-1 was developed and built by a 25-person team at the Instituto Universitario Aeronautico, under the sponsorship of the government of the province of Cordoba, in a 3.5 year, $1.2 million effort.

- **Interbol 2** - . *Payload*: SO-M2 s/n 512. *Mass*: 1,400 kg (3,000 lb). *Nation*: Russia. *Agency*: VKS. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Prognoz-M. *USAF Sat Cat*: 24293 . *COSPAR*: 1996-050C. *Apogee*: 18,604 km (11,559 mi). *Perigee*: 1,369 km (850 mi). *Inclination*: 63.6000 deg. *Period*: 347.20 min. Auroral research. Paired with Magion 5 subsatellite..

- **Magion 5** - . *Payload*: S2. *Mass*: 58 kg (127 lb). *Nation*: Czech Republic. *Agency*: RAKA. *Program*: Intercosmos. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Magion. *USAF Sat Cat*: 24292 . *COSPAR*: 1996-050B. *Apogee*: 18,608 km (11,562 mi). *Perigee*: 1,366 km (848 mi). *Inclination*: 63.6000 deg. *Period*: 347.20 min. The S2-A Magion 5 sub-satellite deployed from Interbol-2 on 30 August 1996 and conducted auroral studies in conjunction with Interbol-2. It was believed lost due to a solar panel failure until it was revived on the 14 May 1998..

1996 October 24 - . 11:37 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-3-48** - . *Payload*: Molniya-3 s/n 62. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2007-10-18 . *USAF Sat Cat*: 24640 . *COSPAR*: 1996-060A. *Apogee*: 38,520 km (23,930 mi). *Perigee*: 1,837 km (1,141 mi). *Inclination*: 64.9000 deg. *Period*: 717.80 min.

1996 November 19 - . 23:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-33** - . *Payload*: Progress M s/n 233. *Mass*: 7,190 kg (15,850 lb). *Nation*: Russia. *Agency*: RAKA. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-24, STS-79 Mir NASA-2. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 112.17 days. *Completed Operations Date*: 1997-03-12 03:22:59 . *Decay Date*: 1997-03-12 03:22:59 . *USAF Sat Cat*: 24663 . *COSPAR*: 1996-066A. *Apogee*: 387 km (240 mi). *Perigee*: 361 km (224 mi).

Inclination: 51.7000 deg. *Period*: 92.00 min.

Unmanned resupply vessel to Mir. Docked with Mir on 22 Nov 1996 01:01:30 GMT. Undocked on 6 Feb 1997 12:13:53 GMT. Thereafter in independent orbital flight in a 377 x 395 km x 51.65 deg orbit. Failed to redock with Mir on 4 Mar 1996. Destroyed in reentry on 12 Mar 1997 03:23:37 GMT. Total free-flight time 35.70 days. Total docked time 76.47 days.

1996 December 24 - . 13:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Bion No. 11** - . *Payload*: Bion No. 11. *Mass*: 5,400 kg (11,900 lb). *Nation*: Russia. *Agency*: RAKA. *Class*: Biology. *Type*: Biology satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Bion. *Duration*: 15.00 days. *Decay Date*: 1997-01-07 . *USAF Sat Cat*: 24701 . *COSPAR*: 1996-073A. *Apogee*: 375 km (233 mi). *Perigee*: 216 km (134 mi). *Inclination*: 62.8000 deg. *Period*: 90.40 min. Biological research. Carried monkeys Lalik and Multik..

1997 January 10 - . *Launch Site*: Plesetsk . *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Oko launch abort** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: USA. *Agency*: MO. *Manufacturer*: Lavochkin bureau. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. Oko launch aborted at moment of engine ignition. Spacecraft was intended to cover Oko constellation planes 8/9 - 209 degree longitude of ascending node..

1997 February 10 - . 14:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-25** - . *Call Sign*: Sirius (Sirius). *Crew*: Ewald, Lazutkin, Tsibliyev. *Backup Crew*: Dezhurov, Padalka, Schlegel. *Payload*: Soyuz TM s/n 74. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Dezhurov, Ewald, Lazutkin, Padalka, Schlegel, Tsibliyev. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-24, Soyuz TM-25, Soyuz TM-25 Mir 97, STS-81 Mir NASA-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 184.92 days. *Decay Date*: 1997-08-14 . *USAF Sat Cat*: 24717 . *COSPAR*: 1997-003A. *Apogee*: 392 km (243 mi). *Perigee*: 385 km (239 mi). *Inclination*: 51.7000 deg. *Period*: 92.30 min. Mir Expedition EO-23. Soyuz TM-25 docked with Mir at the forward port on February 12 at 15:51:13 GMT..

1997 April 6 - . 16:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-34** - . *Payload*: Progress M s/n 234. *Mass*: 7,156 kg (15,776 lb).

Nation: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-25, STS-81 Mir NASA-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 86.60 days. *Completed Operations Date*: 1997-07-02 06:31:45 . *Decay Date*: 1997-07-02 06:31:45 . *USAF Sat Cat*: 24757 . *COSPAR*: 1997-014A. *Apogee*: 393 km (244 mi). *Perigee*: 375 km (233 mi). *Inclination*: 51.7000 deg. *Period*: 92.20 min.

Unmanned resupply vessel to Mir. It carried supplies for the Mir station and repair equipment for Mir's oxygen generators, replacement oxygen-generating 'candles' and a pair of new spacesuits. Docked with Mir at the rear Kvant module port on 8 Apr 1997 17:30:03 GMT. The Mir complex raised its orbit by 5 km on 15 Apr 1997 at 12:00 GMT, using Progress M-34's engine. Undocked on 24 Jun 1997 10:22:50 GMT. It was then used to perform a redocking test using newly developed remote-control procedures which were to replace the automatic system that Russia could no longer afford to buy from Ukraine. At 25 Jun 1997 09:18 GMT Mir commander Tsibliev was remotely commanding the approach of Progress to the Kvant module. This involved guiding the Progress via a television monitor. The Progress was difficult to see against the cloudy earth background at the time of the attempted docking. It went off course and collided with a solar array on the Spektr module and then the module itself. A large hole was made in a solar panel, one of the radiators was buckled, a hole was punched into Spektr's hull, and the module began to depressurize. This was not a slow leak - the crew heard a hissing sound and felt their ears pop. They disconnected the power cables leading from Mir to the main station and closed the hatch on the core module transfer section that led to Spektr. The Spektr module became fully depressurized, remaining docked to Mir with its docking hatch open. The loss of electrical connection between Spektr's solar panels and the main station cut the available power supply to the station, crippling its operations until later repairs reconnected the electrical lines. Tsibliev was also the pilot on a previous orbital collision, when he banged Soyuz TM-17 into Mir in Jan 1994. After the return of the crew to earth he was found to be to blame for the incident, although the fines assessed were later dismissed. The Progress M-34 cargo ship was backed to a safe distance from the station and was destroyed in reentry on 2 Jul 1997 06:31:50 GMT. Total free-flight time 9.90 days. Total docked time 76.70 days.

1997 April 9 - . 08:58 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2340** - . *Payload*: Oko #77. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Lavochkin bureau. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 24761 . *COSPAR*: 1997-015A. *Apogee*: 37,201 km (23,115 mi). *Perigee*: 3,164 km (1,966 mi). *Inclination*: 65.2000 deg. *Period*: 718.00 min. Covered Oko constellation planes 8/9 - 217 degree longitude of ascending node..

1997 May 14 - . 00:33 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4.

LV Family: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2342** - . *Payload*: Oko #78. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Lavochkin bureau. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 24800 . *COSPAR*: 1997-022A. *Apogee*: 37,820 km (23,500 mi). *Perigee*: 2,584 km (1,605 mi). *Inclination*: 66.7000 deg. *Period*: 718.80 min. Covered Oko constellation planes 6/7 - 129 degree longitude of ascending node..

1997 May 15 - . 12:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2343** - . *Payload*: Orlets-1 no. 6. *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Kozlov bureau. *Program*: Orlets. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Orlets-1. *Duration*: 123.00 days. *Decay Date*: 1997-09-15 . *USAF Sat Cat*: 24805 . *COSPAR*: 1997-024A. *Apogee*: 343 km (213 mi). *Perigee*: 179 km (111 mi). *Inclination*: 64.9000 deg. *Period*: 89.40 min.

  Long duration film return military reconnaissance satellite. After returning multiple film capsules, the spacecraft was deorbited. This satellite provided Russia with the photo reconnaisance capability after a break of 7 1/2 months. This launch came on the 40th anniversary of the first successful launch of the R-7 rocket, from which the Soyuz-U was derived. It was the 250th launch of the Soyuz-U from Baikonur, the 350th launch from Launch Complex 31, and the 666th launch of a Soyuz-U.

1997 July 5 - . 04:11 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-35** - . *Payload*: Progress M s/n 235. *Mass*: 7,150 kg (15,760 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-25, STS-84 Mir NASA-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 82.50 days. *Decay Date*: 1997-10-08 . *USAF Sat Cat*: 24851 . *COSPAR*: 1997-033A. *Apogee*: 391 km (242 mi). *Perigee*: 383 km (237 mi). *Inclination*: 51.7000 deg. *Period*: 92.30 min.

  Unmanned resupply vessel to Mir. Docked with Mir on 7 Jul 1997 05:59:24 GMT. Undocked on 6 Aug 1997 11:46:45 GMT. Redocked with Mir on 18 Aug 1997 12:52:48 GMT. Final undocking on 7 Oct 1997 12:03:49 GMT. Destroyed in reentry on 7 Oct 1997 17:23:00 GMT. Total free-flight time 2.30 days. Total docked time 80.21 days.

1997 August 5 - . 15:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-26** - . *Call Sign*: Rodnik. *Crew*: Solovyov, Vinogradov. *Backup Crew*:

Avdeyev, Padalka. *Payload*: Soyuz TM s/n 75. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Avdeyev, Padalka, Solovyov, Vinogradov. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-25, Soyuz TM-26, STS-84 Mir NASA-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 197.73 days. *Decay Date*: 1998-02-19 . *USAF Sat Cat*: 24886 . *COSPAR*: 1997-038A. *Apogee*: 385 km (239 mi). *Perigee*: 378 km (234 mi). *Inclination*: 51.7000 deg. *Period*: 92.20 min. Mir Expedition EO-24. The Soyuz docked manually at 17:02 GMT August 7. Over the next six months the crew undertook seven internal and external spacewalks to repair the crippled space station..

1997 September 24 - . 21:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-1T** - . *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Reshetnev bureau. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 24960 . *COSPAR*: 1997-054A. *Apogee*: 39,575 km (24,590 mi). *Perigee*: 782 km (485 mi). *Inclination*: 63.9000 deg. *Period*: 717.80 min.

1997 October 5 - . 15:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-36** - . *Payload*: Progress M s/n 237. *Mass*: 7,195 kg (15,862 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-26, STS-84 Mir NASA-4, STS-86, STS-86 Mir NASA-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 74.92 days. *Decay Date*: 1997-12-19 . *USAF Sat Cat*: 25002 . *COSPAR*: 1997-058A. *Apogee*: 390 km (240 mi). *Perigee*: 378 km (234 mi). *Inclination*: 51.7000 deg. *Period*: 92.20 min. Unmanned resupply vessel to Mir. Docked with Mir on 8 Oct 1997 17:07:09 GMT. Undocked on 17 Dec 1997 06:01:53 GMT. Destroyed in reentry on 19 Dec 1997 13:20:01 GMT. Total free-flight time 5.39 days. Total docked time 69.54 days..

- **X-Mir Inspector** - . *Payload*: Inspector. *Nation*: Germany. *Agency*: DASA. *Manufacturer*: Bremen. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-26, STS-84 Mir NASA-4, STS-86, STS-86 Mir NASA-5. *Spacecraft*: Inspector. *Decay Date*: 1998-11-02 . *USAF Sat Cat*: 25100 . *COSPAR*: 1997-058D. *Apogee*: 387 km (240 mi). *Perigee*: 377 km (234 mi). *Inclination*: 51.7000 deg. *Period*: 91.10 min.

- **Sputnik-40** - . *Payload*: Spoutnik 40 Ans / RS-17. *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: AFR. *Program*: Oscar. *Class*: Communications. *Type*: Amateur radio communications satellite. *Spacecraft*: PS Model. *Decay Date*: 1998-05-21 . *USAF Sat Cat*: 24958 . *COSPAR*: 1997-058C. *Apogee*: 378 km (234 mi). *Perigee*: 369 km

(229 mi). *Inclination*: 51.6000 deg. *Period*: 87.10 min. Subscale model of the first Spuntik, hand-launched by Mir crew during an EVA. Transmitted radio signals..

1997 October 9 - . 17:59 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton 11** - . *Payload*: Foton s/n 11. *Mass*: 6,190 kg (13,640 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kayser-Threde. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 13.63 days. *Decay Date*: 1997-10-23 . *USAF Sat Cat*: 25006 . *COSPAR*: 1997-060A. *Apogee*: 363 km (225 mi). *Perigee*: 218 km (135 mi). *Inclination*: 62.8000 deg. *Period*: 90.30 min. Microgravity experiments. Landed in Kazakhstan Oct 23..

- **Mirka** - . *Nation*: Germany. *Agency*: DLR. *Manufacturer*: Kayser-Threde. *Class*: Technology. *Type*: Re-entry test vehicle. *Spacecraft*: Mirka. *Decay Date*: 1997-10-23 . *USAF Sat Cat*: 25006 . *COSPAR*: 1997-060xx. *Apogee*: 363 km (225 mi). *Perigee*: 218 km (135 mi). *Inclination*: 62.8000 deg. *Period*: 90.30 min. Landed in Kazakstan Oct 23.

1997 November 18 - . 11:14 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-1M** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kozlov bureau. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1M. *Decay Date*: 1997-12-13 . *USAF Sat Cat*: 25059 . *COSPAR*: 1997-072A. *Apogee*: 238 km (147 mi). *Perigee*: 211 km (131 mi). *Inclination*: 82.3000 deg. *Period*: 89.00 min. Landed in Kazakstan Dec 13..

1997 December 15 - . 15:40 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2348** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 120.00 days. *Decay Date*: 1998-04-14 . *USAF Sat Cat*: 25095 . *COSPAR*: 1997-080A. *Apogee*: 361 km (224 mi). *Perigee*: 175 km (108 mi). *Inclination*: 67.1000 deg. *Period*: 89.40 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission. Landed 14 April 1998..

1997 December 20 - . 08:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-37** - . *Payload*: Progress M s/n 236. *Mass*: 7,040 kg (15,520 lb).

Nation: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-26, STS-86 Mir NASA-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 61.69 days. *Decay Date*: 1998-03-16 . *USAF Sat Cat*: 25102 . *COSPAR*: 1997-081A. *Apogee*: 403 km (250 mi). *Perigee*: 363 km (225 mi). *Inclination*: 51.8000 deg. *Period*: 92.20 min.

Unmanned resupply vessel to Mir. Docked with Mir at the rear Kvant port on 22 Dec 1997 10:22:20 GMT. Undocked on 30 Jan 1998 12:00:00 GMT. Redocked with Mir on 23 Feb 1998 09:42:28 GMT. Final undocking 15 Mar 1998 19:16:01 GMT. Destroyed in reentry on 15 Mar 1998 23:04:00 GMT. Total free-flight time 2.23 days. Total docked time 59.47 days.

1998 January 29 - . 16:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-27** - . *Call Sign*: Kristall. *Crew*: Budarin, Eyharts, Musabayev. *Backup Crew*: Afanasyev, Haignere, Treshchev. *Payload*: Soyuz TM s/n 76. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Afanasyev, Budarin, Eyharts, Haignere, Musabayev, Treshchev. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-26, Soyuz TM-27, Soyuz TM-27 Mir Pegase, STS-86 Mir NASA-5, STS-89, STS-89 Mir NASA-6. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 207.53 days. *Decay Date*: 1998-08-25 . *USAF Sat Cat*: 25146 . *COSPAR*: 1998-004A. *Apogee*: 373 km (231 mi). *Perigee*: 363 km (225 mi). *Inclination*: 51.7000 deg. *Period*: 91.90 min.

  Soyuz TM-27 carried the Mir EO-25 crew and French astronaut Leopold Eyharts. NASA and the Russian Space Agency had hoped Soyuz TM-27 could dock with Mir while Endeavour was still there, resulting in an on-board crew of 13, a record which would have stood for years or decades. But the French vetoed this, saying the commotion and time wasted would ruin Eyharts Pegase experimental programme. Soyuz TM-27 docked at the Kvant module port at 17:54 GMT on January 31, 1998, less than five hours before Endeavour landed in Florida.

  Solovyov handed over command of Mir to EO-25 commander Musabayev, and the Mir EO-24 crew and Eyharts undocked from the forward port of Mir at 05:52 GMT on February 19 aboard the Soyuz TM-26 for their return home. On February 20, the EO-25 crew and Andy Thomas of the NASA-7 mission boarded Soyuz TM-27 and undocked from the Kvant port at 08:48 GMT. They redocked with the forward port on Mir at 09:32 GMT. This freed up the Kvant port for a test redocking of the Progress M-37 cargo ship, parked in a following orbit with Mir during the crew transfer.

1998 February 17 - . 10:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2349** - . *Payload*: Yantar-1KFT s/n 19. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 44.00 days. *Decay Date*: 1998-04-02 . *USAF Sat Cat*: 25167 . *COSPAR*: 1998-009A. *Apogee*: 327 km (203 mi). *Perigee*: 212 km (131 mi). *Inclination*: 70.4000 deg. *Period*: 89.90 min. Topographic mapping for the Army General Staff. Landed in Kazakhstan April 2 1998..

1998 March 14 - . 22:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-38** - . *Payload*: Progress M s/n 240. *Mass*: 7,007 kg (15,447 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-27, STS-89 Mir NASA-6. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 61.05 days. *Decay Date*: 1998-05-15 . *USAF Sat Cat*: 25256 . *COSPAR*: 1998-015A. *Apogee*: 379 km (235 mi). *Perigee*: 372 km (231 mi). *Inclination*: 51.7000 deg. *Period*: 92.10 min.

  Progress M-38 was specially modified to carry the second VDU (Vynosnaya Dvigatel'naya Ustanovka, External Engine Unit) propulsion unit. The VDU was mounted externally on a special structure between the cargo module and the service module, replacing the OKD fuel section present on normal Progress vehicles. The crew spacewalks to extract the VDU from Progress and place it on the end of the Sofora boom extending from the Kvant module. The VDU was used to provide attitude control capability for the station. By 03:20 GMT on March 15 1998 Progress M-38 had successfully completed its first two orbital manoeuvres. It replaced Progress M-37 at the docking port on the Kvant module, with a successful docking on March 16 1998 at 22:45 GMT. Undocked May 15 at 1844 UTC, freeing up the docking port on the Kvant module for Progress M-39. Deorbited over Pacific May 15, 1998.

1998 May 7 - . 08:53 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2351** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Lavochkin bureau. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 25327 . *COSPAR*: 1998-027A. *Apogee*: 37,513 km (23,309 mi). *Perigee*: 2,806 km (1,743 mi). *Inclination*: 63.7000 deg. *Period*: 717.10 min.

1998 May 14 - . 22:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-39** - . *Payload*: Progress M s/n 238. *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir.

Class: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-27, STS-89 Mir NASA-6. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 167.08 days. *Decay Date*: 1998-10-29 . *USAF Sat Cat*: 25340 . *COSPAR*: 1998-031A. *Apogee*: 373 km (231 mi). *Perigee*: 360 km (220 mi). *Inclination*: 51.7000 deg. *Period*: 91.90 min. Docked with Mir at the Kvant port at 23:51 GMT on May 16 1998, bringing supplies and scientific experiments to the station. Undocked 09:28 GMT on August 12 1998 in order to clear the port for Soyuz TM-28. Deorbited over Pacific Ocean on October 29, 1998..

1998 June 24 - . 18:29 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2358** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 120.00 days. *Decay Date*: 1998-10-22 . *USAF Sat Cat*: 25373 . *COSPAR*: 1998-038A. *Apogee*: 316 km (196 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.30 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission. Landed October 22, 1998..

1998 June 25 - . 14:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2359** - . *Mass*: 6,620 kg (14,590 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Decay Date*: 1999-07-12 . *USAF Sat Cat*: 25376 . *COSPAR*: 1998-039A. *Apogee*: 300 km (180 mi). *Perigee*: 239 km (148 mi). *Inclination*: 64.9000 deg. *Period*: 89.90 min. Photo/digital surveillance. Entered an initial 170 x 290 km x 64.9 deg initial orbit. It manoeuvred to its operational orbit of 240 x 302 km x 64.9 deg on June 27..

1998 July 1 - . 00:48 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-3-49** - . *Payload*: Molniya-3 s/n 61. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MOM. *Manufacturer*: Reshetnev bureau. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2011-02-02 . *USAF Sat Cat*: 25379 . *COSPAR*: 1998-040A. *Apogee*: 39,850 km (24,760 mi). *Perigee*: 501 km (311 mi). *Inclination*: 62.8000 deg. *Period*: 717.70 min.

1998 August 13 - . 09:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-28** - . *Call Sign*: Altair. *Crew*: Avdeyev, Baturin, Padalka. *Backup Crew*: Kaleri, Zalyotin. *Payload*: Soyuz TM s/n 77. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Avdeyev, Baturin, Kaleri, Padalka, Zalyotin. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-27, Soyuz TM-28, Soyuz TM-28 Mir EO-26/-27, Soyuz TM-28 Mir EP-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 198.69 days. *Decay Date*: 1999-02-28 . *USAF Sat Cat*: 25429 . *COSPAR*: 1998-047A. *Apogee*: 373 km (231 mi). *Perigee*: 363 km (225 mi). *Inclination*: 51.7000 deg. *Period*: 91.90 min.

  Soyuz TM-28 docked at 10:56 GMT on August 15 with the rear (Kvant) port of the Mir space station, which had been vacated at 09:28 GMT on August 12 by Progress M-39. The EO-25 crew, Musabayev and Budarin, landed with Baturin on Aug 25, leaving the EO-26 crew of Padalka and Avdeyev on the station. As only one final Soyuz mission to Mir was planned, with two of the seats on that Soyuz pre-sold to Slovak and French experimenters, the return crew of Soyuz TM-28 was subject to constant replanning and revision. On February 8, 1999, at 11:23 GMT Padalka and Avdeyev undocked from Mir's -X port in Soyuz TM-28, and redocked at the +X Kvant port at 11:39 GMT, freeing up the front port for the Soyuz TM-29 docking. Finally on February 27, 1999 EO-26 commander Padalka and Slovak cosmonaut Bella undocked Soyuz TM-28 from the Kvant rear docking port at 22:52 GMT, landing in Kazakhstan on February 28 at 02:14 GMT. Avdeyev remained on Mir with the EO-27 crew delivered on Soyuz TM-29, heading for a manned space flight time record.

1998 September 28 - . 23:41 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-1T** - . *Payload*: Molniya-1T. *Mass*: 1,656 kg (3,650 lb). *Nation*: Russia. *Agency*: MOM. *Manufacturer*: Reshetnev bureau. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *USAF Sat Cat*: 25485 . *COSPAR*: 1998-054A. *Apogee*: 38,755 km (24,081 mi). *Perigee*: 1,599 km (993 mi). *Inclination*: 63.3000 deg. *Period*: 717.80 min.

1998 October 25 - . 04:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-40** - . *Payload*: Progress M s/n 239. *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-28, Soyuz TM-28 Mir EO-26/-27. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 103.25 days. *Decay Date*: 1999-02-05 . *USAF Sat Cat*: 25512 . *COSPAR*: 1998-062A. *Apogee*: 360 km (220 mi). *Perigee*: 349 km (216 mi). *Inclination*: 51.6000 deg. *Period*: 91.63 min.

Docked with the rear (+X, Kvant) docking port of the Mir station on October 27. Delivered fuel, dry cargo, and the Znamya-2.5 solar illumination experiment. This was a follow-on to the earlier Znamya-2 experiment on Progress M-15 in 1992. The 25 m diameter Znamya reflector, which would unfold from the nose of the Progress, was to reflect sunlight over a 6 km area onto selected cities. Znamya-2.5 was developed by the Space Regatta Consortium, led by RKK Energia. Energia had long studied such space mirrors as a means of providing lighting to Siberian towns. The project was opposed by environmentalists and astronomers, who feared light pollution. Progress M-40 undocked on February 4, 1999 at 09:59 GMT, but the attempted deployment of the Znamya-2.5 reflector was thwarted when it snagged on a rendezvous system antenna. After two more failed attempts to deploy the antenna the experiment was abandoned. Progress M-40 fired its engines at 10:16 GMT on February 5, braked out of orbit, and burned up over the Pacific Ocean.

- **Spoutnik-41** - . *Nation*: France. *Agency*: ACF, VVS. *Manufacturer*: AFR. *Program*: Oscar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: PS Model. *Decay Date*: 1999-01-11 . *USAF Sat Cat*: 25533 . *COSPAR*: 1998-062C. *Apogee*: 318 km (197 mi). *Perigee*: 313 km (194 mi). *Inclination*: 51.7000 deg.

  On a space walk from Mir on November 10, Padalka and Avdeyev hand-launched the Spoutnik-41 amateur-radio mini-satellite at around 19:30 GMT. Spoutnik-41, also designated RS-18, was another scale model of the first satellite, Sputnik 1, launched 41 years ago. It carried a small transmitter and was sponsored by Aero Club de France, AMSAT-France, and the Astronautical Federation of Russia. A similar model was launched in 1997 for the fortieth anniversary of Sputnik. On that occasion, two flight models were carried to Mir but only one was launched. The second Spoutnik-40 flight model was still aboard Mir as of 1998. The second Spoutnik-40 would perhaps be deployed prior to the abandonment of Mir in 1999.

1999 February 9 - . 03:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Globalstar FM36** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25621 . *COSPAR*: 1999-004A. *Apogee*: 1,421 km (882 mi). *Perigee*: 1,406 km (873 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

  The first launch of the Soyuz- Ikar launch vehicle, selected by Orbcomm after failure of the Zenit launcher. The Ikar upper stage was derived from the Yantar reconnaissance satellite's propulsion module. The Soyuz second stage separated at 8 minutes 48 seconds into flight after placing the Ikar into a 236 km x 884 km x 52.0 deg transfer orbit. The Ikar stage burned at the second apogee passage, at 06:23 GMT, and released the Globalstar satellite at the top of the dispenser into a 915 km x 947 km x 52.0 deg orbit at 07:27 GMT. The three remaining satellites mounted around the side of the dispenser were released into a 903 km x 946 km x 52.0 deg orbit. This was also the first launch carried out by the Starsem organization, a joint

venture including Aerospatiale and TsSKB-Progress (the launch vehicle manufacturer). The dispenser was built by Aerospatiale/Aquitaine (Bordeaux).

- **Globalstar FM40** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25624 . *COSPAR*: 1999-004D. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar FM23** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25622 . *COSPAR*: 1999-004B. *Apogee*: 1,418 km (881 mi). *Perigee*: 1,414 km (878 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar FM38** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25623 . *COSPAR*: 1999-004C. *Apogee*: 1,545 km (960 mi). *Perigee*: 1,541 km (957 mi). *Inclination*: 52.0000 deg. *Period*: 116.90 min.

1999 February 20 - . 04:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-29** - . *Call Sign*: Derbent. *Crew*: Afanasyev, Bella, Haignere. *Payload*: Soyuz TM s/n 78. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Afanasyev, Bella, Haignere. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-28, Soyuz TM-28 Mir EO-26/-27, Soyuz TM-29, Soyuz TM-29 Mir Stefanik. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 188.85 days. *Decay Date*: 1999-08-28 . *USAF Sat Cat*: 25632 . *COSPAR*: 1999-007A. *Apogee*: 357 km (221 mi). *Perigee*: 341 km (211 mi). *Inclination*: 51.6000 deg. *Period*: 91.52 min.

  Soyuz TM-29 docked with Mir on February 22 at 05:36 GMT. Since two crew seats had been sold (to Slovakia and France), Afansyev was the only Russian cosmonaut aboard. This meant that Russian engineer Avdeyev already aboard Mir would have to accept a double-length assignment. After the February 27 departure of EO-26 crew commander Padalka and Slovak cosmonaut Bella aboard Soyuz TM-28, the new EO-27 Mir crew consisted of Afanasyev as Commander, Avdeyev as Engineer and French cosmonaut Haignere. Follwoing an extended mission and three space walks, the last operational crew aboard Mir prepared to return. The station was powered down and prepared for free drift mode.

1999 March 15 - . 03:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Globalstar M022** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25649 . *COSPAR*: 1999-012A. *Apogee*: 1,414 km (878 mi).

Perigee: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

In the second Soyuz/Ikar launch four Globalstar satellites were delivered with the Ikar upper stage into a 235 km x 899 km x 52.0 degree transfer orbit. The Ikar stage then placed itself and its payload into a 897 km x 950 km x 52.0 degree deployment orbit. Satellite M022 was separated first from the top of the dispenser, followed by ejection of the other three satellites from the sides at 06:37 GMT. After dispensing the satellites, the Ikar deorbited itself on March 16.

- **Globalstar M046** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25651 . *COSPAR*: 1999-012C. *Apogee*: 1,595 km (991 mi). *Perigee*: 1,594 km (990 mi). *Inclination*: 52.0000 deg. *Period*: 118.10 min.

- **Globalstar M037** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25652 . *COSPAR*: 1999-012D. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar M041** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25650 . *COSPAR*: 1999-012B. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

1999 April 2 - . 11:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-41** - . *Payload*: Progress M s/n 241. *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-28 Mir EO-26/-27, Soyuz TM-29. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 105.99 days. *Decay Date*: 1999-07-17 . *USAF Sat Cat*: 25664 . *COSPAR*: 1999-015A. *Apogee*: 361 km (224 mi). *Perigee*: 336 km (208 mi). *Inclination*: 51.6000 deg. *Period*: 91.51 min.

  Resupply craft docked uneventfully with the Mir complex two days later. It also delivered the Sputnik-99 amateur radio satellite, launched into orbit by hand by the cosmonauts during an EVA on April 16. Still hopeful of finding a backer to pay to keep Mir in space, Progress M-41 began a series of engine burns in late April to raise the orbit of the station. It finally undocked from Mir at 11:20 GMT on July 17 and was deorbited over the Pacific later the same day.

- **Sputnik-99** - . *Nation*: France. *Agency*: AmSat. *Program*: Oscar. *Class*: Communications. *Type*: Amateur radio communications satellite. *Spacecraft*: OSCAR. *Decay Date*: 1999-07-29 . *USAF Sat Cat*: 25685 . *COSPAR*: 1999-015C. *Apogee*: 400 km (240 mi). *Perigee*: 400 km (240 mi). *Inclination*: 51.6000 deg. Subscale amateur radio model of Sputnik 1. Reentered July 29..

1999 April 15 - . 00:46 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Globalstar M019** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25676 . *COSPAR*: 1999-019A. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

  The Ikar upper stage entered a 234 km x 900 km transfer orbit, then maneuvered to dispense the four spacecraft into 900 km x 950 km x 52.0 deg parking orbits. The satellite's own thrusters would be used to place them into their 1410 km circular operational orbits. The Ikar stage deorbited itself after one day. The Globalstar satellites, built by Alenia and Loral, are L-band comsats which provide satellite phone service.

- **Globalstar M045** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25679 . *COSPAR*: 1999-019D. *Apogee*: 1,586 km (985 mi). *Perigee*: 1,581 km (982 mi). *Inclination*: 52.0000 deg. *Period*: 117.80 min.

- **Globalstar M044** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25678 . *COSPAR*: 1999-019C. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar M042** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25677 . *COSPAR*: 1999-019B. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

1999 July 8 - . 08:45 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-3-50** - . *Payload*: Molniya-3 s/n 63. *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Reshetnev bureau. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *USAF Sat Cat*: 25847 . *COSPAR*: 1999-036A. *Apogee*: 38,540 km (23,940 mi). *Perigee*: 1,811 km (1,125 mi). *Inclination*: 63.5000 deg. *Period*: 717.70 min.

  The launch was from one of the three active R-7 class pads at Plesetsk (LC16/pad 2, LC43/pad 3, LC43/pad 4) and used the 8K78M launch vehicle, consisting of the 11S59 core packet, the 11S510 Block I third stage, and the Block-ML upper stage. The Block ML and the payload were placed in a 62.8 degree low parking orbit and then the ML fired to deliver the payload to a 12-hour operational orbit. This was the 52nd Molniya-3 to be launched (two were orbited under the Cosmos designation).

1999 July 16 - . 16:37 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-42** - . *Payload*: Progress M s/n 242. *Mass*: 7,450 kg (16,420 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-28 Mir EO-26/-27, Soyuz TM-29. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 200.57 days. *Decay Date*: 2000-02-04 . *USAF Sat Cat*: 25858 . *COSPAR*: 1999-038A. *Apogee*: 348 km (216 mi). *Perigee*: 340 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.42 min.

  Delivered supplies to the crew of the Mir complex. Docked with the Kvant port at 17:53 GMT on July 18. Remained docked to the station after the departure of the last operational crew in September 1999. Undocked on February 2. 2000, to clear the port for Progress M1, at 0311:52 GMT. Deorbited over the Pacific later the same day at 0610:40 UTC with an 8 minute burn.

1999 August 18 - . 18:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2365** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 119.00 days. *Decay Date*: 1999-12-15 . *USAF Sat Cat*: 25889 . *COSPAR*: 1999-044A. *Apogee*: 338 km (210 mi). *Perigee*: 184 km (114 mi). *Inclination*: 67.1000 deg. *Period*: 89.73 min. High resolution photo reconnaissance; returned film in two small SpK capsules during the mission and with the main capsule at completion of the mission. Landed in Russia on December 15, 1999..

1999 September 9 - . 18:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton 12** - . *Payload*: Foton s/n 12. *Mass*: 6,190 kg (13,640 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kozlov bureau. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Duration*: 14.64 days. *Decay Date*: 1999-09-24 . *USAF Sat Cat*: 25902 . *COSPAR*: 1999-048A. *Apogee*: 365 km (226 mi). *Perigee*: 215 km (133 mi). *Inclination*: 62.8000 deg. *Period*: 90.30 min. Foton 12 carried European microgravity experiments. The spacecraft's descent module landed on Russian territory at 52.47 deg N 53.83 deg E on September 24, 1999..

1999 September 22 - . 14:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Globalstar 33** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*:

Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25907 . *COSPAR*: 1999-049A. *Apogee*: 1,416 km (879 mi). *Perigee*: 1,412 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min. The third stage put the complex into a 235 km x 906 km x 51.9 degree transfer orbit. The Ikar upper stage maneouvered, placed the four satellites into their final parking orbit, then made a deorbit burn and re-entered on September 24. .

- **Globalstar 58** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25910 . *COSPAR*: 1999-049D. *Apogee*: 1,557 km (967 mi). *Perigee*: 1,547 km (961 mi). *Inclination*: 52.0000 deg. *Period*: 117.10 min.

- **Globalstar 50** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25908 . *COSPAR*: 1999-049B. *Apogee*: 1,655 km (1,028 mi). *Perigee*: 1,641 km (1,019 mi). *Inclination*: 52.0000 deg. *Period*: 119.30 min.

- **Globalstar 55** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25909 . *COSPAR*: 1999-049C. *Apogee*: 1,416 km (879 mi). *Perigee*: 1,412 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

1999 September 28 - . 11:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs F-1M** - . *Mass*: 6,300 kg (13,800 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kozlov bureau. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Resurs F1M. *Duration*: 24.00 days. *Decay Date*: 1999-10-22 . *USAF Sat Cat*: 25929 . *COSPAR*: 1999-054A. *Apogee*: 240 km (140 mi). *Perigee*: 214 km (132 mi). *Inclination*: 82.3000 deg. *Period*: 89.00 min. Remote sensing film satellite. Recovered in Russia on October 22, 1999..

1999 October 18 - . 13:22 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Globalstar 31** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25943 . *COSPAR*: 1999-058A. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min. At the time of this launch Globalstar began limited service of its satellite telephone system..

- **Globalstar 59** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25946 . *COSPAR*: 1999-058D. *Apogee*: 1,415 km (879 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar 57** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25945 . *COSPAR*: 1999-058C. *Apogee*: 1,415 km (879 mi). *Perigee*: 1,412 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar 56** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25944 . *COSPAR*: 1999-058B. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

1999 November 22 - . 16:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Globalstar 29** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25961 . *COSPAR*: 1999-062A. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min. Additional launches into Globalstar communications satellite constellation..

- **Globalstar 34** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25962 . *COSPAR*: 1999-062B. *Apogee*: 1,614 km (1,002 mi). *Perigee*: 1,610 km (1,000 mi). *Inclination*: 52.0000 deg. *Period*: 118.50 min.

- **Globalstar 39** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25963 . *COSPAR*: 1999-062C. *Apogee*: 1,417 km (880 mi). *Perigee*: 1,410 km (870 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar 61** - . *Mass*: 222 kg (489 lb). *Nation*: USA. *Agency*: Globalstar. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 25964 . *COSPAR*: 1999-062D. *Apogee*: 1,791 km (1,112 mi). *Perigee*: 1,783 km (1,107 mi). *Inclination*: 52.0000 deg. *Period*: 122.40 min.

1999 December 27 - . 19:12 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2368** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Lavochkin bureau. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 26042 . *COSPAR*: 1999-073A. *Apogee*: 38,751 km (24,078 mi). *Perigee*: 1,603 km (996 mi). *Inclination*: 63.2000 deg. *Period*: 717.80 min.

  Early warning satellite, carrying a large telescope to monitor missile launches. The payload and fourth stage were placed in an initial 229 km x 523 km x 62.8 deg orbit; the fourth stage (Block-2BL) fired over South America on the first orbit and

delivered the payload to its 12-hour final orbit.

2000 February 1 - . 06:47 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M1-1** - . *Payload*: Progress M1 s/n 250. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 85.53 days. *Decay Date*: 2000-04-27 . *USAF Sat Cat*: 26067 . *COSPAR*: 2000-005A. *Apogee*: 348 km (216 mi). *Perigee*: 342 km (212 mi). *Inclination*: 51.6000 deg. *Period*: 91.44 min.

  Progress M1 was a modification of the Progress M for the International Space Station. The first such spacecraft was diverted to raise the orbit of Mir. It docked with the unoccupied Mir space station on February 3 at 0802:20 GMT. Burns of its motor to raise Mir's orbit began on February 5 and continued through February 9. Progress M1-1 undocked at 16:33 GMT on April 26 to clear the docking port for Progress M1-2. It was deorbited over the Pacific at 19:27 GMT the same day.

2000 February 8 - . 23:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **IRDT** - . *Mass*: 110 kg (240 lb). *Nation*: Russia. *Agency*: ESA. *Manufacturer*: Lavochkin bureau. *Class*: Technology. *Type*: Re-entry test vehicle. *Spacecraft Bus*: Rescue. *Spacecraft*: IRDT. *COSPAR*: 2000-009x. *Apogee*: 613 km (381 mi). *Perigee*: 580 km (361 mi). *Inclination*: 64.8545 deg. *Period*: 96.53 min.

  After four orbits around the Earth the test vehicle was powered by the launcher's upper stage to re-enter the atmosphere for a landing about 1800 km northwest of the launch site. The heat shield was inflated and the IRDT separated from the upper stage. It then passed through the upper atmospheric layers that imposed the highest dynamic pressure, heat flux and acceleration loads onto the system. The IRDT landed inside the predicted area at 54 deg E and 51 deg N near the Kazakhstan border. Unfortunately, a tear occurred in the inflatable shield during descent resulting in a higher velocity and a heavier than expected impact on landing, resulting in some damage to the lower part of the IRDT. The IRDT was collected by helicopter so that the memory unit of the sensor package, with all recorded data, could be analysed. An initial data check confirmed that all experiments in the sensor package worked perfectly.

- **Dummy satellite** - . *Nation*: Russia. *Agency*: Starsem. *Manufacturer*: Lavochkin bureau. *Class*: Technology. *Type*: Navigation technology satellite. *USAF Sat Cat*: 26086 . *COSPAR*: 2000-009A. *Apogee*: 613 km (381 mi). *Perigee*: 580 km (361 mi). *Inclination*: 64.8545 deg. *Period*: 96.53 min. .

2000 March 20 - . 18:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Dumsat** - . *Mass*: 2,382 kg (5,251 lb). *Nation*: Europe. *Agency*: Starsem. *Manufacturer*: Toulouse. *Class*: Technology. *Type*: Navigation technology satellite. *Spacecraft*: Cluster 2. *USAF Sat Cat*: 26106 . *COSPAR*: 2000-015A. *Apogee*: 17,687 km (10,990 mi). *Perigee*: 332 km (206 mi). *Inclination*: 64.7000 deg. *Period*: 316.60 min. Cluster 2 Composite Mock-Up validation flight. Mass model of a pair of Cluster II scientific satellites built by Aerospatiale Matra. Second test launch of the Soyuz-Fregat launch vehicle..

2000 April 4 - . 05:01 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-30** - . *Call Sign*: Yenisey. *Crew*: Kaleri, Zalyotin. *Payload*: Soyuz TM s/n 204. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Kaleri, Zalyotin. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-30. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 72.82 days. *Decay Date*: 2000-06-16 . *USAF Sat Cat*: 26116 . *COSPAR*: 2000-018A. *Apogee*: 384 km (238 mi). *Perigee*: 358 km (222 mi). *Inclination*: 51.6000 deg. *Period*: 91.97 min.

  Soyuz TM-30 docked with Mir's forward (-X) port on April 6 at 0631 GMT. Zalyotin and Kaleri reactivated the uninhabited station. Unloading Progress M1-1 and M1-2, they resupplied the station. The Progress spacecraft were also used to raise the station's orbit to 360 x 378 km x 51.6 deg. The orbital plane of Mir was then around 120 degrees away from that of ISS (making transport between the stations impossible, as desired by NASA).

2000 April 25 - . 20:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M1-2** - . *Payload*: Progress M1 s/n 252. *Mass*: 7,280 kg (16,040 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-30. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 173.00 days. *Decay Date*: 2000-10-15 . *USAF Sat Cat*: 26301 . *COSPAR*: 2000-021A. *Apogee*: 380 km (230 mi). *Perigee*: 363 km (225 mi). *Inclination*: 51.6000 deg. *Period*: 91.98 min. Progress M1-2 docked with the rear Kvant port of Mir at 2128 GMT on April 27. Mir's orbit was raised on April 29 in the first of a series of three burns by Progress M1-2. It later undocked and was deorbited over the Pacific on 15 October..

2000 May 3 - . 13:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2370** - . *Payload*: Neman. *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Military

surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *Decay Date*: 2001-05-03 . *USAF Sat Cat*: 26354 . *COSPAR*: 2000-023A. *Apogee*: 312 km (194 mi). *Perigee*: 244 km (152 mi). *Inclination*: 64.7252 deg. *Period*: 90.00 min.

Military Observation. Advanced imaging reconnaissance satellite. Relays digital imagery to earth via geostationary comsats. The last such satellite, Cosmos 2359, reentered in July 1999 after one year in orbit. The Soyuz-U launcher placed it in a 183 x 277 km x 64.8 deg initial orbit; it raised altitude to 240 x 300 km about 24 hr after launch.

2000 July 16 - . 12:39 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Samba** - . *Payload*: Cluster 2-FM6. *Mass*: 1,200 kg (2,600 lb). *Nation*: Europe. *Agency*: ESA. *Manufacturer*: Friedrichshafen. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Cluster 2. *USAF Sat Cat*: 26410 . *COSPAR*: 2000-041A. *Apogee*: 116,279 km (72,252 mi). *Perigee*: 21,449 km (13,327 mi). *Inclination*: 88.5000 deg. *Period*: 3,423.40 min.

  The first two European Space Agency Cluster II satellites, Samba (FM7) and Salsa (FM6) were launched into an initial 200 km / 64.8 deg circular orbit. The Fregat upper stage then burned once before ejecting the satellites into a 250 x 18072 km x 64.7 deg transfer orbit. Both satellites then used their Astrium (former MBB) S400 liquid engines in a series of four additional burns before reaching their final 16869 x 121098 km x 90.6 deg orbits. Each magnetosphere research satellite deployed four 50-meter wire antennas.

- **Salsa** - . *Mass*: 1,200 kg (2,600 lb). *Nation*: Europe. *Agency*: ESA. *Manufacturer*: Friedrichshafen. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Cluster 2. *USAF Sat Cat*: 26411 . *COSPAR*: 2000-041B. *Apogee*: 116,294 km (72,261 mi). *Perigee*: 21,430 km (13,310 mi). *Inclination*: 88.6000 deg. *Period*: 3,423.20 min.

2000 August 6 - . 18:26 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M1-3** - . *Payload*: Progress M1 s/n 251. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-106. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 86.53 days. *Decay Date*: 2000-11-01 . *USAF Sat Cat*: 26461 . *COSPAR*: 2000-044A. *Apogee*: 362 km (224 mi). *Perigee*: 347 km (215 mi). *Inclination*: 51.5000 deg. *Period*: 91.63 min.

  Progress M1-3 automatically docked with the International Space Station on August 8 at 20:13 GMT at the rear Zvezda port. The supply ship began refuelling of the station a few days later. It remained attached for offloading of its dry cargo by the STS-106 crew. It later separated from Zvezda's rear port at 0405 GMT November 1

and was deorbited over the Pacific at 0705 GMT.

2000 August 9 - . 11:13 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Rumba** - . *Mass*: 1,200 kg (2,600 lb). *Nation*: Europe. *Agency*: ESA. *Manufacturer*: Friedrichshafen. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Cluster 2. *USAF Sat Cat*: 26463 . *COSPAR*: 2000-045A. *Apogee*: 116,297 km (72,263 mi). *Perigee*: 21,430 km (13,310 mi). *Inclination*: 88.5000 deg. *Period*: 3,423.30 min.

- **Tango** - . *Mass*: 1,200 kg (2,600 lb). *Nation*: Europe. *Agency*: ESA. *Manufacturer*: Friedrichshafen. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Cluster 2. *USAF Sat Cat*: 26464 . *COSPAR*: 2000-045B. *Apogee*: 116,300 km (72,200 mi). *Perigee*: 21,430 km (13,310 mi). *Inclination*: 88.5000 deg. *Period*: 3,423.40 min.

  Rumba and Tango were the second pair of Cluster II magnetospheric research satellites of the European Space Agency. A series of five burns of the Fregat stage took them from an initial 190 km / 64.8 degree parking orbit to their final 17,200 x 120,600 km orbits inclined 90 degrees to the equator. They then separated from the Fregat and took up operations.

2000 September 29 - . 09:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2373** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 46.56 days. *Decay Date*: 2000-11-14 . *USAF Sat Cat*: 26552 . *COSPAR*: 2000-058A. *Apogee*: 285 km (177 mi). *Perigee*: 211 km (131 mi). *Inclination*: 70.3000 deg. *Period*: 89.46 min.

  Twentieth Kometa cartographic satellite, using the Yantar service module with a Vostok-type reentry vehicle. It was announced as a dual civil-military geodetic mission. After a day it raised its orbit to 211 x 285 km x 70.4 deg. Landed near Orenburg, Russia on November 14. Deorbit burn was probably around 2230 GMT; the Vostok-style sphere landed at 2253 GMT.

2000 October 16 - . 21:27 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-43** - . *Payload*: Progress M s/n 243. *Mass*: 6,860 kg (15,120 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 101.00 days. *Decay Date*: 2001-01-29 . *USAF Sat Cat*: 26570 . *COSPAR*: 2000-064A. *Apogee*: 228 km (141 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. *Period*: 88.64 min.

Mir Servicing flight. Launch delayed from October 15. Progress docked with Mir, primarily to raise its orbit and preserve the option of a MirCorp-financed flight in 2001. However the funding never came through and the decision was taken to deorbit Mir. Progress M-43 undocked at 0519 GMT on January 25 from the +X Kvant port to clear it for Progress M1-5 (which would deorbit the Mir station). On January 29 Progress M-43 was in a 271 x 280 km x 51.6 deg orbit.

2000 October 31 - . 07:52 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-31** - . *Call Sign*: Uran. *Crew*: Gidzenko, Krikalyov, Shepherd. *Payload*: Soyuz TM s/n 205. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Gidzenko, Krikalyov, Shepherd. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-31. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 186.91 days. *Decay Date*: 2001-05-06 . *USAF Sat Cat*: 26603 . *COSPAR*: 2000-070A. *Apogee*: 385 km (239 mi). *Perigee*: 378 km (234 mi). *Inclination*: 51.5000 deg. *Period*: 92.18 min.

  Soyuz TM-31 delivered the Expedition One crew to the International Space Station with Gidzenko as the Soyuz crew commander with the call-sign 'Uran'. The spacecraft docked at Zvezda's rear port at 0921 GMT on November 2. The hatch to Zvezda was opened at 1023 GMT. Once aboard ISS, Shepherd became the ISS Commander, with 'Station Alpha' as the ISS callsign. Soyuz TM-31, with Shepherd, Gidzenko and Krikalyov aboard, undocked from the -Y port on Zvezda on February 24, 2001 at 1006 GMT and redocked with the -Z port on Zarya at 1037 GMT. This freed the Zvezda port for a Progress resupply ship. After the departure of the Progress, Soyuz TM-31 undocked from the Zarya nadir port April 18 2001 at 1240 GMT and redocked with the Zvezda aft port at 1301 GMT, leaving clearance for the Raffaello MPLM module to be berthed at the Unity nadir during the STS-100 mission.

2000 November 16 - . 00:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M1-4** - . *Payload*: Progress M1 s/n 253. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-31. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 84.58 days. *Decay Date*: 2001-02-08 . *USAF Sat Cat*: 26615 . *COSPAR*: 2000-073A. *Apogee*: 363 km (225 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.70 min.

  Progress M1-4 was an unmanned resupply craft that rendezvoused with the International Space Station on November 18. After problems with the automatic system, ISS Expedition 1 crew member Gidzenko took over manual control with the remote TORU system at 0302 GMT. The first docking attempt was aborted when M1-4 was only 5 m from the station at 0309 GMT. On the second attempt docking

was successfully achieved at 0348 GMT at Zarya's nadir port. The problem on the first attempt was icing of the TORU system TV camera on the Progress when the spacecraft was in shadow. Progress M1-4 undocked from ISS at 1623 GMT on December 1. Following the mission of STS-97 Progress M1-4 redocked to Zarya's nadir port on December 26 at 1054 GMT. The redocking tested a fix to the software that caused problems in the vehicle's first docking attempt on November 18. Yuri Gidzenko completed the docking manually using the remote control TORU system. Progress M1-4 undocked from Zarya's nadir port for the last time at 1126 GMT on February 8. It was deorbited over the Pacific and reentered at 1350 GMT the same day.

2001 January 24 - . 04:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M1-5** - . *Payload*: Progress M1 s/n 254. *Mass*: 7,300 kg (16,000 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: Mir. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 58.00 days. *Decay Date*: 2001-03-23 . *USAF Sat Cat*: 26688 . *COSPAR*: 2001-003A. *Apogee*: 215 km (133 mi). *Perigee*: 151 km (93 mi). *Inclination*: 51.6000 deg. *Period*: 88.20 min.

  Mir Deorbiting mission. Launch delayed from January 16 and 18. The Mir station had a power failure on January 18, delaying the launch of the Progress cargo ship that was to deorbit it for a few days. Nick-named "Hearse", it was to deliver the 130 tonne Mir station to its cremation over the southern Pacific. Six cosmonauts were on "Hot-Standby" to reach Mir in the event the automatic docking failed. Progress M1-5 carried 2677 kg of fuel. A special three-day fuel-economy approach was be used to keep as much fuel as possibile for the deorbit. Progress M1-5 docked with the +X Kvant port at 0533 GMT on January 27. It later undocked and was deorbited over the Pacific together with Mir on 23 March.

2001 February 26 - . 08:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-44** - . *Payload*: Progress M s/n 244. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TM-31. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 49.22 days. *Decay Date*: 2001-04-16 . *USAF Sat Cat*: 26713 . *COSPAR*: 2001-008A. *Apogee*: 393 km (244 mi). *Perigee*: 376 km (233 mi). *Inclination*: 51.6000 deg. *Period*: 92.20 min.

  ISS Servicing flight. Launch delayed from February10/20. Progress M-44 was a Russian, automatic cargo carrier that carried 2.5 tonnes of food, water, fuel, oxygen, and equipment to the International Space Station. In preparation for the docking, the ISS crew repositioned the Soyuz TM-31 escape craft from its port on Zvezda to a port on the Zarya module. Progress M-44 docked with the -Y port on Zvezda at 09:47

UT on 28 February. It undocked from Zvezda's aft port on April 16 at 0848 GMT and was deorbited at 1323 GMT over the Pacific Ocean.

2001 April 28 - . 07:37 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-32** - . *Call Sign*: Kristall. *Crew*: Baturin, Musabayev, Tito. *Payload*: Soyuz TM s/n 206. *Mass*: 6,750 kg (14,880 lb). *Nation*: Russia. *Related Persons*: Baturin, Musabayev, Tito. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-32 ISS EP-1. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 185.89 days. *Decay Date*: 2001-10-31 . *USAF Sat Cat*: 26749 . *COSPAR*: 2001-017A. *Apogee*: 397 km (246 mi). *Perigee*: 385 km (239 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

  Soyuz TM-32 was designated ISS flight 2S by NASA and EP-1 (Visiting Crew 1) by RKK Energia. Soyuz TM-32 was a fresh lifeboat for the station; the Soyuz TM-31 crew themselves would return in Soyuz TM-31, which was at the end of its rated in-space storage tie. Dennis Tito's inclusion in the crew created controversy between NASA and the Russians since he was the first space tourist to fly to ISS. He had originally paid to fly to the Mir station but funds ran out to keep that station in orbit. Soyuz TM-32 docked with the -Z port on Zarya at 0758 GMT on April 30 after Endeavour had departed.. The crew transferred their customized reentry seat liners to Soyuz TM-31, at which point TM-32 became the Station's rescue vehicle. After a six day stay, the Soyuz TM-32 crew returned to earth aboard Soyuz TM-31. The Expedition 3 crew entered Soyuz TM-32) on October 19, 2001 and undocked from the nadir port of Zarya at 1048 GMT, flying it out and then sideways a few meters before approaching the station again to dock with the Pirs nadir port at 1104 GMT. This freed up Zarya for the arrival of a new Soyuz. The docking port at the aft end of Zvezda was occupied by the Progress M-45 cargo ship.

2001 May 20 - . 22:32 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Progress M1-6** - . *Payload*: Progress M1 s/n 255. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-102 ISS EO-2. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 93.44 days. *Decay Date*: 2001-08-22 . *USAF Sat Cat*: 26773 . *COSPAR*: 2001-021A. *Apogee*: 402 km (249 mi). *Perigee*: 391 km (242 mi). *Inclination*: 51.6000 deg. *Period*: 92.50 min.

  ISS Servicing flight. Launch delayed from april 12. This Progress resupply mission to the ISS was launched by the first Soyuz-FG rocket - a modified Soyuz-U with 5 percent improved perfomance using new fuel utilisation systems. Progress M1-6 after launch was also designated as ISS supply mission 4P. It carried 2.5 tonnes of food, fuel, water, life-support material, and equipment, including spare computer equipment for the ISS Destiny module. Nearly one tonne of the fuel was for raising

the altitude of the ISS. Progress M1-6 docked with Zvezda's aft (-Y) port at 0024 GMT on May 23. It undocked at 0601 GMT on August 22 and deorbited at around 0900 GMT the same day.

2001 May 29 - . 17:55 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2377** - . *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 131.00 days. *Decay Date*: 2001-10-10 . *USAF Sat Cat*: 26775 . *COSPAR*: 2001-022A. *Apogee*: 261 km (162 mi). *Perigee*: 170 km (100 mi). *Inclination*: 67.1000 deg. *Period*: 88.80 min. The Kobalt-class imaging satellite landed on October 10, 2001 after a four month mission..

2001 July 20 - . 00:17 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-3-51** - . *Payload*: Molniya-3K. *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: MO. *Manufacturer*: Reshetnev bureau. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2016-12-19 . *USAF Sat Cat*: 26867 . *COSPAR*: 2001-030A. *Apogee*: 39,467 km (24,523 mi). *Perigee*: 888 km (551 mi). *Inclination*: 62.9000 deg. *Period*: 717.80 min.

  Molniya-3K military communications satellite and booster fourth stage entered a 214 x 420 km x 62.8 deg parking orbit at 0026 GMT. About half an orbit later, over the southeast Pacific, the NPO Lavochkin Block-ML fourth stage fired to put the payload into a 407 x 40831 km x 62.9 deg orbit. The Molniya-3K was an improved version of the Molniya-3 military satellite.

2001 August 21 - . 09:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-45** - . *Payload*: Progress M s/n 245. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-105 ISS EO-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 93.50 days. *Decay Date*: 2001-11-22 . *USAF Sat Cat*: 26890 . *COSPAR*: 2001-036A. *Apogee*: 389 km (241 mi). *Perigee*: 376 km (233 mi). *Inclination*: 51.6000 deg. *Period*: 92.20 min.

  ISS Servicing Mission. Launch delayed from July 4 and 24. Progress M-45, 7K-TGM No. 245 (of the older generation series of Progress) docked with the ISS at 0951 GMT on August 23 at the aft Zvezda port vacated by Progress M6-1 a day earlier. It and delivered 2.5 tonnes of fuel, water, oxygen, equipment and spare parts. Progress M-45 undocked on November 22 and was deorbited over the Pacific later the same

day.

2001 September 14 - . 23:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-SO1** - . *Payload*: Progress M-SO1 s/n 301. *Mass*: 6,900 kg (15,200 lb). *Nation*: Russia. *Agency*: RAKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-105 ISS EO-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M-SO. *Duration*: 12.00 days. *Decay Date*: 2001-09-26 . *USAF Sat Cat*: 26908 . *COSPAR*: 2001-041A. *Apogee*: 335 km (208 mi). *Perigee*: 329 km (204 mi). *Inclination*: 51.6000 deg. *Period*: 91.20 min.

  Progress M-SO1 was the designation given to the service module section of a Progress M; the 3900 kg Pirs docking and airlock module for the ISS replaced the standard cargo and fuel sections. It also carried an astronaut chair, a space suit, a small crane, and some equipment for the Zvezda module of the ISS. Progress-M No. 301 was launched into an initial 180 km circular orbit. By September 16 it had maneuvered into a 238 x 264 km orbit; by 0038 GMT on September 17, a 385 x 395 km x 51.6 deg orbit upon rendezvous with the ISS. The Progress began a fly around of the station and lined up with the nadir port on Zvezda. Docking of Pirs with Zvezda came at 0105 GMT on September 17. The Progress M-SO1 later undocked from the Pirs nadir port to leave it free for future dockings. Pirs gave extra clearance from the Station for ships docking underneath Zvezda, and was also used as an airlock for spacewalks using the Russian Orlan EVA suits. Progress M-SO1 service module undocked from the Pirs module at 1536 GMT on September 26 and was deorbited over the Pacific at 2330 GMT the same day.

2001 October 21 - . 08:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-33** - . *Call Sign*: Derbent. *Crew*: Afanasyev, Andre-Deshays, Kozeyev. *Payload*: Soyuz TM s/n 207. *Mass*: 6,750 kg (14,880 lb). *Nation*: Russia. *Related Persons*: Afanasyev, Andre-Deshays, Kozeyev. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-33 ISS EP-2. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 195.79 days. *Decay Date*: 2002-05-05 . *USAF Sat Cat*: 26955 . *COSPAR*: 2001-048A. *Apogee*: 397 km (246 mi). *Perigee*: 386 km (239 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

  Soyuz TM-33, an ISS lifeboat, carried two Russian and one French cosmonaut to the International Space Station (ISS). It docked with the ISS at 10:00 UT on 23 October. This new crew spent eight days on the ISS, and returned on the older Soyuz TM-32 at 03:59 UT on 31 October. The new Soyuz was to remain docked as a lifeboat craft for the long-term ISS crew of three (two Russian and one American) astronauts. On May 5, 2002, after a week aboard the station, the visting Soyuz TM-34 crew moved to the old Soyuz TM-33, docked at the Pirs port. They undocked at 0031:08 UTC on

May 5, leaving the EO-4 crew of Onufrienko, Walz and Bursch with the new Soyuz TM-34 as their rescue vehicle. Soyuz TM-33 made its deorbit burn at 0257 UTC and landed successfully at 0352 UTC 25 km SE of Arkalyk.

2001 October 25 - . 11:34 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-3-52** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Reshetnev bureau. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2011-12-06 . *USAF Sat Cat*: 26970 . *COSPAR*: 2001-050A. *Apogee*: 40,658 km (25,263 mi). *Perigee*: 646 km (401 mi). *Inclination*: 62.9000 deg.

  Launch delayed from October 11. The Molniya-3 military communications satellite and Block ML upper stage were inserted into an initial 214 x 617 km x 62.8 deg parking orbit at 1143 GMT. At apogee over the South Pacific, the BOZ ullage motor fired and separated, then the ML main engine ignited and put the Molniya-3 satellite into its 615 x 40659 km x 62.8 deg operational orbit with apogee over the northern hemisphere.

2001 November 26 - . 18:24 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Progress M1-7** - . *Payload*: Progress M1 s/n 256. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-105 ISS EO-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 113.29 days. *Decay Date*: 2002-03-20 . *USAF Sat Cat*: 26983 . *COSPAR*: 2001-051A. *Apogee*: 392 km (243 mi). *Perigee*: 384 km (238 mi). *Inclination*: 51.6000 deg. *Period*: 92.30 min.

  ISS Servicing flight. Launch delayed from November 14. The Progress M1-7 Russian automatic cargo carrier soft docked with the International Space Station Zvezda module at 1943 GMT on Nov 28. The docking probe retracted, but the eight peripheral latches would not engage. It turned out that a rubber seal had been left on the docking ring by Progress M-45. Cosmonauts from aboard the station cleared the debris in a spacewalk on December 3. As they watched from a few meters away Progress M1-7 was commanded to a hard dock with the station. NASA referred to this flight as `Progress 6'. It delivered 2.5 tonnes of food, fuel and equipment to the station, as well as a microsatellite named Kolibri. The Expedition 4 crew finished loading trash into Progress M1-7 on 19 March 2002, and it undocked from Zvezda's aft port at 1743 UTC. The Kolibri-2000 microsatellite was ejected from the Progress cargo compartment at 2228 UTC; Progress fired its engines to deorbit over the Pacific at about 0127 UTC on Mar 20.

2002 February 25 - . 17:26 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2387** - . *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Agency*: KVR. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 122.00 days. *Decay Date*: 2002-06-27 . *USAF Sat Cat*: 27382 . *COSPAR*: 2002-008A. *Apogee*: 297 km (184 mi). *Perigee*: 168 km (104 mi). *Inclination*: 67.1000 deg. *Period*: 89.20 min. The optical reconnaissance satellite carried two small film capsules and a large reentry module. The main recoverable section of Cosmos 2387 landed at about 0230 UTC on June 27..

2002 March 19 - . 22:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Kolibri** - . *Mass*: 21 kg (46 lb). *Nation*: Russia. *Agency*: RAKA. *Class*: Technology. *Type*: Navigation technology satellite. *Spacecraft*: Kolibri. *Decay Date*: 2002-05-04 . *USAF Sat Cat*: 27394 . *COSPAR*: 2001-051C. *Apogee*: 388 km (241 mi). *Perigee*: 385 km (239 mi). *Inclination*: 51.6000 deg.

2002 March 21 - . 20:13 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M1-8** - . *Payload*: Progress M1 s/n 257. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-108 ISS EO-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 95.67 days. *Decay Date*: 2002-06-25 . *USAF Sat Cat*: 27395 . *COSPAR*: 2002-013A. *Apogee*: 398 km (247 mi). *Perigee*: 379 km (235 mi). *Inclination*: 51.6000 deg. *Period*: 92.30 min.

  ISS Servicing mission. Launch delayed from February 15 and 28. The Progress M1-8 resupply spacecraft was flown on ISS mission 7P. It docked with the Zvezda module on the Station at 2058 UTC on March 24. Progress M1-8 undocked from the Zvezda module at 0826 UTC on June 25. The deorbit burn was at 1135 UTC, lowering its orbit from 379 x 398 km x 51.6 deg to 50 x 398 km. The spacecraft reentered over the Pacific at 1213 UTC with debris impact near 46 S 144 W.

2002 April 1 - . 22:07 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2388** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: KVR. *Manufacturer*: Lavochkin bureau. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2011-09-14 . *USAF Sat Cat*: 27409 . *COSPAR*: 2002-017A. *Apogee*: 39,178 km (24,344 mi). *Perigee*: 519 km (322 mi). *Inclination*: 62.9300 deg.

  The Blok-I upper stage and Oko satellite were placed in a 231 x 490 km x 62.8 deg

parking orbit. Following the stage burn the Lavochkin US-KS (Oko) elliptical orbit early warning satellite built by Lavochkin was not tracked immediately, but later was reported to be in the correct standard orbit.

2002 April 25 - . 06:26 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Soyuz TM-34** - . *Call Sign*: Uran. *Crew*: Gidzenko, Shuttleworth, Vittori. *Payload*: Soyuz TM s/n 208. *Mass*: 6,750 kg (14,880 lb). *Nation*: Russia. *Related Persons*: Gidzenko, Shuttleworth, Vittori. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TM-34 ISS EP-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TM. *Duration*: 198.73 days. *Decay Date*: 2002-11-10 . *USAF Sat Cat*: 27416 . *COSPAR*: 2002-020A. *Apogee*: 397 km (246 mi). *Perigee*: 387 km (240 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

  Launch delayed from April 10, 22 and 17. Soyuz TM-34 was launched on ISS Mission 4S with Commander Yuri Gidzenko of Rosaviakosmos, Flight Engineer is Roberto Vittori of ESA, and Tourist Mark Shuttleworth, a South African citizen. At 1210 UTC Soyuz TM-34 was in a 242 x 269 km x 51.6 deg orbit. The flight was also referred to as ISS Mission 4S, the EP-3 visiting crew flight, and even as 'Soyuz 4' by NASA. Soyuz TM-34 docked with the nadir port on the Zarya module at 0755 UTC on April 27. The 4S flight docked at the Zarya nadir port on April 27. and the crew would return to Earth in the old TM-33 vehicle, leaving TM-34 as the active ISS rescue vehicle.

2002 June 26 - . 05:36 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-46** - . *Payload*: Progress M s/n 246. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-111 ISS EO-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 110.00 days. *Decay Date*: 2002-10-14 . *USAF Sat Cat*: 27454 . *COSPAR*: 2002-033A. *Apogee*: 397 km (246 mi). *Perigee*: 387 km (240 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

  Launch delayed from May 21, then moved forward from July 14. Progress M-46 was launched on ISS mission 8P and docked with the Zvezda module at 0623 UTC on June 29 after carrying out tests of the Kurs rendezvous system on June 28. Seperated from ISS and commanded to destructive re-entry on 14 October 2002.

2002 September 25 - . 16:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Progress M1-9** - . *Payload*: Progress M1 s/n 258. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-111 ISS EO-5.

Spacecraft Bus: Soyuz. *Spacecraft*: Progress M1. *Duration*: 129.00 days. *Decay Date*: 2003-02-01 . *USAF Sat Cat*: 27531 . *COSPAR*: 2002-045A. *Apogee*: 324 km (201 mi). *Perigee*: 282 km (175 mi). *Inclination*: 51.6331 deg. *Period*: 90.60 min.

Launch delayed from July 22, September 10 and 20. Progress-M1 9, known to NASA as Progress 9P, was a Russian automatic cargo transportation craft that was to deliver food, fuel, and supplies to the International Space Station (ISS). It docked with the Zvezda module of the ISS on September 29 at 1700 UTC. Prior to the docking, the port was vacated by the earlier Progress-M 46. Undocked from the station on 1 February 2003 and commanded to destructive re-entry in the atmosphere.

2002 October 15 - . 18:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Contamination in hydrogen peroxide line of fuel pump system led to explosion of Strap-on D 29 seconds after launch. The rocket crashed near the pad, debris from the explosion killing one soldier.. *Failed Stage*: 0.

- **Foton-M** - . *Payload*: Foton M-1 / Foton 13. *Mass*: 6,425 kg (14,164 lb). *Nation*: Russia. *Agency*: ESA, RAKA. *Manufacturer*: Kozlov bureau. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton.

  Launch delayed from October 9. Foton-M No. 1 (Foton-13) was an improved version of the Foton materials processing satellite. The 6425 kg satellite carried a variety of microgravity experiments including those of the European Space Agency. The satellite was destroyed in the accident.

2002 October 30 - . 03:11 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-1** - . *Call Sign*: Yenisey. *Crew*: De Winne, Lonchakov, Zalyotin. *Payload*: Soyuz TMA s/n 211. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: De Winne, Lonchakov, Zalyotin. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-1 ISS EP-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 185.96 days. *Decay Date*: 2003-05-04 . *USAF Sat Cat*: 27552 . *COSPAR*: 2002-050A. *Apogee*: 295 km (183 mi). *Perigee*: 278 km (172 mi). *Inclination*: 51.6200 deg. *Period*: 90.20 min.

  Launch delayed from October 22, 28 pending investigation of causes of failure of another Soyuz booster on 15 October. Soyuz-TMA 1 was a Russian automatic passenger craft. It carried the EP-4 visiting crew of three astronauts (two Russians and one Belgian) to automatically dock with the International Space Station (ISS). This was the first flight of the new Soyuz-TMA model. It was to remain parked at the ISS as the escape craft, relieving the Soyuz TM-34. The crew conducted several microgravity experiments on the ISS during their 10-day stay before returning in

Soyuz TM-34.

2002 December 24 - . 12:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2393** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Lavochkin bureau. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *Decay Date*: 2013-12-22 . *USAF Sat Cat*: 27613 . *COSPAR*: 2002-059A. *Apogee*: 39,722 km (24,682 mi). *Perigee*: 542 km (336 mi). *Inclination*: 62.9000 deg. *Period*: 716.00 min. Launch delayed from September, then October 22..

2003 February 2 - . 12:59 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-47** - . *Payload*: Progress M s/n 247. *Mass*: 7,290 kg (16,070 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: STS-113 ISS EO-6. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 206.00 days. *Decay Date*: 2003-08-28 . *USAF Sat Cat*: 27681 . *COSPAR*: 2003-006A. *Apogee*: 247 km (154 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.6476 deg. *Period*: 88.77 min.

  Launch delayed from original schedule of January 30, and was made just one day after the Columbia disaster resulted in a suspension of shuttle flights. Docked successfully with the ISS on 14:49 GMT on 4 February 2003. Undocked from Zvezda on August 27 and deorbited later the same day.

2003 April 2 - . 01:53 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 1-92** - . *Payload*: Molniya 1T-26 or 28. *Mass*: 1,660 kg (3,650 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Reshetnev bureau. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2013-05-27 . *USAF Sat Cat*: 27707 . *COSPAR*: 2003-011A. *Apogee*: 39,693 km (24,664 mi). *Perigee*: 655 km (406 mi). *Inclination*: 62.9000 deg. *Period*: 717.60 min.

2003 April 26 - . 03:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-2** - . *Call Sign*: Agat. *Crew*: Lu, Malenchenko. *Backup Crew*: Foale, Kaleri. *Return Crew*: Duque, Lu, Malenchenko. *Payload*: Soyuz TMA s/n 212. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Duque, Foale, Kaleri, Lu, Malenchenko. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-2. *Spacecraft Bus*: Soyuz.

Spacecraft: Soyuz TMA. *Duration*: 184.95 days. *Decay Date*: 2003-10-28 . *USAF Sat Cat*: 27781 . *COSPAR*: 2003-016A. *Apogee*: 394 km (244 mi). *Perigee*: 386 km (239 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min. Two-man Russian/American crew to provide minimal manning of space station while shuttle is grounded. Replaced three-man crew aboard ISS since before STS-107 disaster..

2003 June 2 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Mars Express (F-1) / Mars Orbiter / Beagle 2** - . *Mass*: 1,120 kg (2,460 lb). *Nation*: Europe. *Agency*: ESA. *Manufacturer*: Friedrichshafen. *Class*: Mars. *Type*: Mars probe. *Spacecraft*: Mars Express. *USAF Sat Cat*: 27816 . *COSPAR*: 2003-022A. *Apogee*: 177 km (109 mi). *Perigee*: 177 km (109 mi). *Inclination*: 51.8000 deg. *Period*: 88.00 min.

  Europe's first probe to Mars. Mars Express had a mass of 637 kg dry, including science payload and Beagle separation device, together with 480 kg of propellant and the 69 kg Beagle 2 lander, for a total of 1186 kg. In addition to this a 37 kg adapter remained attached to the Fregat upper stage. Mars Express was placed into a 1.014 x 1.531 AU x 0.2 deg orbit around the Sun, following a course correction on June 5. The launch was first moved forward from June 1 and May 31 to May 23. Then delayed to June 6, then moved forward to June 2.

2003 June 8 - . 10:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M1-10** - . *Payload*: Progress M1 s/n 259. *Mass*: 7,270 kg (16,020 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-2. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 117.06 days. *Decay Date*: 2003-10-03 . *USAF Sat Cat*: 27823 . *COSPAR*: 2003-025A. *Apogee*: 341 km (211 mi). *Perigee*: 247 km (153 mi). *Inclination*: 51.6000 deg. *Period*: 90.40 min.

  Resupply of International Space Station. Additional water carried to meet needs of skeleton crew. Successfully docked with the nadir port on Pirs at 1115 GMT on June 11. It undocked from the station on September 4 to clear the port for Soyuz TMA-3 but then unusually spent a month on an autonomous earth observation mission. The deorbit engine ignited at 11:26 GMT on October 3 from a 247 x 340 km x 51.6 deg orbit, reducing the perigee to 69 km. Progress M1-10 reentered the atmosphere over the Pacific at 11:58 GMT and broke up around 12:05 GMT.

2003 June 19 - . 20:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya 3-53** - . *Mass*: 1,600 kg (3,500 lb). *Nation*: Russia. *Agency*: VKS. *Program*: Molniya. *Class*: Communications. *Type*: Military communications

satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-3. *Decay Date*: 2013-06-15 . *USAF Sat Cat*: 27834 . *COSPAR*: 2003-029A. *Apogee*: 39,703 km (24,670 mi). *Perigee*: 651 km (404 mi). *Inclination*: 62.9000 deg. *Period*: 717.80 min.

The satellite entered a 211 x 559 km x 62.8 deg parking orbit, and then the Blok ML upper stage fired to put it in a 604 x 40578 km x 62.7 deg drift orbit with a 734 minute period. The orbit was later adjusted to 717.8 minutes (semi-synchronous) with an onboard engine. The special orbital inclination of 63 degrees minimizes the rotation of the orbit in its plane due to the oblateness of the Earth, keeping the apogee in the same apparent position over the northern hemisphere.

2003 August 12 - . 14:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2399** - . *Mass*: 6,750 kg (14,880 lb). *Nation*: Russia. *Agency*: VKS. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Orlets-1. *Decay Date*: 2003-12-09 . *USAF Sat Cat*: 27856 . *COSPAR*: 2003-035A. *Apogee*: 289 km (179 mi). *Perigee*: 180 km (110 mi). *Inclination*: 64.9000 deg. *Period*: 89.20 min.

  Originally to have launched September 2002; June 2003. A Russian newspaper report (Kommersant, 13 August) stated that Cosmos 2399 was a Neman (Yantar-4KS1M) imaging satellite, which used data relay satellites to return CCD imagery rather than physically recovering film. However some Western observors, when Cosmos 2399 raised its perigee on August 14 to 205 km and lowered the apogee to 330 km, believed this was more like the standard operational orbit for an Orlets-1 Don 17F12 film-return capsule imaging satellite. This seemed confirmed when debris was tracked around the satellite later on, which was then said to be due to a failed film capsule recovery attempt. Destroyed in orbit on December 9 after completing its mission.

2003 August 29 - . 01:47 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-48** - . *Payload*: Progress M s/n 248. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-2. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 152.00 days. *Decay Date*: 2004-01-28 . *USAF Sat Cat*: 27873 . *COSPAR*: 2003-039A. *Apogee*: 383 km (237 mi). *Perigee*: 376 km (233 mi). *Inclination*: 51.6000 deg. *Period*: 92.10 min.

  Delayed from July 30, moved up from September 18 and August 30. Docked with the Zvezda module of the ISS on August 31. Undocked from the station at 08:36 GMT on 28 January 2004 after being filled with trash and unneeded equipment. Deorbited and reentered over the Pacific at 13:46 GMT.

2003 October 18 - . 05:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-3** - . *Call Sign*: Ingul. *Crew*: Duque, Foale, Kaleri. *Return Crew*: Foale, Kaleri, Kuipers. *Payload*: Soyuz TMA s/n 213. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Duque, Foale, Kaleri, Kuipers. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-2, Soyuz TMA-3, Soyuz TMA-3 Cervantes. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 194.77 days. *Decay Date*: 2004-04-30 . *USAF Sat Cat*: 28052 . *COSPAR*: 2003-047A. *Apogee*: 384 km (238 mi). *Perigee*: 376 km (233 mi). *Inclination*: 51.6000 deg. *Period*: 92.20 min.

  The spacecraft carried the Expedition 8 crew of Mike Foale and Aleksandr Kaleri and the EP-5 (Cervantes) mission crewmember Pedro Duque. During the flight to the station spacecraft Commander was Aleksandr Kaleri . Soyuz TMA-3 docked with the Pirs module at 07:16 GMT on October 20. Once the EO-7 crew aboard the ISS was relieved, the roles switched, with Foale becoming the ISS Commander. Duque carried out out 24 experiments in the fields of life and physical sciences, Earth observation, education and technology. The experiments were sponsored by the European Space Agency and Spain. After ten days in space, Duque returned to earth with the EO-7 crew of Malenchenko and Lu aboard Soyuz TMA-2.

2003 December 27 - . 21:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Amos 2** - . *Mass*: 996 kg (2,195 lb). *Nation*: Israel. *Agency*: Starsem. *Program*: Amos. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft*: Amos. *USAF Sat Cat*: 28132 . *COSPAR*: 2003-059A. *Apogee*: 35,795 km (22,241 mi). *Perigee*: 35,780 km (22,230 mi). *Inclination*: 0.0600 deg. *Period*: 1,436.14 min. Intermediate orbit shown. Fregat stage later placed Amos-2 in geostationary orbit. As of 2007 Mar 9 located at 4.00W drifting at 0.003W degrees per day..

2004 January 29 - . 11:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M1-11** - . *Payload*: Progress M1 s/n 260. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-3. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M1. *Duration*: 116.00 days. *Decay Date*: 2004-06-03 . *USAF Sat Cat*: 28142 . *COSPAR*: 2004-002A. *Apogee*: 263 km (163 mi). *Perigee*: 192 km (119 mi). *Inclination*: 51.6500 deg. *Period*: 88.73 min.

  ISS resupply, to dock at the Zvezda module of the station 13:15 GMT on 31 January. Launch delayed from November 20, 2003. Payload delivered amounted to 2345 kg and included a new flex hose for the Destiny module's leaky window, replacement parts for the Russian Elektron oxygen-generating unit, a spare Elektron, new

Russian Solid Fuel Oxygen Generator candles, batteries for the Zarya and Zvezda modules, gas analyser equipment, updated fire suppression and detection equipment, a new Russian Orlan spacesuit, film, cameras, data cassettes and the Matreshka experiment package for installation on Zvezda's exterior during a spacewalk.

A few days prior to its departure from the ISS, ground controllers fired the Progress M1-11's engines for 11 minutes, boosting the Station's altitude by 3.7 km and adjusting its inclination by one one-hundredth of a degree. Progress M1-11 undocked from the Station at 11:19 GMT on 24 May 2005, clearing the way for the arrival of Progress M-49. It was thereafter commanded to a destructive re-entry over the Pacific Ocean.

2004 February 18 - . 07:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Molniya-1T** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Lavochkin bureau. *Program*: Molniya. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-1T. *Decay Date*: 2016-04-16 . *USAF Sat Cat*: 28163 . *COSPAR*: 2004-005A. *Apogee*: 39,708 km (24,673 mi). *Perigee*: 650 km (400 mi). *Inclination*: 62.9000 deg. *Period*: 717.90 min. Launched during a nationwide military exercise. Original name Cosmos 2405..

2004 April 19 - . 03:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-4** - . *Call Sign*: Altair. *Crew*: Fincke, Kuipers, Padalka. *Return Crew*: Fincke, Padalka, Shargin. *Payload*: Soyuz TMA s/n 214. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Fincke, Kuipers, Padalka, Shargin. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-3, Soyuz TMA-4, Soyuz TMA-4 Delta. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 187.89 days. *Decay Date*: 2004-10-24 . *USAF Sat Cat*: 28228 . *COSPAR*: 2004-013A. *Apogee*: 367 km (228 mi). *Perigee*: 359 km (223 mi). *Inclination*: 51.6000 deg. *Period*: 91.80 min.

  Soyuz TMA-4 was ISS transport mission ISS 8S and delivered the EO-9 caretaker crew of Gennadiy Padalka and Michael Fincke, together with the ESA/Netherlands Delta mission crewmember Andre Kuipers, to the Space Station. Soyuz TMA-4 docked with the nadir port on Zarya at 05:01 GMT on April 21 and the hatches to the ISS were opened at 06:30 GMT. Another gyro on the station had shut down prior to the docking and possibly would require a maintenance spacewalk to replace its failed electronics.

  After Soyuz TMA-5 docked with the ISS on October 16, the EO-9 crew handed activities over to the EO-10 crew.

2004 May 25 - . 12:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-49** - . *Payload*: Progress M s/n 249. *Mass*: 7,283 kg (16,056 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 66.00 days. *Decay Date*: 2004-07-30 . *USAF Sat Cat*: 28261 . *COSPAR*: 2004-019A. *Apogee*: 367 km (228 mi). *Perigee*: 359 km (223 mi). *Inclination*: 51.6000 deg. *Period*: 91.80 min.

  Docked at the aft port of the Zvezda Service Module of the International Space Station on 27 May at 13:55 GMT. Delivered two and a half tons of food, water, fuel, spare parts and supplies. Progress M-49 undocked from the Zvezda module on 30 July 2004 at 7:05 GMT, after having been filled with a tonne of trash. Fincke filmed its departure, and Station exterior cameras captured rare footage of the Progress' fiery re-entry into Earth's atmosphere after it was deorbited.

2004 August 11 - . 05:01 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-50** - . *Payload*: Progress M s/n 250. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-4. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 133.73 days. *Decay Date*: 2004-12-23 . *USAF Sat Cat*: 28399 . *COSPAR*: 2004-032A. *Apogee*: 365 km (226 mi). *Perigee*: 358 km (222 mi). *Inclination*: 51.6000 deg. *Period*: 91.80 min. Delayed from July 22 and 28. Docked with the International Space Station at 05:01 GMT on August 14. Undocked from the Zvezda module of the ISS on December 22 at 19:34 GMT and was deorbited over the Pacific at 22:32 GMT..

2004 September 24 - . 16:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2410** - . *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Agency*: KVR. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 107.00 days. *Decay Date*: 2005-01-09 . *USAF Sat Cat*: 28396 . *COSPAR*: 2004-038A. *Apogee*: 348 km (216 mi). *Perigee*: 208 km (129 mi). *Inclination*: 67.1000 deg. *Period*: 90.10 min.

  Film-return reconnaisance satellite. Maneuvered on October 1 to a 213 x 330 km orbit. Believed to be an improved Yantar-4K1 with a longer lifetime - and given the code name 'Kobalt' previously applied to the defunct Yantar-4K2 system. When re-entry was commanded after only 107 days in orbit, there was speculation that problems had arisen with the satellite. Sources claimed the satellite had some kind of control problem, which was brought under control, and the two smaller film return

capsules were successfully returned. But when the control problem reoccurred, it was decided to bring the main re-entry capsule down early. At retrofire, two objects were tracked as having separated from the spacecraft. Russian search teams were unable to locate the capsule after re-entry. Further launches of the satellite were put on hold until a State Commission could determine the causes of the failure.

2004 October 14 - . 03:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-5** - . *Call Sign*: Tien Shan. *Crew*: Chiao, Shargin, Sharipov. *Return Crew*: Chiao, Sharipov, Vittori. *Payload*: Soyuz TMA s/n 215. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Chiao, Shargin, Sharipov, Vittori. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 192.79 days. *Decay Date*: 2005-04-25 . *USAF Sat Cat*: 28444 . *COSPAR*: 2004-040A. *Apogee*: 359 km (223 mi). *Perigee*: 353 km (219 mi). *Inclination*: 51.6000 deg. *Period*: 91.70 min.

  Soyuz TMA-5 docked with the Pirs module on October 16 at 0416 GMT. Aboard the spacecraft were the EO-10 crew of Sharipov and Chiao, and guest cosmonaut Shargin. After a week at the station, the EO-9 crew of Padalka and Fincke, together with Shargin, entered Soyuz TMA-4 at 18:14 GMT on October 23 and returned to earth. Chiao and Sharipov continued as the ISS skeleton station crew.

2004 November 8 - . 18:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Soyuz 2 flight test.** - . *Nation*: Russia. *Agency*: KVR.

  First flight test of a modernized version of the Soyuz ST equipped with a digital control system. Suborbital launch; carried an obsolete Zenit-8 reconnaisance satellite as a mass model and impacted in the Pacific Ocean. Launch delayed from October 15 and 29, November 6.

2004 December 23 - . 22:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-51** - . *Payload*: Progress M s/n 251. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 76.00 days. *Decay Date*: 2005-03-09 . *USAF Sat Cat*: 28503 . *COSPAR*: 2004-051A. *Apogee*: 355 km (220 mi). *Perigee*: 316 km (196 mi). *Inclination*: 51.6000 deg. *Period*: 91.20 min.

  Launch delayed from November 24, December 22 . Progress M-51 docked with the Zvezda module of the International Space Station on December 25 at 23:58 GMT,

bringing critical food supplies to the EO-10 crew. Press hype during the delays prior to the launch had portrayed the situation as one where failure of the Progress to dock would have required the crew to either return to earth or starve.

Undocked from at 16:06 GMT on February 27, 2005, in order to clear the port for Progress M-52, which would launch the next day. Progress M-51 lowered its perigee at around 18:30 GMT and remained in orbit for several days. FInally an engine firing was commanded, bringing it down in a destructive re-entry over the Pacific Ocean on March 9.

2005 February 28 - . 19:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-52** - . *Payload*: Progress M s/n 252. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kozlov bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-5. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 107.20 days. *Decay Date*: 2005-06-16 . *USAF Sat Cat*: 28624 . *COSPAR*: 2005-007A. *Apogee*: 360 km (220 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min. Docked with the Zvezda module of the International Space Station at 20:10 GMT on March 2. Undocked at 20:16 GMT on 15 June. Retrofire at 23:16 GMT lowered its perigee to 62 km, and resulting in a destructive re-entry over the Pacific at 23:57 GMT..

- **Nanosputnik** - . *Payload*: TEKh-42 / TNS-0 s/n 1. *Mass*: 5.00 kg (11.00 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Technology. *Type*: Navigation technology satellite. *Flight*: Soyuz TMA-5. *Spacecraft*: Nanosputnik. *Decay Date*: 2005-08-30 . *USAF Sat Cat*: 28547 . *COSPAR*: 2005-007C. *Apogee*: 353 km (219 mi). *Perigee*: 341 km (211 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min. Nanosatellite delivered by Progress M-52 to the International Space Station. 30 cm long, it was released from during a spacewalk on 28 March 2005..

2005 April 15 - . 00:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-6** - . *Call Sign*: Basalt. *Crew*: Krikalyov, Phillips, Vittori. *Return Crew*: Krikalyov, Olsen, Phillips. *Payload*: Soyuz TMA s/n 216. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Krikalyov, Olsen, Phillips, Vittori. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-5, Soyuz TMA-6, Soyuz TMA-6 Eneide. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 179.02 days. *Decay Date*: 2005-10-11 . *USAF Sat Cat*: 28640 . *COSPAR*: 2005-013A. *Apogee*: 360 km (220 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min.

  The Soyuz TMA-6 docked with International Space Station's Pirs module at 02:20 GMT on April 17. Commander of the long-duration EO-11 crew was Russian cosmonaut Sergey Krikalyov. Flight engineer and science officer was American

astronaut John Phillips. Italian Roberto Vittori accompanied the EO-10 crew aboard Soyuz TMA-6 to the station on the European Space Agency EP-8 Eneide mission.

2005 May 31 - . 12:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton M-2** - . *Payload*: Foton 14. *Mass*: 6,535 kg (14,407 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kozlov bureau. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Decay Date*: 2005-06-16 . *USAF Sat Cat*: 28686 . *COSPAR*: 2005-020A. *Apogee*: 304 km (188 mi). *Perigee*: 262 km (162 mi). *Inclination*: 63.0000 deg. *Period*: 89.93 min.

  Microgravity mission with the experiments being returned to earth after 16 days in a spherical Vostok capsule of the type that first carried Yuri Gagarin into space in 1961. The capsule landed in Kazakhstan at 07:36 GMT on 16 June. For this mission a 385 kg European payload of 39 experiments in fluid physics, biology, material science, meteoritics, radiation dosimetry and exobiology was carried. A further 215 kg of Russian instruments were also flown. Many were experiments were being reflown following loss of Foton-M1 on 15 October 2002. The planned Fotino miniature re-entry capsule experiment was not flown.

  Applied research included heat transfer experiments with the European FluidPac facility, chemical diffusion experiments in the SCCO (Soret Coefficients in Crude Oil), and material science investigations in the Agat and Polizon furnaces. These experiments were expected to contribute to new heat-exchanger designs, more efficient oil exploration processes, and better semiconductor alloys. The Biopan facility carried life science experiments, including a student seed germination test.

2005 June 16 - . 23:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-53** - . *Payload*: Progress M s/n 353. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-6. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 82.62 days. *Decay Date*: 2005-09-07 . *USAF Sat Cat*: 28700 . *COSPAR*: 2005-021A. *Apogee*: 353 km (219 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min.

  Delayed from June 10. Space station resupply mission. After a communications failure, ISS Commander Krikalyov took manual remote control used the TORU system to guide Progress M-53 to a docking at the ISS Zvezda module at 00:42 GMT on 19 June. Undocked at 10:26 GMT on 7 September into a 350 km x 351 km orbit. Progress M-53 began retrofire at 13:26 GMT the same day, lowering its perigee to 56 km and thereby ensuring a destructive re-entry into the Pacific Ocean.

2005 June 21 - . 00:49 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk

LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M. *FAILURE*: Failure - Third stage propulsion. *Failed Stage*: 3.

- **Molniya 3K** - . *Payload*: 11F637. *Mass*: 1,750 kg (3,850 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Reshetnev bureau. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: KAUR-2. *Spacecraft*: Molniya-2. Delayed from May 25.

2005 August 13 - . 23:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Galaxy 14** - . *Mass*: 2,087 kg (4,601 lb). *Nation*: USA. *Agency*: PanAmSat. *Manufacturer*: OSC. *Program*: Galaxy. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Star bus. *USAF Sat Cat*: 28790 . *COSPAR*: 2005-030A. *Apogee*: 35,790 km (22,230 mi). *Perigee*: 35,782 km (22,233 mi). *Inclination*: 0.0000 deg. *Period*: 1,436.10 min. Payload swapped from Ariane 5. Launch delayed from December 2004; February 25, March 16 and 25, April 25, June 17, July 10 and 28, August 1, 6 and 12, 2005. As of 2007 Mar 9 located at 125.05W drifting at 0.008W degrees per day..

2005 September 2 - . 09:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2415** - . *Payload*: Kometa s/n 21. *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-1KFT. *Duration*: 44.00 days. *Decay Date*: 2005-10-16 . *USAF Sat Cat*: 28841 . *COSPAR*: 2005-034A. *Apogee*: 272 km (169 mi). *Perigee*: 205 km (127 mi). *Inclination*: 64.9000 deg. *Period*: 89.30 min. 1,700th launch of a vehicle derived from the R-7 ICBM put a Kometa-type cartographic satellite into orbit. The surveillance satellite's primary camera and film payload was recovered at 21:44 on 15 or 16 October..

2005 September 8 - . 13:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-54** - . *Payload*: Progress M s/n 354. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kozlov bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-6. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 176.00 days. *Decay Date*: 2006-03-03 . *USAF Sat Cat*: 28866 . *COSPAR*: 2005-035A. *Apogee*: 348 km (216 mi). *Perigee*: 347 km (215 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min. Delayed from August 24. Resupply spacecraft which docked with the ISS Zvezda module at 14:42 GMT on 10 September. Undocked from the Zvezda module on March 3 2006 at 10:06 GMT and fired its engines to reenter over the Pacific at 13:05 GMT..

2005 October 1 - . 03:54 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-7** - . *Call Sign*: Rassvet. *Crew*: McArthur, Olsen, Tokarev. *Return Crew*: McArthur, Pontes, Tokarev. *Payload*: Soyuz TMA s/n 217. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: McArthur, Olsen, Pontes, Tokarev. *Agency*: NASA, RAKA, Shanghai Astronautics Bureau. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-6, Soyuz TMA-7, Soyuz TMA-8 ISS EP-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 189.83 days. *Decay Date*: 2006-04-08 . *USAF Sat Cat*: 28877 . *COSPAR*: 2005-039A. *Apogee*: 348 km (216 mi). *Perigee*: 347 km (215 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min.

  Launch delayed from September 27. Soyuz TMA-7 docked with the International Space Station at 05:27 GMT on 3 October, bringing the long duration EO-12 crew of (McArthur, Commander; Tokarev, Flight Engineer) and space tourist Olsen. McArthur, Tokarev and Pontes (brought to the station aboard Soyuz TMA-8) transferred to TMA-7 on April 8, 2006, closing the hatches at 17:15 GMT and undocking from Zvezda at 20:28 GMT, leaving Vinogradov and Williams from Soyuz TMA-8 as the Expedition 13 in charge of the station. Soyuz TMA-7 fired its engines at 22:58 GMT for the deorbit burn and landed in Kazakhstan at 23:48 GMT.

2005 November 9 - . 03:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Venus Express** - . *Mass*: 1,270 kg (2,790 lb). *Nation*: Europe. *Agency*: ESA. *Class*: Venus. *Type*: Venus probe. *Spacecraft*: Venus Express. *USAF Sat Cat*: 28901 . *COSPAR*: 2005-045A.

  Launch delayed from October 26. The Soyuz placed the probe and Fregat upper stage into a 30 km x 190 km x 51.6 deg orbit around the earth. At apogee the Fregat stage made a 50 m/s maneuver to circularize the orbit. At the appropriate moment in this parking orbit, the Fregat fired again, then separated from the now Venus-bound probe at 05:11 GMT. Venus Express passed lunar orbit on November 10 at 10:10 GMT and went into a 0.702 AU x 0.993 AU x 0.26 deg inclination solar orbit. It was to brake itself into a 250 km x 326,550 km x 89.7 deg orbit around Venus on 11 April 2006 at 08:40 GMT. Two maneuvers would put in its final 24-hour Venus orbit of 282 x 66,911 km x 90.0 deg on 30 April. This was selected to synchronise the satellite with tracking stations on earth, while the planet slowly revolves below its perigee point over the following several months.

2005 December 21 - . 18:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-55** - . *Payload*: Progress M s/n 355. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS.

Class: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-7. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 179.96 days. *Decay Date*: 2006-06-19 . *USAF Sat Cat*: 28906 . *COSPAR*: 2005-047A. *Apogee*: 349 km (216 mi). *Perigee*: 336 km (208 mi). *Inclination*: 51.6000 deg. *Period*: 91.40 min. The resupply spacecraft docked with the ISS Pirs module at 19:46 GMT on 23 December. It undocked at 14:06 GMT on June 19, 2006; fired its engines at 17:06 GMT to lower its orbit into the atmosphere; and burned up over the Pacific Ocean at 17:41 GMT..

2005 December 28 - . 05:19 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Giove-A** - . *Payload*: GSTB-V2/A / Heavily modified Surrey MiniSat-400. *Mass*: 600 kg (1,320 lb). *Nation*: Europe. *Agency*: ESA. *Manufacturer*: Surrey. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: SSTL-900. *USAF Sat Cat*: 28922 . *COSPAR*: 2005-051A. *Apogee*: 23,360 km (14,510 mi). *Perigee*: 23,314 km (14,486 mi). *Inclination*: 56.2000 deg. *Period*: 849.60 min.

  Delayed from September, October, December 26. Galileo In-Orbit Validation Element, a prototype for the Galileo European navigation satellite network. Giove carried carried two rubidium atomic clocks and a large L-band phased array antenna. Retired in 2012 as the production models went on-line.

2006 March 30 - . 02:30 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-8** - . *Call Sign*: Carat. *Crew*: Pontes, Vinogradov, Williams, Jeffrey. *Return Crew*: Ansari, Vinogradov, Williams, Jeffrey. *Payload*: Soyuz TMA s/n 218. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Ansari, Pontes, Vinogradov, Williams, Jeffrey. *Agency*: NASA, RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-7, Soyuz TMA-8, Soyuz TMA-8 ISS EP-10. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 182.95 days. *Decay Date*: 2006-09-29 . *USAF Sat Cat*: 28996 . *COSPAR*: 2006-009A. *Apogee*: 349 km (216 mi). *Perigee*: 336 km (208 mi). *Inclination*: 51.6000 deg. *Period*: 91.40 min.

  Soyuz TMA-8 docked with the Zarya nadir port of the ISS at 04:19 GMT on April 1. It undocked from Zarya on 28 September at 21:53 GMT, with the return crew of Vinogradov, Williams and space tourist Ansari aboard. It landed in Kazakhstan at 01:13 GMT on 29 September.

2006 April 24 - . 16:03 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-56** - . *Payload*: Progress M s/n 356. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-8. *Spacecraft*

Bus: Soyuz. *Spacecraft*: Progress M. *Duration*: 157.35 days. *Decay Date*: 2006-09-19 . *USAF Sat Cat*: 29057 . *COSPAR*: 2006-013A. *Apogee*: 349 km (216 mi). *Perigee*: 336 km (208 mi). *Inclination*: 51.6000 deg. *Period*: 91.40 min. Progress M-56 docked at the Zvezda port of the International Space Station on 26 April at 17:41 GMT. It undocked at 00:28 GMT on 29 September and was then commanded to a destructive reentry over the south Pacific Ocean..

2006 May 3 - . 17:38 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2420** - . *Payload*: Yantar 4K-2M. *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Military surveillance radar satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Decay Date*: 2006-07-19 . *USAF Sat Cat*: 29111 . *COSPAR*: 2006-017A. *Apogee*: 349 km (216 mi). *Perigee*: 178 km (110 mi). *Inclination*: 67.1000 deg. *Period*: 89.80 min. Imaging reconnaissance satellite, probably the second Kobalt-M satellite, built by the Arsenal factory. The satellite carried small film recovery capsules and one large reentry vehicle, recovered at the end of the mission with the camera and more film..

2006 June 15 - . 08:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Resurs DK-1** - . *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kozlov bureau. *Program*: Resurs. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4KS1. *USAF Sat Cat*: 29228 . *COSPAR*: 2006-021A. *Apogee*: 585 km (363 mi). *Perigee*: 355 km (220 mi). *Inclination*: 69.9000 deg. *Period*: 94.00 min.

  Civilian remote sensing satellite with a one-meter-resolution-class Geoton-1 camera payload.that relayed its data to the ground via a digital link. It was based on the Terilen/Neman class military reconnaissance satellite in use since the 1980s, using the Yantar satellite bus.

2006 June 24 - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-57** - . *Payload*: Progress M s/n 357. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-8. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 207.00 days. *Decay Date*: 2007-01-17 . *USAF Sat Cat*: 29245 . *COSPAR*: 2006-025A. *Apogee*: 349 km (216 mi). *Perigee*: 335 km (208 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min. The Progress flew International Space Station resupply mission 22P (NASA called the flight Progress 22). It docked at the ISS Pirs port at 16:25 GMT on June 26..

2006 July 21 - . 04:20 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2422** - . *Mass*: 1,750 kg (3,850 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Lavochkin bureau. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 29260 . *COSPAR*: 2006-030A. *Apogee*: 39,741 km (24,693 mi). *Perigee*: 616 km (382 mi). *Inclination*: 62.9000 deg. *Period*: 717.80 min. Missile early warning satellite.

2006 September 14 - . 13:41 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2423** - . *Mass*: 6,750 kg (14,880 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Orlets-1. *Duration*: 64.00 days. *Decay Date*: 2006-11-17 . *USAF Sat Cat*: 29402 . *COSPAR*: 2006-039A. *Apogee*: 306 km (190 mi). *Perigee*: 208 km (129 mi). *Inclination*: 64.9000 deg. *Period*: 89.70 min. Military surveillance; believed to be a derivative of the Orlets-1 multiple-capsule-return reconnaisance sattelite. Destroyed in orbit on November 17 at the end of its mission..

2006 September 18 - . 04:08 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-9** - . *Call Sign*: Vostok. *Crew*: Ansari, Lopez-Alegria, Tyurin. *Return Crew*: Lopez-Alegria, Simonyi, Tyurin. *Payload*: Soyuz TMA s/n 219. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Ansari, Lopez-Alegria, Simonyi, Tyurin. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-8, Soyuz TMA-9. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 215.35 days. *Decay Date*: 2007-04-21 . *USAF Sat Cat*: 29400 . *COSPAR*: 2006-040A. *Apogee*: 348 km (216 mi). *Perigee*: 330 km (200 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min.

  Carried the Expedition 14 crew and space tourist Anousheh Ansari to the International Space Station. Ansari replaced tourist Daisuke Enomoto, who was removed from flight status by the Russians just 28 days before the flight. Docked at the Zvezda port of the station at 05:21 GMT on September 20. On 21 April 2007, Lopez-Alegria, Tyurin and space tourist Charles Simonyi (who was taken to the station aboard Soyuz TMA-10) boarded Soyuz TMA-9, separated from the ISS, conducted retrofire, and landed in Kazakhstan at 12:31 GMT.

2006 October 19 - . 16:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Metop-A** - . *Mass*: 4,093 kg (9,023 lb). *Nation*: Europe. *Agency*: RKA. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: SPOT-5A-5B. *Spacecraft*: Metop. *USAF Sat*

Cat: 29499 . *COSPAR*: 2006-044A. *Apogee*: 817 km (507 mi). *Perigee*: 817 km (507 mi). *Inclination*: 98.7000 deg. *Period*: 101.00 min.

European polar weather satellite equipped with high-resolution visible and infrared cameras, a microwave sounder, ozone monitors, a GPS atmospheric sounding device, a wind scatterometer, and a search and rescue package. First launch of the Soyuz 2 version of the venerable Soyuz launch vehicle. The main change in this first version of the new booster was a digital control system. Problems with this system delayed the launch repeatedly.

2006 October 23 - . 13:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-58** - . *Payload*: Progress M s/n 358. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-8. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 155.38 days. *Decay Date*: 2007-03-28 . *USAF Sat Cat*: 29503 . *COSPAR*: 2006-045A. *Apogee*: 351 km (218 mi). *Perigee*: 321 km (199 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min.

  The Progress docked with the Zvezda module of the ISS at 14:29 GMT on October 26. There were indications that the Kurs rendezvous antenna on the forward docking ring had not retracted correctly, but this proved not to be the case. Hard dock was commanded at 18:06 GMT. Progress M-58 undocked from the Zvezda module on 27 March 2007 at 18:11 GMT and was deorbited at 22:44 GMT.

2006 December 24 - . 08:34 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Meridian 1** - . *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Reshetnev bureau. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: Glonass. *Spacecraft*: Meridian. *USAF Sat Cat*: 29668 . *COSPAR*: 2006-061A. *Apogee*: 39,093 km (24,291 mi). *Perigee*: 1,264 km (785 mi). *Inclination*: 63.4000 deg. *Period*: 717.80 min.

  Launch rescheduled twice due to Soyuz 2 software problems. The Meridian satellite was designed to provide communication between vessels and airplanes involved in ice surveillance in the North Sea area, and coastal stations on the ground, as well as to expand a network of satellite communications in the northern regions of Siberia and the Russian Far East.

2006 December 27 - . 14:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Corot** - . *Mass*: 640 kg (1,410 lb). *Nation*: France. *Agency*: CNES. *Manufacturer*: Alenia. *Class*: Astronomy. *Type*: X-ray astronomy satellite. *Spacecraft Bus*: Proteus.

Spacecraft: Corot. *USAF Sat Cat*: 29678 . *COSPAR*: 2006-063A. *Apogee*: 902 km (560 mi). *Perigee*: 898 km (557 mi). *Inclination*: 90.0000 deg. *Period*: 103.00 min.

European COnvection ROtation and planetary Transits satellite, designed to detect transits of planets down to earth size as they pass in front of their stars, and convection currents on stellar surfaces. The satellite was to use its 27-cm-diameter telescope to scan 120,000 stars during its 30-month mission. This was the first flight of the Soyuz-2 booster with the improved RD-0124 third stage engine.

2007 January 18 - . 02:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-59** - . *Payload*: Progress M s/n 359. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Lopez-Alegria, Tyurin, Williams. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-9, STS-117 ISS EO-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 195.00 days. *Decay Date*: 2007-08-01 . *USAF Sat Cat*: 29714 . *COSPAR*: 2007-002A. *Apogee*: 351 km (218 mi). *Perigee*: 321 km (199 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min. Progress docked to the Pirs port of the ISS at 01:59 GMT on 20 January. The cargo craft brought up 780 kg of propellant for the Russian thrusters, 50 kg of oxygen and 1500 kg of spare parts, experiment hardware and life support components..

2007 April 7 - . 17:31 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-10** - . *Call Sign*: Pulsar. *Crew*: Kotov, Simonyi, Yurchikhin. *Return Crew*: Kotov, Muszaphar, Yurchikhin. *Payload*: Soyuz TMA s/n 220 / ISS-14S. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Related Persons*: Kotov, Muszaphar, Simonyi, Yurchikhin. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-10, Soyuz TMA-10 ISS EP-12. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 196.71 days. *Decay Date*: 2007-10-21 . *USAF Sat Cat*: 31100 . *COSPAR*: 2007-008A. *Apogee*: 341 km (211 mi). *Perigee*: 330 km (200 mi). *Inclination*: 51.6000 deg. *Period*: 91.20 min.

  Carried the Expedition 15 crew and space tourist Charles Simonyi to the International Space Station. Soyuz TMA-10 docked at the Zarya port of the International Space Station at 19:10 GMT on 9 April. It undocked from Zarya at 19:20 GMT on Sep 27 September and docked at the Zvezda port at 19:47 GMT to clear Zarya for Soyuz TMA-10.

  The EO-15 crew and EP-13 space tourist Shukor (brought to the station by Soyuz TMA-11) boarded Soyuz TM-10 and undocked from the Zvezda port at 07:14 GMT on 21 October. The re-entry burn began at 09:47 and was normal. But afterwards, due to failure of an explosive bolt, the Soyuz service module remained connected to the re-entry capsule. The Soyuz tumbled, then began re-entry with the forward hatch

taking the re-entry heating, until the connecting strut burned through. The Soyuz the righted itself with the heat shield taking the heating, but defaulted to an 8.6 G ballistic re-entry, landing 340 km short of the aim point at 10:36 GMT. Improved procedures after the ballistic re-entry of Soyuz TMA-1 meant a helicopter recovery crew reached the capsule only 20 minutes after thumpdown. However the true nature of the failure was concealed from the world until the same thing happened on Soyuz TMA-11.

2007 May 12 - . 03:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-60** - . *Payload*: Progress M s/n 360. *Mass*: 7,280 kg (16,040 lb). *Nation*: Russia. *Related Persons*: Kotov, Williams, Yurchikhin. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-10, STS-117 ISS EO-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 136.65 days. *Decay Date*: 2007-09-25 . *USAF Sat Cat*: 31393 . *COSPAR*: 2007-017A. *Apogee*: 341 km (211 mi). *Perigee*: 330 km (200 mi). *Inclination*: 51.6000 deg. *Period*: 91.20 min.

  Space station resupply spacecraft which docked with the Zvezda port of the International Space Station at 05:10 GMT on 15 May. It undocked on 19 September was conducted plasma depletion experiments before being deorbited over the Pacific at 19:01 GMT on 25 September..

2007 May 29 - . 20:31 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Globalstar A** - . *Mass*: 450 kg (990 lb). *Nation*: USA. *Agency*: Globalstar. *Manufacturer*: Palo Alto. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 31571 . *COSPAR*: 2007-020A. *Apogee*: 932 km (579 mi). *Perigee*: 914 km (567 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min. First replenishment launch of the resurgent Globalstar MEO communications satellite constellation after a five-year hiatus..

- **Globalstar B** - . *Mass*: 450 kg (990 lb). *Nation*: USA. *Agency*: Globalstar. *Manufacturer*: Palo Alto. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 31573 . *COSPAR*: 2007-020C. *Apogee*: 931 km (578 mi). *Perigee*: 913 km (567 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min.

- **Globalstar C** - . *Mass*: 450 kg (990 lb). *Nation*: USA. *Agency*: Globalstar. *Manufacturer*: Palo Alto. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 31574 . *COSPAR*: 2007-020D. *Apogee*: 932 km (579 mi). *Perigee*: 926 km (575 mi). *Inclination*: 52.0000 deg. *Period*: 103.60 min.

- **Globalstar D** - . *Mass*: 450 kg (990 lb). *Nation*: USA. *Agency*: Globalstar. *Manufacturer*: Palo Alto. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 31576 . *COSPAR*: 2007-020F. *Apogee*: 938 km (582 mi). *Perigee*: 919 km (571 mi). *Inclination*: 52.0000 deg. *Period*: 103.60 min.

2007 June 7 - . 18:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2427** - . *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Kozlov bureau. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 76.13 days. *Decay Date*: 2007-08-22 . *USAF Sat Cat*: 31595 . *COSPAR*: 2007-022A. *Apogee*: 339 km (210 mi). *Perigee*: 167 km (103 mi). *Inclination*: 67.1000 deg. *Period*: 89.80 min.

  Recoverable capsule military optical reconnaisance satellite. Orbit was raised on 11 June to 182 km x 354 km; decayed until 19 June, when it was lowered to 175 km x 325 km. On 28 June the orbit was raised to 183 km x 348 km; on 5 July to 169 km x 375 km. Landed at 21:00 GMT on 22 August after a 76-day mission.

2007 August 2 - . 17:33 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-61** - . *Payload*: Progress M s/n 361. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-10, STS-117 ISS EO-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 173.00 days. *Decay Date*: 2008-01-22 . *USAF Sat Cat*: 32001 . *COSPAR*: 2007-033A. *Apogee*: 346 km (214 mi). *Perigee*: 334 km (207 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min.

  International space station resupply; docked with the Pirs module at 18:40 GMT on 5 August. Undocked at 03:59 GMT on 22 December to clear port for Progress M-62 launched the next day. Deorbited over the Pacific on 22 January 2008 after a month of free flight carrying out the Plazma-Progress experiment.

2007 September 14 - . 11:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Foton M-3** - . *Mass*: 6,500 kg (14,300 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Kozlov bureau. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft Bus*: Vostok. *Spacecraft*: Foton. *Decay Date*: 2007-09-26 . *USAF Sat Cat*: 32058 . *COSPAR*: 2007-040A. *Apogee*: 280 km (170 mi). *Perigee*: 258 km (160 mi). *Inclination*: 62.9000 deg. *Period*: 89.90 min.

  Recoverable spacecraft derived from the Vostok. Carried Russian and European

microgravy, life sciences and technology experiments. After deploying the YES-2 tether on 25 September, Foton M-3 was deorbited at 07:23 GMT on 26 September and successfully landed at 07:58 GMT in Kazakhstan.

- **YES-2** - . *Payload*: Young Engineers Satellite. *Mass*: 5.00 kg (11.00 lb). *Nation*: Europe. *Agency*: ESA. *Manufacturer*: ESTEC. *Class*: Technology. *Type*: Navigation technology satellite. *Spacecraft*: YES. *COSPAR*: 2007-040x.

  YES-2/Fotino space tether for re-entry experiment. The YES-2 tether was deployed from the Nauka module at the front end of Foton at 04:47 on 25 September, and releaed at 07:20 after reaching only 8.5 km of the planned 30 km tether length. The 5 kg Fotino reentry capsule separated from the MASS data support system at the end of the tether at around 07:30. The idea was to toss the Fotino against the direction of orbital motion to push it into a lower orbit and re-entry without the need for a retrorocket. Unfortunately the final outcome of the experiment remained unknown.

2007 October 10 - . 13:22 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-11** - . *Call Sign*: Agat. *Crew*: Malenchenko, Muszaphar, Whitson. *Payload*: Soyuz TMA s/n 221 / ISS 15S. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Related Persons*: Malenchenko, Muszaphar, Whitson. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-11, Soyuz TMA-11 ISS EP-13. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 191.80 days. *Decay Date*: 2008-04-19 . *USAF Sat Cat*: 32256 . *COSPAR*: 2007-045A. *Apogee*: 344 km (213 mi). *Perigee*: 340 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.40 min.

  Soyuz TMA-11 delivered the EO-16 crew of Whitson and Malenchenko and EP-13 space tourist Shukor to the International Space Station. The Soyuz docked at the Zarya module at 14:50 GMT on 12 October. Whitson was EO-16 commander, with third astronaut Clay Anderson remaining aboard the station after the EO-15 crew and Shukor returned to earth on Soyuz TMA-10.

  Malenchenko and Whitson, together with visiting Korean astronaut Yi, who had been delivered to the ISS by Soyuz TMA-12, undocked from the station aboard Soyuz TMA-11 at 05:06 GMT on 19 April 2008. Following the deorbit burn at 07:40 GMT the aft service module of the Soyuz failed to separate and the spacecraft began re-entry in a reversed position, with the forward hatch taking the initial re-entry heating. As was the case with Soyuz 5 in 1970, the connections with the service module finally melted away, and the freed capsule righted itself aerodynamically with the heat shield taking the brunt of the re-entry heating. However the crew experienced a rough ride, a ballistic re-entry of over 8 G's force, smoke in the cabin, a failure of the soft landing system, and a very hard landing. They landed 470 km short of the target point at 50 deg 31" N, 61 deg 7" E at 08:29 GMT. A small grass fire was started at the landing point and the injured crew had to be helped from the capsule

by passers-by. Malenchenko and Whitson suffered no permanent injury, but Yi was hit by Whitson's personal effects bag on impact and required physical therapy for neck and spine injuries.

2007 October 20 - . 20:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Globalstar FM66** - . *Mass*: 450 kg (990 lb). *Nation*: USA. *Agency*: Globalstar. *Manufacturer*: Palo Alto. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 32265 . *COSPAR*: 2007-048C. *Apogee*: 932 km (579 mi). *Perigee*: 914 km (567 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min. Last of the first generation Globalstar satellites, launched to replenish the constellation. The Fregat stage made three burns to deploy the satellites into circular orbit, and then deorbit itself to a reentry over the Pacific Ocean..

- **Globalstar FM67** - . *Mass*: 450 kg (990 lb). *Nation*: USA. *Agency*: Globalstar. *Manufacturer*: Palo Alto. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 32263 . *COSPAR*: 2007-048A. *Apogee*: 935 km (580 mi). *Perigee*: 925 km (574 mi). *Inclination*: 52.0000 deg. *Period*: 103.60 min.

- **Globalstar FM68** - . *Mass*: 450 kg (990 lb). *Nation*: USA. *Agency*: Globalstar. *Manufacturer*: Palo Alto. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 32266 . *COSPAR*: 2007-048D. *Apogee*: 930 km (570 mi). *Perigee*: 915 km (568 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min.

- **Globalstar FM70** - . *Mass*: 450 kg (990 lb). *Nation*: USA. *Agency*: Globalstar. *Manufacturer*: Palo Alto. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Globalstar. *USAF Sat Cat*: 32264 . *COSPAR*: 2007-048B. *Apogee*: 931 km (578 mi). *Perigee*: 911 km (566 mi). *Inclination*: 52.0000 deg. *Period*: 103.40 min.

2007 October 23 - . 04:39 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2430** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: VKS. *Manufacturer*: Lavochkin bureau. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 32268 . *COSPAR*: 2007-049A. *Apogee*: 39,175 km (24,342 mi). *Perigee*: 520 km (320 mi). *Inclination*: 62.9000 deg. *Period*: 704.50 min. Missile early warning satellite.

2007 December 14 - . 13:17 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Radarsat-2** - . *Mass*: 2,200 kg (4,800 lb). *Nation*: Canada. *Agency*: Starsem. *Class*: Surveillance. *Type*: Civilian surveillance radar satellite. *Spacecraft Bus*: BCP-4000. *Spacecraft*: Radarsat. *USAF Sat Cat*: 32382 . *COSPAR*: 2007-061A. *Apogee*: 793 km (492 mi). *Perigee*: 791 km (491 mi). *Inclination*: 98.6000 deg. *Period*: 100.70 min.

  Follow-on to Canadian Radarsat-1 launched in 1995. Designed to provide C-band synthetic aperture radar mapping with resolution of 3 m to Canadian government users. Compared to the earlier model had greater resolution, vastly increased on-board data storage capacity, and capability to scan left or right of ground track. Planned lifetime of seven years.

2007 December 23 - . 07:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-62** - . *Payload*: Progress M s/n 362. *Mass*: 7,130 kg (15,710 lb). *Nation*: Russia. *Agency*: RAKA. *Manufacturer*: Korolev bureau. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-11, STS-120 ISS EO-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 54.11 days. *Decay Date*: 2008-02-15 . *USAF Sat Cat*: 32391 . *COSPAR*: 2007-064B. *Apogee*: 341 km (211 mi). *Perigee*: 333 km (206 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min.

  Resupply spacecraft that docked with the Pirs port of the International Space Station at 08:14 GMT on 26 December. Undocked on 4 February 2008 at 10:32 GMT and then carried out Earth observations for ten days before being deorbited on 15 February at 09:44 GMT.

2008 February 5 - . 13:03 GMT - . *Launch Site*: Baikonur. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-63** - . *Payload*: Progress M s/n 363. *Mass*: 7,130 kg (15,710 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-11, STS-120 ISS EO-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 61.96 days. *Decay Date*: 2008-04-07 12:00:00 . *USAF Sat Cat*: 32484 . *COSPAR*: 2008-004A. *Apogee*: 339 km (210 mi). *Perigee*: 338 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min. Docked with the ISS at the Pirs module on 7 February at 14:38 GMT. Undocked on 7 April at 08:49 GMT and was deorbited over the Pacific later the same day..

2008 April 8 - . 11:16 GMT - . *Launch Site*: Baikonur. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-12** - . *Call Sign*: Eridanus. *Crew*: Kononenko, Volkov, Sergey, Yi Soyeon. *Return Crew*: Garriott, Richard, Kononenko, Volkov, Sergey. *Payload*: Soyuz TMA s/n 222. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Related Persons*: Garriott, Richard, Kononenko, Volkov, Sergey, Yi Soyeon. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-12, STS-123 ISS

EO-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 198.54 days. *Decay Date*: 2008-04-19 08:29:00 . *USAF Sat Cat*: 32756 . *COSPAR*: 2008-015A. *Apogee*: 343 km (213 mi). *Perigee*: 336 km (208 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min.

Launched the EO-17 long-duration crew to replace the EO-16 crew. The commander was the son of cosmonaut Aleksandr Volkov. Also aboard was Oleg Kononenko (no relation to the 1970's Buran pilot of the same name) and Korean astronaut Yi Soyeon. Soyuz TMA-12 docked at the Pirs module of the International Space Station on 2008 Apr 10 at 12:57 GMT on 10 April. Volkov and Kononenko stayed aboard as the EO-17 long duration crew. Yi returned to earth with the EO-16 crew aboard Soyuz TMA-11. Soyuz TMA-12 undocked on 24 October at 00:16 GMT with the EO-17 crew of Kononenko and Volkov, plus space tourist Richard Garriott, aboard. They landed safely at 03:37 GMT.

2008 April 26 - . 22:16 GMT - . *Launch Site*: Baikonur. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Giove-B** - . *Payload*: GSTB-V2/B. *Mass*: 530 kg (1,160 lb). *Nation*: Europe. *Agency*: Starsem. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: SSTL-900. *USAF Sat Cat*: 32781 . *COSPAR*: 2008-020A. *Apogee*: 23,244 km (14,443 mi). *Perigee*: 23,104 km (14,356 mi). *Inclination*: 56.0000 deg. *Period*: 842.60 min.

  Second European Galileo navigation system test satellite. The booster placed the Giove/Fregat stack on a suborbital trajectory. The Fregat stage then burned to enter a a 170 km parking orbit. The stage burned at least twice more before releasing the satellite into its operational orbit. Retired in 2012 as the production models went on-line.

2008 May 14 - . 20:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-64** - . *Payload*: Progress M s/n 364. *Mass*: 7,056 kg (15,555 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-12, STS-123 ISS EO-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 137.02 days. *Decay Date*: 2008-09-08 . *USAF Sat Cat*: 32847 . *COSPAR*: 2008-023A. *Apogee*: 343 km (213 mi). *Perigee*: 336 km (208 mi). *Inclination*: 51.6000 deg. *Period*: 91.30 min.

  Unmanned space station resupply mission. Docked with the International Space Station at the Zarya port on 16 May. Undocked on 1 September at 19:47 GMT. It then flew for a week in independent orbit, carrying out the Plazma-Progress experiment. On 8 September at 20:47 GMT it was deorbited to destruction over the Pacific Ocean.

2008 July 26 - . 18:31 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4.

LV Family: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2441** - . *Mass*: 7,100 kg (15,600 lb). *Nation*: Russia. *Agency*: KVR. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft*: Persona. *USAF Sat Cat*: 33272 . *COSPAR*: 2008-037A. *Apogee*: 735 km (456 mi). *Perigee*: 711 km (441 mi). *Inclination*: 98.3000 deg. *Period*: 99.20 min.

  First in the Persona series of Russian military imaging reconnaisance satellites. The initial orbit was 195 x 726 km x 98.3 deg. The spacecraft maneuvered itself into its operational sun-synchronous orbit on 31 July. Reportedly the satellite married the Yantar electro-optical bus with subsystems developed for the abandoned Arkon-1 reconnsaisance satellite. Said to have shut down in February 2009 due to an electronics failure.

2008 September 10 - . 19:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-65** - . *Payload*: Progress M s/n 365. *Mass*: 7,100 kg (15,600 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-12, STS-124 ISS EO-17. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 88.00 days. *Decay Date*: 2008-12-07 . *USAF Sat Cat*: 33340 . *COSPAR*: 2008-043A. *Apogee*: 357 km (221 mi). *Perigee*: 348 km (216 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min.

  Docking with the ISS at the Zvezda module was delayed due to NASA Houston operations being curtailed during Hurricane Ike. The resupply spacecraft finally docked at 18:43 GMT on 27 September. It undocked at 16:20 GMT on 14 November, but then flew independently in orbit until 7 December in order to conduct continue ionospheric experiments.

2008 October 12 - . 07:01 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-13** - . *Call Sign*: Titan. *Crew*: Fincke, Garriott, Richard, Lonchakov. *Payload*: Soyuz TMA s/n 223. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Related Persons*: Fincke, Garriott, Richard, Lonchakov. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-13. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 178.01 days. *Decay Date*: 2009-04-08 . *USAF Sat Cat*: 33399 . *COSPAR*: 2008-050A. *Apogee*: 362 km (224 mi). *Perigee*: 352 km (218 mi). *Inclination*: 51.6000 deg. *Period*: 91.70 min. Docked at the Zarya port of the ISS on 14 October at 08:26 GMT..

2008 November 14 - . 15:50 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2445** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: KVR. *Class*:

Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Decay Date*: 2009-02-23 . *USAF Sat Cat*: 33439 . *COSPAR*: 2008-058A. *Apogee*: 327 km (203 mi). *Perigee*: 181 km (112 mi). *Inclination*: 67.2000 deg. *Period*: 89.60 min. Recoverable reconnaisance satellite. Launched annually since 2005 with a typical 75 to 100 day mission, with recovery on an interim basis of two film capsules and final deorbiting of the camera and main film magazine..

2008 November 26 - . 12:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-01M** - . *Payload*: Progress M s/n 401. *Mass*: 7,290 kg (16,070 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-13, STS-126 ISS EO-18. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 74.00 days. *Decay Date*: 2009-02-08 . *USAF Sat Cat*: 33443 . *COSPAR*: 2008-060A. *Apogee*: 362 km (224 mi). *Perigee*: 352 km (218 mi). *Inclination*: 51.6000 deg. *Period*: 91.70 min. ISS resupply spacecraft, a modernized version of Progress with a digital control system, docked at the Pirs port of the station on 30 November..

2008 December 2 - . 05:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2446** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: KVR. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 33447 . *COSPAR*: 2008-062A. *Apogee*: 39,772 km (24,713 mi). *Perigee*: 625 km (388 mi). *Inclination*: 63.0000 deg. *Period*: 718.60 min. Molniya-orbit early warning satellite..

2009 February 10 - . 05:49 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-66** - . *Payload*: Progress M s/n 366. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-13, STS-126 ISS EO-18. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 97.00 days. *Decay Date*: 2009-05-18 . *USAF Sat Cat*: 33593 . *COSPAR*: 2009-006A. *Apogee*: 357 km (221 mi). *Perigee*: 342 km (212 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min. ISS resupply. Docked with the ISS at 07:18 GMT on 13 February. Undocked at 15:18 on 6 May and destroyed over the Pacific on 18 May..

2009 March 26 - . 11:49 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-14** - . *Call Sign*: Altair. *Crew*: Barratt, Padalka, Simonyi. *Backup Crew*: Dyson, Surayev, Walker. *Return Crew*: Barratt, Laliberte, Padalka. *Payload*: Soyuz

TMA s/n 224. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-14. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 198.66 days. *Decay Date*: 2009-10-11 . *USAF Sat Cat*: 34669 . *COSPAR*: 2009-015A. *Apogee*: 354 km (219 mi). *Perigee*: 344 km (213 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min. Delivered EO-19 crew and space tourist Simonyi to ISS; returned EO-19 crew and space tourist Laliberte to earth on 11 October 2009 at 04:32 GMT..

2009 April 29 - . 16:58 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2450** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Agency*: KVR. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 90.00 days. *Decay Date*: 2009-07-27 . *USAF Sat Cat*: 34871 . *COSPAR*: 2009-022A. *Apogee*: 282 km (175 mi). *Perigee*: 180 km (110 mi). *Inclination*: 67.1000 deg. *Period*: 89.10 min. Return film capsule optical reconnaisance satellite. Landed on 27 July..

2009 May 7 - . 18:37 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-02M** - . *Payload*: Progress M s/n 402. *Mass*: 7,120 kg (15,690 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-14. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 67.00 days. *Decay Date*: 2009-07-13 . *USAF Sat Cat*: 34905 . *COSPAR*: 2009-024A. *Apogee*: 348 km (216 mi). *Perigee*: 337 km (209 mi). *Inclination*: 51.6000 deg. *Period*: 91.40 min.

  ISS logistics flight. Docked with the Pirs module of the ISS on 12 May at 19:24. Undocked with ISS on 30 June, conducted scientific experiments, then made a second rendezvous with the ISS at the Zvezda module to test docking systems for the upcoming Mini-Research Module 2. Backed away after getting within 10 m of the station. Retrofire on 13 July followed by burn up over the Pacific at 16:28 GMT.

2009 May 21 - . 21:53 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Meridian 2** - . *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Agency*: KVR. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: Glonass. *Spacecraft*: Meridian. *USAF Sat Cat*: 35008 . *COSPAR*: 2009-029A. *Apogee*: 36,423 km (22,632 mi). *Perigee*: 328 km (203 mi). *Inclination*: 62.9000 deg. *Period*: 646.00 min. Secon Meridian communications satellite. Third stage cut off early. Fregat upper stage ran out of fuel during second burn, leaving satellite in useless orbit..

2009 May 27 - . 10:34 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-15** - . *Call Sign*: Parus. *Crew*: De Winne, Romanenko, Roman, Thirsk. *Backup Crew*: Hadfield, Kondratiyev, Kuipers. *Payload*: Soyuz TMA s/n 225. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 187.86 days. *Decay Date*: 2009-12-01 . *USAF Sat Cat*: 35010 . *COSPAR*: 2009-030A. *Apogee*: 354 km (219 mi). *Perigee*: 344 km (213 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min. Delivered EO-20 crew to the ISS. Returned to earth 1 December 2009..

2009 July 24 - . 10:56 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-67** - . *Payload*: Progress M s/n 367. *Mass*: 7,285 kg (16,060 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-14, Soyuz TMA-15. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 65.00 days. *Decay Date*: 2009-09-27 . *USAF Sat Cat*: 35641 . *COSPAR*: 2009-040A. *Apogee*: 354 km (219 mi). *Perigee*: 344 km (213 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min. Docked at the Zvezda port of the International Space Station at 11:12 GMT on 29 July. Undocked and was deorbited over the Pacific Ocean on 27 September at 09:33 GMT..

2009 September 17 - . 15:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Meteor-M** - . *Mass*: 2,700 kg (5,900 lb). *Nation*: Russia. *Agency*: RKA. *Class*: Earth. *Type*: Weather satellite. *Spacecraft Bus*: Meteor. *Spacecraft*: Meteor-M. *USAF Sat Cat*: 35865 . *COSPAR*: 2009-049A. *Apogee*: 820 km (500 mi). *Perigee*: 818 km (508 mi). *Inclination*: 98.8000 deg. *Period*: 101.30 min.

  First Meteor-M satellite. This replaced the Meteor-3M satellite, with new generation weather instruments. Plagued with problems: the infrared sensor cooling broke down, an antenna did not deploy properly, camera mirrors were degraded by vibration, imagery was not delivered in a usable rectified format.

- **Sterkh 12L** - . *Mass*: 160 kg (350 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Search and rescue satellite. *Spacecraft*: Sterkh. *USAF Sat Cat*: 35866 . *COSPAR*: 2009-049B. *Apogee*: 818 km (508 mi). *Perigee*: 814 km (505 mi). *Inclination*: 98.5400 deg. *Period*: 101.22 min. Second dedicated Sterkh search-and-rescue satellite..

- **IRIS** - . *Nation*: Russia. *Agency*: RKA. *Class*: Technology. *Type*: Technology satellite. *USAF Sat Cat*: 35867 . *COSPAR*: 2009-049C. *Apogee*: 502 km (311 mi). *Perigee*: 490 km (300 mi). *Inclination*: 97.3000 deg. *Period*: 94.50 min. Inflatable

structure technology test - two inflatable masts carrying dummy solar arrays mounted on the Fregat upper stage and inflated after all payloads had been deployed..

- **Tatyana-2** - . *Mass*: 90 kg (198 lb). *Nation*: Russia. *Class*: Science. *Type*: Science satellite. *Spacecraft*: Tatyana. *USAF Sat Cat*: 35868 . *COSPAR*: 2009-049D. *Apogee*: 820 km (500 mi). *Perigee*: 814 km (505 mi). *Inclination*: 98.5400 deg. *Period*: 101.23 min. Space physics research satellite built by students from Moscow State University..

- **UGATUSAT** - . *Mass*: 35 kg (77 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft*: UGATUSAT. *USAF Sat Cat*: 35869 . *COSPAR*: 2009-049E. *Apogee*: 821 km (510 mi). *Perigee*: 815 km (506 mi). *Inclination*: 98.5400 deg. *Period*: 101.25 min. Remote sensing satellite built by the Ufa State Aviation Technical University..

- **Sumbandila** - . *Mass*: 81 kg (178 lb). *Nation*: Russia. *Agency*: RKA. *Class*: Technology. *Type*: Technology satellite. *Spacecraft*: Sumbandila. *USAF Sat Cat*: 35870 . *COSPAR*: 2009-049F. *Apogee*: 505 km (313 mi). *Perigee*: 501 km (311 mi). *Inclination*: 97.3000 deg. *Period*: 94.70 min. South African imaging satellite with a ground resolution of 6.25 m..

- **BLITS** - . *Mass*: 7.00 kg (15.40 lb). *Nation*: Russia. *Agency*: RKA. *Class*: Earth. *Type*: Earth resources satellite. *Spacecraft*: BLITS. *USAF Sat Cat*: 35871 . *COSPAR*: 2009-049G. *Apogee*: 822 km (510 mi). *Perigee*: 818 km (508 mi). *Inclination*: 98.8000 deg. *Period*: 101.30 min. Spherical glass lens for laser geodesy, built by the NII for Precision Instruments (NIIPP), Moscow..

2009 September 30 - . 07:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-16** - . *Call Sign*: Bort. *Crew*: Laliberte, Surayev, Williams, Jeffrey. *Backup Crew*: Barrett, Skvortsov, Walker, Shannon. *Return Crew*: Surayev, Williams. *Payload*: Soyuz TMA s/n 226. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 169.17 days. *Decay Date*: 2010-03-18 . *USAF Sat Cat*: 35940 . *COSPAR*: 2009-053A. *Apogee*: 352 km (218 mi). *Perigee*: 342 km (212 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min. Docked with the International Space Station at 08:35 GMT on 2 October. Carried the EO-21 crew of Suraev and Williams, and space tourist Guy Laliberte due to the station. Surayev and Williams landed aboard Soyuz TMA-16 in Kazakhstan on 18 March 2010..

2009 October 15 - . 01:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-03M** - . *Payload*: Progress M s/n 403. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-15, Soyuz TMA-16. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 194.00 days. *Decay Date*: 2010-05-03 . *USAF Sat Cat*: 35948 . *COSPAR*: 2009-056A. *Apogee*: 348 km (216 mi). *Perigee*: 314 km (195 mi). *Inclination*: 51.6000 deg. *Period*: 91.20 min. Docked at the Pirs module of the International Space Station at 01:41 GMT on 18 October..

2009 November 10 - . 14:22 GMT - . *Launch Site*: Baikonur. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Poisk** - . *Payload*: Progress M s/n 302 / 240GK s/n 2L. *Mass*: 3,670 kg (8,090 lb). *Nation*: Russia. *Agency*: RKA. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M-SO. *USAF Sat Cat*: 36086 . *COSPAR*: 2009-060A. *Perigee*: 11 km (6 mi).

  Docking/research module for the ISS, consisting of a pressurized Small Research Module and a Progress M service module. Docked at the zenith port of the Zvezda module of the ISS at 15:41 GMT on 12 November. On 8 December at 00:16 GMT the service module separated from Small Research Module, leaving the docking port clear for future spacecraft visiting the ISS. At 04:48 GMT the service module retrofired into a descructive reentry over the Pacific at 05:27 GMT.

2009 November 20 - . 10:44 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2455** - . *Payload*: Lotos-S. *Mass*: 6,620 kg (14,590 lb). *Nation*: Russia. *Agency*: KVR. *Class*: Surveillance. *Type*: ELINT. *Spacecraft*: Lotos-S. *USAF Sat Cat*: 36095 . *COSPAR*: 2009-063A. *Apogee*: 908 km (564 mi). *Perigee*: 902 km (560 mi). *Inclination*: 67.2000 deg. *Period*: 103.10 min.

  First Lotos-S electronic intelligence satellite, built by TsSKB-Progress, Samara and KB Arsenal, Saint Petersburg, using the same bus as the Resurs-DK optical remote sensing satellites. Maneuvered from an initial orbit of 199 km x 904 km x 67.2 deg to operational orbit of 903 km x 906 km on 23 November.

2009 December 20 - . 21:52 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-17** - . *Call Sign*: Pulsar. *Crew*: Creamer, Kotov, Noguchi. *Backup Crew*: Furukawa, Shkaplerov, Wheelock. *Payload*: Soyuz 7K-STMA s/n 227 / ISS-21S. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Related Persons*: Creamer, Kotov, Noguchi. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-17. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 163.23 days. *Decay Date*: 2010-06-02 . *USAF Sat Cat*: 36129 . *COSPAR*: 2009-074A. *Apogee*: 351 km (218 mi). *Perigee*: 336 km (208 mi). *Inclination*: 51.6000 deg.

Period: 91.40 min. Docked with Zarya port of ISS at 22:48 GMT on 22 December. Undocked at 0:04 GMT on 2 June 2010 and landed in Kazakhstan at 03:25 GMT..

2010 February 3 - . 03:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-04M** - . *Payload*: Progress M s/n 404 / ISS-36P. *Mass*: 7,400 kg (16,300 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-16, Soyuz TMA-17. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 148.42 days. *Decay Date*: 2010-07-01 . *USAF Sat Cat*: 36361 . *COSPAR*: 2010-003A. *Apogee*: 353 km (219 mi). *Perigee*: 346 km (214 mi). *Inclination*: 51.6000 deg. *Period*: 91.50 min. Undocked from the Zvezda module of the ISS on 10 May 2010. Conducted free-flight experiments until deorbited at 13:54 GMT on 1 July..

2010 April 2 - . 04:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-18** - . *Call Sign*: Cliff. *Crew*: Caldwell, Korniyenko, Skvortsov, Aleksandr. *Backup Crew*: Borisenko, Andrei, Kelly, Scott, Samokutyayev. *Payload*: Soyuz 7K-STMA s/n 228. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-18. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 176.05 days. *Decay Date*: 2010-04-20 . *USAF Sat Cat*: 36505 . *COSPAR*: 2010-011A. *Apogee*: 361 km (224 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min.

  ISS EO-23. The crew first attempted to depart the ISS on 24 September. However the latches between the Soyuz and the station failed to release. Return to earth the next day was successful, with undocking at 02:03 GMT; deorbit burn at 04:31 GMT; and landing in Kazakhstan at 05:23 GMT.

2010 April 16 - . 15:00 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2462** - . *Mass*: 6,900 kg (15,200 lb). *Nation*: Russia. *Agency*: KVR. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 95.76 days. *Decay Date*: 2010-07-21 . *USAF Sat Cat*: 36511 . *COSPAR*: 2010-014A. *Apogee*: 270 km (160 mi). *Perigee*: 180 km (110 mi). *Inclination*: 67.2000 deg. *Period*: 89.00 min. Recoverable optical surveillance satellite. Secondary recoverable film capsules probably recovered on 9 June and 18 July. Main spacecraft reentry vehicle landed at 09:10 GMT on 21 July 2010..

2010 April 28 - . 17:15 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-05M** - . *Payload*: Progress M s/n 405 / ISS-37P. *Mass*: 7,400 kg (16,300 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-17, Soyuz TMA-18, Soyuz TMA-18. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 201.00 days. *Decay Date*: 2010-11-15 . *USAF Sat Cat*: 36521 . *COSPAR*: 2010-018A. *Apogee*: 361 km (224 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min. Undocked from the Pirs module of the ISS on 25 October 2010 at 14:22 GMT and was deorbited over the Pacific on 15 November 2010 after three weeks of independent flight..

2010 June 15 - . 21:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-19** - . *Call Sign*: Olympus. *Crew*: Walker, Shannon, Wheelock, Yurchikhin. *Backup Crew*: Coleman, Catherine, Kondratiyev, Nespoli. *Payload*: Soyuz 7K-STMA s/n 229. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-19. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 163.30 days. *Decay Date*: 2010-11-26 . *USAF Sat Cat*: 36603 . *COSPAR*: 2010-029A. *Apogee*: 361 km (224 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min.

  ISS EO-24 crew. The return to earth was reported advanced four days to avoid coinciding with an OSCE conference in Kazakhstan. The crew undocked from the Rassvet module of the ISS at 01:23 GMT on 26 November 2010. There was a leak in the descent module, but ground controllers concluded the return to earth could be conducted safely. The Soyuz made its deorbit burn at 03:55 GMT and landed safely in Kazakhstan at 04:46 GMT.

2010 June 30 - . 15:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-06M** - . *Payload*: Progress M s/n 406 / ISS-38P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-18, Soyuz TMA-19. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 67.86 days. *Decay Date*: 2010-07-14 . *USAF Sat Cat*: 36748 . *COSPAR*: 2010-033A. *Apogee*: 361 km (224 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min.

  First docking attempt with the ISS on 2 July aborted due to radio interference. Successfully docked with the ISS at the Zvezda module on 4 July at 16:17 GMT. Undocked from the Zvezda module of the ISS at 11:21 GMT on 31 August 2010. Conducted experiments in free flight until deorbited at 12:13 GMT on 6 September.

2010 September 10 - . 10:22 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-07M** - . *Payload*: Progress M s/n 407 / ISS-39P. *Mass*: 7,250 kg

(15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-18, Soyuz TMA-19. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 163.00 days. *Decay Date*: 2011-02-20 . *USAF Sat Cat*: 37156 . *COSPAR*: 2010-044A. *Apogee*: 355 km (220 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min. Docked at the Zvezda module of the ISS at 11:58 GMT on 12 September 2010. Undocked from Zvezda on 20 February 2011 at 13:12 GMT and deorbited over the Pacific at 16:12 GMT..

2010 September 30 - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Molniya 8K78M.

- **Cosmos 2469** - . *Mass*: 1,900 kg (4,100 lb). *Nation*: Russia. *Agency*: KVR. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft*: Oko. *USAF Sat Cat*: 37170 . *COSPAR*: 2010-049A. *Apogee*: 39,609 km (24,611 mi). *Perigee*: 745 km (462 mi). *Inclination*: 62.9000 deg. *Period*: 717.80 min. Early warning satellite..

2010 October 7 - . 23:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-01M** - . *Call Sign*: Ingul. *Crew*: Kaleri, Kelly, Scott, Skripochka. *Backup Crew*: Garan, Kononenko, Volkov, Sergey. *Payload*: Soyuz TMA s/n 701. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-01M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 159.78 days. *Decay Date*: 2011-03-16 . *USAF Sat Cat*: 37183 . *COSPAR*: 2010-052A. *Apogee*: 355 km (220 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min. ISS EO-25 crew. The Soyuz docked at the Poisk module of the ISS at 00:01 GMT on 10 October. The crew entered the spacecraft and undocked at 04:27 GMT on 16 March 2011. Following retrofire and re-entry they landed safely in Kazakhstan at 07:53 GMT..

2010 October 19 - . 17:10 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Globalstar M079** - . *Payload*: Globalstar-2 M079. *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Agency*: RKA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37188 . *COSPAR*: 2010-054A. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min. First six or 48 new-generation Globalstar-2 satellites that will replace the 44 operational Globalstar satellites already aloft..

- **Globalstar M074** - . *Payload*: Globalstar-2 M074. *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Agency*: RKA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37189 . *COSPAR*: 2010-054B. *Apogee*: 1,415 km (879 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar M076** - . *Payload*: Globalstar-2 M076. *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Agency*: RKA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37190 . *COSPAR*: 2010-054C. *Apogee*: 1,415 km (879 mi). *Perigee*: 1,412 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar M077** - . *Payload*: Globalstar-2 M077. *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Agency*: RKA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37191 . *COSPAR*: 2010-054D. *Apogee*: 993 km (617 mi). *Perigee*: 951 km (590 mi). *Inclination*: 52.0000 deg. *Period*: 104.50 min.

- **Globalstar M075** - . *Payload*: Globalstar-2 M075. *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Agency*: RKA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37192 . *COSPAR*: 2010-054E. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar M073** - . *Payload*: Globalstar-2 M073. *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Agency*: RKA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37193 . *COSPAR*: 2010-054F. *Apogee*: 1,004 km (623 mi). *Perigee*: 955 km (593 mi). *Inclination*: 52.0000 deg. *Period*: 104.70 min.

2010 October 27 - . 15:11 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-08M** - . *Payload*: Progress M s/n 408 / ISS-40P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-01M, Soyuz TMA-19. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 88.59 days. *Decay Date*: 2011-01-24 . *USAF Sat Cat*: 37196 . *COSPAR*: 2010-055A. *Apogee*: 355 km (220 mi). *Perigee*: 352 km (218 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min. Undocked from the Pirs module of the ISS at 00:42 GMT on 24 January 2011 and deorbited over the Pacific at 05:16 GMT the same day..

2010 November 2 - . 00:59 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/3. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Meridian 3** - . *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: Glonass. *Spacecraft*: Meridian. *USAF Sat Cat*: 37212 . *COSPAR*: 2010-058A. *Apogee*: 39,395 km (24,478 mi). *Perigee*: 957 km (594 mi). *Inclination*: 62.8000 deg. *Period*: 717.70 min. Third military communications satellite in this series..

2010 December 15 - . 19:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-20** - . *Call Sign*: Varyag. *Crew*: Coleman, Catherine, Kondratiyev, Nespoli. *Backup Crew*: Fossum, Furukawa, Ivanishin. *Payload*: Soyuz 7K-STMA s/n 230. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-20. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 159.30 days. *Decay Date*: 2011-05-24 . *USAF Sat Cat*: 37254 . *COSPAR*: 2010-067A. *Apogee*: 355 km (220 mi). *Perigee*: 350 km (210 mi). *Inclination*: 51.6000 deg. *Period*: 91.60 min.

  ISS EO-26 crew. Docked at the Rassvet module of the ISS at 20:11 GMT on 17 December. The crew boarded Soyuz TMA-20 and undocked at 21:35 GMT on 23 May 2011. They pulled back 200 m from the station, then took comprehensive photography of the station until 22:17 as it rotated before them. After departure from the visinity of the station, the Soyuz fired its engines at 01:36 GMT on 24 May to start the descent into the atmosphere. The orbital module and service modules separated from the descent module at 02:01 GMT. The crew landed safely in Kazakhstan at 02:27 GMT.

2011 January 28 - . 01:31 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-09M** - . *Payload*: Progress M s/n 409 / ISS-41P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-01M, Soyuz TMA-20. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 88.00 days. *Decay Date*: 2011-04-26 . *USAF Sat Cat*: 37359 . *COSPAR*: 2011-004A. *Apogee*: 345 km (214 mi). *Perigee*: 270 km (160 mi). *Inclination*: 51.6000 deg. *Period*: 90.70 min. Undocked from the Pirs module of the ISS on 22 April at 11:41 GMT and deorbited over the Pacific on 26 April..

2011 February 26 - . 03:07 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2471** - . *Payload*: Glonass-K No. 11. *Mass*: 1,415 kg (3,119 lb). *Nation*: Russia. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Ekspress-1000. *USAF Sat Cat*: 37372 . *COSPAR*: 2011-009A. *Apogee*: 19,147 km (11,897 mi). *Perigee*: 19,111 km (11,875 mi). *Inclination*: 64.8000 deg. *Period*: 675.70 min. First launch of the Glonass-K satellite using the Ekspress-1000 bus. The second would not come until 2014..

2011 April 4 - . 22:18 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-21** - . *Call Sign*: Tarkhany / Gagarin. *Crew*: Borisenko, Garan, Samokutyayev. *Backup Crew*: Burbank, Ivanishin, Shkaplerov. *Payload*: Soyuz 7K-

STMA s/n 231. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-21. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 164.24 days. *Decay Date*: 2011-09-16 . *USAF Sat Cat*: 37382 . *COSPAR*: 2011-012A. *Apogee*: 347 km (215 mi). *Perigee*: 343 km (213 mi). *Inclination*: 51.6000 deg. *Period*: 91.40 min.

ISS EO-27 crew. The Soyuz docked at the Poisk module of the ISS at 23:09 GMT on 6 April, and undocked at 00:38 GMT on 16 September 2011, eight days later than planned due to the Progress M-11M launch failure. A dropout of communications after the reentry burn caused concern, but the crew landed safely in Kazakhstan at 03:59 GMT.

2011 April 27 - . 13:05 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-10M** - . *Payload*: Progress M s/n 410 / ISS-42P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-20, Soyuz TMA-21. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 185.00 days. *Decay Date*: 2011-10-29 . *USAF Sat Cat*: 37396 . *COSPAR*: 2011-017A. *Apogee*: 347 km (215 mi). *Perigee*: 343 km (213 mi). *Inclination*: 51.6000 deg. *Period*: 91.40 min. Docked with the ISS Pirs module at 14:28 GMT on 29 April. Undocked at 09:04 GMT on 29 October. Following retrofire at 12:10 GMT it was destroyed on reentry over the Pacific at 12:48 GMT..

2011 May 4 - . 17:41 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Meridian 4** - . *Payload*: Meridian No. 14L. *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: Glonass. *Spacecraft*: Meridian. *USAF Sat Cat*: 37398 . *COSPAR*: 2011-018A. *Apogee*: 39,739 km (24,692 mi). *Perigee*: 968 km (601 mi). *Inclination*: 62.8000 deg. *Period*: 724.90 min. Communications for the Russian Defense Ministry, and replacing the older Molniya satellites..

2011 June 7 - . 20:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-02M** - . *Call Sign*: Eridanus. *Crew*: Fossum, Furukawa, Volkov, Sergey. *Backup Crew*: Kononenko, Kuipers, Pettit. *Payload*: Soyuz TMA s/n 702. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-02M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 167.26 days. *Decay Date*: 2011-11-22 . *USAF Sat Cat*: 37633 . *COSPAR*: 2011-023A. *Apogee*: 403 km (250 mi). *Perigee*: 374 km (232 mi). *Inclination*: 51.6000 deg. *Period*: 92.30 min. Carried the EO-28 crew to the station.

Docked with the ISS at the Rassvet on 9 June at 21:18 GMT. Undocked from the same port on 21 November at 23:00 GMT, followed by landing of the crew in Kazakhstan at 02:26 GMT on 22 November..

2011 June 21 - . 14:38 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-11M** - . *Payload*: Progress M s/n 411 / ISS-43P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-02M, Soyuz TMA-21. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 71.79 days. *Decay Date*: 2011-09-01 . *USAF Sat Cat*: 37679 . *COSPAR*: 2011-027A. *Apogee*: 383 km (237 mi). *Perigee*: 343 km (213 mi). *Inclination*: 51.6000 deg. *Period*: 91.80 min.

  ISS resupply. Also carried the 40 kg Chibis satellite. Docked with the Zvezda module of the ISS on 23 June at 16:37 GMT. Undocked from Zvezda at 09:38 GMT on 23 August. After several maneuvers to carry out the Radar-4 experiment, deorbited over the Pacific at 09:34 GMT on 1 September.

2011 June 27 - . 16:00 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2472** - . *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Duration*: 191.20 days. *Decay Date*: 2011-10-24 . *USAF Sat Cat*: 37726 . *COSPAR*: 2011-028A. *Apogee*: 338 km (210 mi). *Perigee*: 217 km (134 mi). *Inclination*: 81.4000 deg. *Period*: 88.90 min.

  Optical surveillance satellite. First launch into this inclination since 1994. Probably jettisoned two recoverable film capsules during the mission. Six reboosts during the mission maintained a 210 km x 250 km observation orbit. The main spacecraft landed at 20:48 GMT on 24 October.

2011 July 13 - . 02:27 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Globalstar M08** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37739 . *COSPAR*: 2011-033A. *Apogee*: 932 km (579 mi). *Perigee*: 920 km (570 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min.

- **Globalstar M08** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37740 . *COSPAR*: 2011-033B. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar M09** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37741 . *COSPAR*: 2011-033C. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.10 min.

- **Globalstar M08** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37742 . *COSPAR*: 2011-033D. *Apogee*: 931 km (578 mi). *Perigee*: 916 km (569 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min.

- **Globalstar M08** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37743 . *COSPAR*: 2011-033E. *Apogee*: 1,178 km (731 mi). *Perigee*: 1,103 km (685 mi). *Inclination*: 52.0000 deg. *Period*: 108.10 min. Second batch of six second-generation Globalstar low-orbit communications satellites launched on a single booster..

- **Globalstar M08** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 37744 . *COSPAR*: 2011-033F. *Apogee*: 932 km (579 mi). *Perigee*: 916 km (569 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min.

2011 August 24 - . 13:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB. *FAILURE*: Five minutes and 25 seconds into flight, during the burn of the booster's third stage, the engine's gas generator failed and the engine shut down. The upper stage and spacecraft crashed in the Gorno-Altai region.. *Failed Stage*: 3.

- **Progress M-12M** - . *Payload*: Progress M s/n 412 / ISS-44P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-02M, Soyuz TMA-21. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M.

  ISS resupply mission. The Progress M failed to reach orbit. Five minutes and 25 seconds into flight, during the burn of the booster's third stage, the engine's gas generator failed and the engine shut down. The upper stage and spacecraft crashed in the Gorno-Altai region of Russia. First ever failure of a Progress spacecraft to dock with a space station in its 135-mission history. The six crew aboard the ISS had sufficient supplies, but the mishap delayed the launch of the Expedition 29 replacement crew until the cause of the failure was understood and the Soyuz launch vehicle cleared again for manned launches. The return to Earth of the first half of the Expedition 28 crew has also delayed to mid-September, meaning the station would be reduced to a three-person crew for a time.

2011 October 2 - . 20:15 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2474** - . *Payload*: Glonass-M No. 42 / Uragan-M sn 742. *Mass*: 1,415 kg (3,119 lb). *Nation*: Russia. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Glonass. *USAF Sat Cat*: 37829 . *COSPAR*: 2011-055A. *Apogee*: 19,156 km (11,902 mi). *Perigee*: 19,104 km (11,870 mi). *Inclination*: 64.8000 deg. *Period*: 675.70 min. Glonass-M navigation satellite. The Fregat upper stage maneuvered from a 60 km x 220 km orbit on release from the Soyuz third stage; then to 220 km x 220 km, 250 km x 19,100 km and then to the deployment orbit of 19,235 km x 19,667 km x 64.8 deg..

2011 October 21 - . 10:30 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-B.

- **GalileoSat-1** - . *Payload*: Galileo-PFM / Thijs. *Mass*: 640 kg (1,410 lb). *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 37846 . *COSPAR*: 2011-060A. *Apogee*: 23,307 km (14,482 mi). *Perigee*: 23,234 km (14,436 mi). *Inclination*: 54.7000 deg. *Period*: 846.80 min. First Galileo navigation satellites launched to establish an autonomous European navigation satellite constellation. First Soyuz booster launch from the new Ensemble de Lancement Soyuz pad in Kourou..

- **GalileoSat-2** - . *Payload*: Galileo-FM2 / Natalia. *Mass*: 640 kg (1,410 lb). *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 37847 . *COSPAR*: 2011-060B. *Apogee*: 23,274 km (14,461 mi). *Perigee*: 23,228 km (14,433 mi). *Inclination*: 54.7000 deg. *Period*: 845.90 min.

2011 October 30 - . 10:11 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-13M** - . *Payload*: Progress M s/n 413 / ISS-45P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Flight*: Soyuz TMA-02M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 87.00 days. *Decay Date*: 2012-01-25 . *USAF Sat Cat*: 37857 . *COSPAR*: 2011-062A. *Apogee*: 403 km (250 mi). *Perigee*: 374 km (232 mi). *Inclination*: 51.6000 deg. *Period*: 92.30 min.

  Space station resupply. Docked with the Pirs module of the ISS on 2 November. This restored resupply of the station after the Progress M-12M launch failure and two intermediate successful flights of the Soyuz booster. Also carried the Chibis-M subsatellite.

2011 November 14 - . 04:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-22** - . *Call Sign*: Astraeus. *Crew*: Burbank, Ivanishin, Shkaplerov. *Backup Crew*: Acaba, Padalka, Revin. *Payload*: Soyuz 7K-STMA s/n 232. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned.

Type: Manned spacecraft. *Flight*: Soyuz TMA-22. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 165.31 days. *Decay Date*: 2012-04-27 . *USAF Sat Cat*: 37877 . *COSPAR*: 2011-067A. *Apogee*: 410 km (250 mi). *Perigee*: 376 km (233 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min.

Launch delayed two months to verify booster after launch failure of Progress M-12M in August 2011. After successful launch of Progress M-13M on 30 October, Soyuz TMA-22 was cleared for launch. Delivered the EO-29 crew to the ISS, docking at the Poisk module of the station at 05:24 GMT on 16 November. Undocked on 27 April 2012 at 08:15 GMT and landed in Kazakhstan at 11:45 GMT.

2011 November 28 - . 08:26 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2478** - . *Payload*: Glonass-M No. 46. *Mass*: 1,415 kg (3,119 lb). *Nation*: Russia. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Glonass. *USAF Sat Cat*: 37938 . *COSPAR*: 2011-071A. *Apogee*: 19,157 km (11,903 mi). *Perigee*: 19,102 km (11,869 mi). *Inclination*: 64.8000 deg. *Period*: 675.70 min.

2011 December 17 - . 02:03 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-A.

- **Pleiades HR1** - . *Mass*: 970 kg (2,130 lb). *Nation*: France. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft*: Pleiades. *USAF Sat Cat*: 38007 . *COSPAR*: 2011-076A. *Apogee*: 692 km (429 mi). *Perigee*: 676 km (420 mi). *Inclination*: 98.2000 deg. *Period*: 98.50 min. High resolution military surveillance satellite..

- **Elisa 1** - . *Mass*: 120 kg (260 lb). *Nation*: France. *Class*: Surveillance. *Type*: ELINT. *Spacecraft*: Myriade. *USAF Sat Cat*: 38008 . *COSPAR*: 2011-076B. *Apogee*: 692 km (429 mi). *Perigee*: 675 km (419 mi). *Inclination*: 98.2000 deg. *Period*: 98.40 min.

  Quartet of electronic intelligence satellites, which succeed Essaim as France's next space-based SIGINT demonstrator. Like Essaim, Elisa consists of four Myriade microsatellites equipped with electronic intelligence instruments to intercept radar transmissions from space. Elisa was to offer a pre-operational capability until a fully operational space-based intelligence capability would be deployed in 2016.

- **Elisa 2** - . *Mass*: 120 kg (260 lb). *Nation*: France. *Class*: Surveillance. *Type*: ELINT. *Spacecraft*: Myriade. *USAF Sat Cat*: 38009 . *COSPAR*: 2011-076C. *Apogee*: 693 km (430 mi). *Perigee*: 681 km (423 mi). *Inclination*: 98.2000 deg. *Period*: 98.50 min.

- **Elisa 3** - . *Mass*: 120 kg (260 lb). *Nation*: France. *Class*: Surveillance. *Type*: ELINT. *Spacecraft*: Myriade. *USAF Sat Cat*: 38010 . *COSPAR*: 2011-076D. *Apogee*: 693 km (430 mi). *Perigee*: 674 km (418 mi). *Inclination*: 98.2000 deg. *Period*: 98.40 min.

- **Elisa 4** - . *Mass*: 120 kg (260 lb). *Nation*: France. *Class*: Surveillance. *Type*: ELINT.

Spacecraft: Myriade. *USAF Sat Cat*: 38011 . *COSPAR*: 2011-076E. *Apogee*: 616 km (382 mi). *Perigee*: 601 km (373 mi). *Inclination*: 98.2000 deg. *Period*: 96.90 min.

- **Fasat-Charlie** - . *Mass*: 50 kg (110 lb). *Nation*: Chile. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft*: Myriade. *USAF Sat Cat*: 38012 . *COSPAR*: 2011-076F. *Apogee*: 612 km (380 mi). *Perigee*: 597 km (370 mi). *Inclination*: 98.2000 deg. *Period*: 96.80 min. Imaging satellite for the Chilean Air Force..

2011 December 21 - . 13:16 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-03M** - . *Call Sign*: Antares. *Crew*: Kononenko, Kuipers, Pettit. *Backup Crew*: Hoshide, Malenchenko, Williams. *Payload*: Soyuz TMA s/n 703. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-03M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 192.79 days. *Decay Date*: 2012-07-01 . *USAF Sat Cat*: 38036 . *COSPAR*: 2011-078A. *Apogee*: 405 km (251 mi). *Perigee*: 375 km (233 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min. Docked at the Rassvet module of the ISS at 15:19 GMT on 23 December. Undocked from the ISS on 1 July 2012 at 04:47 GMT and landed in Kazakhstan at 08:14 GMT..

2011 December 23 - . 12:08 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B. *FAILURE*: Third stage shut down at 7:01 after launch. Stage and payload crashed in Siberia..

- **Meridian** - . *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: Glonass. *Spacecraft*: Meridian. Was to have been fifth launch of Meridian military communications satellite..

2011 December 28 - . 17:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Globalstar M084** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 38040 . *COSPAR*: 2011-080A. *Apogee*: 926 km (575 mi). *Perigee*: 921 km (572 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min. Replenishment of Globalstar MEO constellation..

- **Globalstar M080** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 38041 . *COSPAR*: 2011-080B. *Apogee*: 926 km (575 mi). *Perigee*: 920 km (570 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min.

- **Globalstar M082** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus.

USAF Sat Cat: 38042 . *COSPAR*: 2011-080C. *Apogee*: 926 km (575 mi). *Perigee*: 918 km (570 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min.

- **Globalstar M092** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 38043 . *COSPAR*: 2011-080D. *Apogee*: 926 km (575 mi). *Perigee*: 916 km (569 mi). *Inclination*: 52.0000 deg. *Period*: 103.40 min.

- **Globalstar M090** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 38044 . *COSPAR*: 2011-080E. *Apogee*: 926 km (575 mi). *Perigee*: 917 km (569 mi). *Inclination*: 52.0000 deg. *Period*: 103.40 min.

- **Globalstar M086** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 38045 . *COSPAR*: 2011-080F. *Apogee*: 926 km (575 mi). *Perigee*: 919 km (571 mi). *Inclination*: 52.0000 deg. *Period*: 103.50 min.

2012 January 24 - . 23:18 GMT - . *Launch Site*: Baikonur. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Chibis-M** - . *Mass*: 40 kg (88 lb). *Nation*: Russia. *Class*: Earth. *Type*: Magnetosphere satellite. *Spacecraft*: Chibis-M. *Decay Date*: 2014-10-15 . *USAF Sat Cat*: 38051 . *COSPAR*: 2011-062C. *Apogee*: 502 km (311 mi). *Perigee*: 484 km (300 mi). *Inclination*: 51.6000 deg. *Period*: 94.50 min. Released in low earth orbit from Progress M-13M after separation from ISS. Carried plasma wave experiment..

2012 January 25 - . 23:06 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-14M** - . *Payload*: Progress M s/n 414 / ISS-46P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 94.00 days. *Decay Date*: 2012-04-28 . *USAF Sat Cat*: 38073 . *COSPAR*: 2012-004A. *Apogee*: 405 km (251 mi). *Perigee*: 375 km (233 mi). *Inclination*: 51.6000 deg. *Period*: 92.40 min. Docked with the International Space Station at the Pirs module on 28 January at 00:09 GMT. Undocked on 19 April 11:04 GMT to begin nine days of autonomous Radar-Progress ionospheric experiments. Deorbited over the Pacific Ocean on 28 April..

2012 April 20 - . 12:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-15M** - . *Payload*: Progress M s/n 415 / ISS-47P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M.

Duration: 122.00 days. *Decay Date*: 2012-08-20 . *USAF Sat Cat*: 38222 . *COSPAR*: 2012-015A. *Apogee*: 406 km (252 mi). *Perigee*: 392 km (243 mi). *Inclination*: 51.6000 deg. *Period*: 92.50 min.

Docked at the Pirs module of the International Space Station on 22 April at 14:39 GMT. Undocked and after three weeks of independent flight involving Radar-Progress experiments using thruster burns to study the ionosphere, was deorbited over the Pacific on 20 August.

2012 May 15 - . 03:01 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-04M** - . *Call Sign*: Altair. *Crew*: Acaba, Padalka, Revin. *Backup Crew*: Ford, Kevin, Novitskiy, Tarelkin. *Payload*: Soyuz TMA s/n 705. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-04M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 124.99 days. *Decay Date*: 2012-09-17 . *USAF Sat Cat*: 38291 . *COSPAR*: 2012-022A. *Apogee*: 406 km (252 mi). *Perigee*: 392 km (243 mi). *Inclination*: 51.6000 deg. *Period*: 92.50 min.

  Docked at the station's Poisk module on 17 May at 04:36 GMT. On 16 September at 23:09 GMT undocked from the station to return the crew to earth. Soyuz TMA-04M flew for 2 hr 47 min in a 403 km x 426 km orbit, then fired its engines for the deorbit burn at 01:56 GMT on 17 September to enter a 13 kmx 425 km reentry orbit. The crew landed safely in Kazakhstan at 02:23 GMT.

2012 May 17 - . 14:05 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC16/2. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Cosmos 2480** - . *Payload*: Kobalt-M. *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Decay Date*: 2012-09-24 . *USAF Sat Cat*: 38335 . *COSPAR*: 2012-024A. *Apogee*: 280 km (170 mi). *Perigee*: 199 km (123 mi). *Inclination*: 81.4000 deg. *Period*: 89.30 min. Kobalt-M film reconnaisance satellite. A deorbit burn on 24 September at 16:39 GMT was followed by separation of the service module and reentry of the pressurized main payload section which contained cameras and film. Landed at 17:03 GMT..

2012 July 15 - . 02:40 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-05M** - . *Call Sign*: Agate. *Crew*: Hoshide, Malenchenko, Williams. *Backup Crew*: Hadfield, Marshburn, Romanenko, Roman. *Payload*: Soyuz TMA s/n 706. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-05M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 126.97 days. *Decay Date*: 2012-11-19 . *USAF Sat*

Cat: 38671 . *COSPAR*: 2012-037A. *Apogee*: 428 km (265 mi). *Perigee*: 403 km (250 mi). *Inclination*: 51.6000 deg. *Period*: 92.90 min. Docked with the ISS at 04:51 GMT on 17 July. Undocked at 22:26 GMT on 18 November; landed in Kazakhstan at 01:53 GMT on 29 November..

2012 July 22 - . 06:41 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Kanopus-V 1** - . *Payload*: Kanopus-V. *Mass*: 473 kg (1,042 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Civilian surveillance satellite. *Spacecraft*: Kanopus. *USAF Sat Cat*: 38707 . *COSPAR*: 2012-039A. *Apogee*: 507 km (315 mi). *Perigee*: 500 km (310 mi). *Inclination*: 97.5000 deg. *Period*: 94.70 min. Remote sensing satellite. Imager provided a resolution of 2.5 m in a 20 km swath and 12.5 m in four spectral channels along the same swath. A separate imager provided optical resolution of 25 m in a 250 km swath..

- **BKA 2** - . *Payload*: BelKA-2. *Mass*: 473 kg (1,042 lb). *Nation*: Belarus. *Class*: Surveillance. *Type*: Civilian surveillance satellite. *Spacecraft*: Kanopus. *USAF Sat Cat*: 38708 . *COSPAR*: 2012-039B. *Apogee*: 507 km (315 mi). *Perigee*: 506 km (314 mi). *Inclination*: 97.5000 deg. *Period*: 94.80 min. Remote sensing satellite; replaced BelKa 1 satellite lost in an launch failure. Imager provided a resolution of 2.1 m and four spectral channels..

- **ExactView-1** - . *Mass*: 100 kg (220 lb). *Nation*: Canada. *Agency*: ExactView. *Manufacturer*: Surrey. *Class*: Communications. *Type*: Civilian communications satellite. *Spacecraft*: MicroSat-100. *USAF Sat Cat*: 38709 . *COSPAR*: 2012-039C. *Apogee*: 822 km (510 mi). *Perigee*: 805 km (500 mi). *Inclination*: 98.9000 deg. *Period*: 101.20 min. Carried Automatic Identification System (AIS) for the identification and location of maritime vessels..

- **TET-1** - . *Mass*: 120 kg (260 lb). *Nation*: Germany. *Class*: Technology. *Type*: Technology satellite. *Spacecraft*: TET. *USAF Sat Cat*: 38710 . *COSPAR*: 2012-039D. *Apogee*: 506 km (314 mi). *Perigee*: 504 km (313 mi). *Inclination*: 97.5000 deg. *Period*: 94.70 min. DLR Technologieerprobungstr  ger 1, as part of their On-Orbit Verification Program. Tested new space components; carried an imaging payload..

- **MKA-FKI 1** - . *Payload*: MKA-PN1. *Mass*: 156 kg (343 lb). *Nation*: Russia. *Class*: Earth. *Type*: Climate satellite. *Spacecraft*: MKA-FKI. *USAF Sat Cat*: 38711 . *COSPAR*: 2012-039E. *Apogee*: 822 km (510 mi). *Perigee*: 805 km (500 mi). *Inclination*: 98.9000 deg. *Period*: 101.20 min. Equipped with L-band UHF panoramic radiometer to map soil moisture and water salinity, studying the land-ocean-atmosphere energy system; and a multi-spectral Pribor EK camera..

2012 August 1 - . 19:35 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-16M** - . *Payload*: Progress M s/n 416 / ISS-48P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 192.00 days. *Decay Date*: 2013-02-09 . *USAF Sat Cat*: 38738 . *COSPAR*: 2012-042A. *Apogee*: 428 km (265 mi). *Perigee*: 403 km (250 mi). *Inclination*: 51.6000 deg. *Period*: 92.90 min. Undocked from the Pirs module at 13:16 GMT on 9 February. Deorbited over the Pacific Ocean at 16:19 GMT with debris impact at 17:05 GMT..

2012 September 17 - . 16:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **METOP-B** - . *Mass*: 4,244 kg (9,356 lb). *Nation*: Europe. *Class*: Earth. *Type*: Weather satellite. *Spacecraft*: SPOT-5A-5B. *USAF Sat Cat*: 38771 . *COSPAR*: 2012-049A. *Apogee*: 811 km (503 mi). *Perigee*: 806 km (500 mi). *Inclination*: 98.7000 deg. *Period*: 101.00 min. European weather satellite agency EUMETSAT's second METOP satellite..

2012 October 12 - . 18:15 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-B.

- **GalileoSat-3** - . *Payload*: Galileo IOV-3 / David. *Mass*: 640 kg (1,410 lb). *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 38857 . *COSPAR*: 2012-055A. *Apogee*: 23,228 km (14,433 mi). *Perigee*: 23,217 km (14,426 mi). *Inclination*: 55.3000 deg. *Period*: 844.70 min. In-orbit validation satellite for the Galileo navigation system. Nicknamed David in honor a competition winner, Mr. David Markarjanc (b.2001) of the Czech Republic..

- **GalileoSat-4** - . *Payload*: Galileo IOV-4 / Sif. *Mass*: 640 kg (1,410 lb). *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 38858 . *COSPAR*: 2012-055B. *Apogee*: 23,227 km (14,432 mi). *Perigee*: 23,218 km (14,426 mi). *Inclination*: 55.3000 deg. *Period*: 844.70 min. In-orbit validation satellite for the Galileo navigation system. Nicknamed Sif in honor a competition winner, Ms. Sif Skov Christensen (b.2002) of Denmark..

2012 October 23 - . 10:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-06M** - . *Call Sign*: Kazbek. *Crew*: Ford, Kevin, Novitskiy, Tarelkin. *Backup Crew*: Cassidy, Misurkin, Vinogradov. *Payload*: ISS-32S. Soyuz TMA s/n 707. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-06M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 143.68 days. *Decay Date*: 2013-03-16 . *USAF Sat Cat*: 38871 . *COSPAR*: 2012-058A. *Apogee*: 422 km (262 mi). *Perigee*: 401 km (249 mi). *Inclination*: 51.6000 deg. *Period*: 92.80 min. Docked with the Poisk module of

the ISS at 12:29 GMT on 25 October. Undocked at 23:43 GMT on 15 March 2013. Retrofire at 02:13 GMT the next day,followed by landing in Kazakhstan at about 03:06 GMT on 16 March..

2012 October 31 - . 07:41 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U-PVB.

- **Progress M-17M** - . *Payload*: Progress M s/n 417 / ISS-49P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 172.00 days. *Decay Date*: 2013-04-21 . *USAF Sat Cat*: 38975 . *COSPAR*: 2012-060A. *Apogee*: 422 km (262 mi). *Perigee*: 401 km (249 mi). *Inclination*: 51.6000 deg. *Period*: 92.80 min.

  Docked with the Zvezda module of the ISS after a quick-rendezvous 5 hour 52 min flight. Undocked from Zvezda at 12:02 GMT on 15 April for independent flight to conduct Radar-Progress ionospheric tests. Retrofire on 21 April on 14:07 GMT lasted 173 seconds, producing a delta-V of 90 m/s. Impacted in the Pacific at 15:02 GMT.

2012 November 14 - . 11:42 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Meridian No. 16** - . *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Class*: Communications. *Type*: Military communications satellite. *Spacecraft Bus*: Glonass. *Spacecraft*: Meridian. *USAF Sat Cat*: 38995 . *COSPAR*: 2012-063A. *Apogee*: 39,732 km (24,688 mi). *Perigee*: 986 km (612 mi). *Inclination*: 62.8000 deg. *Period*: 725.20 min. Sixth Meridian military communications satellite for the Russian Defense Ministry..

2012 December 2 - . 02:02 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-A.

- **Pleiades 1B** - . *Mass*: 970 kg (2,130 lb). *Nation*: France. *Class*: Surveillance. *Type*: Military surveillance satellite. *Spacecraft*: Pleiades. *USAF Sat Cat*: 39019 . *COSPAR*: 2012-068A. *Apogee*: 699 km (434 mi). *Perigee*: 697 km (433 mi). *Inclination*: 98.2000 deg. *Period*: 98.70 min. High resolution French military optical reconnaisance satellite..

2012 December 19 - . 12:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-07M** - . *Call Sign*: Parus. *Crew*: Hadfield, Marshburn, Romanenko, Roman. *Backup Crew*: Nyberg, Parmitano, Yurchikhin. *Payload*: Soyuz TMA s/n 704A. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-07M. *Spacecraft Bus*: Soyuz.

Spacecraft: Soyuz TMA. *Duration*: 145.60 days. *Decay Date*: 2013-05-14 . *USAF Sat Cat*: 39032 . *COSPAR*: 2012-074A. *Apogee*: 421 km (261 mi). *Perigee*: 402 km (249 mi). *Inclination*: 51.6000 deg. *Period*: 92.80 min. Docked with the Rassvet module of the ISS at 14:09 GMT on 21 December. Undocked at 23:08 GMT on 13 May 2013. Retrofire at 01:37 GMT on 14 May was followed by landing in Kazakhstan at 02:31 GMT..

2013 February 6 - . 16:04 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31/6. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Globalstar M097** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 39072 . *COSPAR*: 2013-005A. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.08 min.

- **Globalstar M093** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 39073 . *COSPAR*: 2013-005B. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 51.9800 deg. *Period*: 114.08 min.

- **Globalstar M094** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 39074 . *COSPAR*: 2013-005C. *Apogee*: 927 km (576 mi). *Perigee*: 916 km (569 mi). *Inclination*: 52.0100 deg. *Period*: 103.44 min.

- **Globalstar M096** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 39075 . *COSPAR*: 2013-005D. *Apogee*: 1,415 km (879 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 52.0000 deg. *Period*: 114.08 min.

- **Globalstar M078** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 39076 . *COSPAR*: 2013-005E. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 51.9900 deg. *Period*: 114.08 min.

- **Globalstar M095** - . *Mass*: 700 kg (1,540 lb). *Nation*: USA. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: Proteus. *USAF Sat Cat*: 39077 . *COSPAR*: 2013-005F. *Apogee*: 1,414 km (878 mi). *Perigee*: 1,413 km (877 mi). *Inclination*: 51.9800 deg. *Period*: 114.08 min. Six satellites in one launch; replenishment of Globalstar MEO mobile-phone communications satellite constellation..

2013 February 11 - . 14:41 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-18M** - . *Payload*: Progress M s/n 418 / ISS-50P. *Mass*: 7,250 kg

(15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 165.00 days. *Decay Date*: 2013-07-26 . *USAF Sat Cat*: 39082 . *COSPAR*: 2013-007A. *Apogee*: 421 km (261 mi). *Perigee*: 409 km (254 mi). *Inclination*: 51.6500 deg. *Period*: 92.88 min. Docked with the Pirs module of the ISS at 20:34 GMT on launch day. Undocked from the Pirs module at 20:53 GMT on July 25 and was deorbited over the South Pacific three hours later, with debris ocean impact around 00:42 GMT July 26..

2013 March 28 - . 20:43 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-08M** - . *Call Sign*: Karat. *Crew*: Cassidy, Misurkin, Vinogradov. *Backup Crew*: Hopkins, Kotov, Ryazansky. *Payload*: Soyuz TMA s/n 708. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-08M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 166.26 days. *Decay Date*: 2013-09-11 . *USAF Sat Cat*: 39125 . *COSPAR*: 2013-013A. *Apogee*: 421 km (261 mi). *Perigee*: 409 km (254 mi). *Inclination*: 51.6500 deg. *Period*: 92.88 min.

  Docked with the Poisk module of the ISS at 02:28 GMT on 29 March. Soyuz TMA-08M undocked from the ISS and made its deorbit burn at 02:05 GMT. The BO and PAO modules were jettisoned at 02:32 GMT and the SA descent module containing Vinogradov, Misurkin and Cassidy touched down safely in Kazakhstan at 02:58 GMT after 166.3 days in space.

2013 April 19 - . 10:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31/6. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Bion-M No. 1** - . *Mass*: 6,266 kg (13,814 lb). *Nation*: Russia. *Class*: Biology. *Type*: Biology satellite. *Spacecraft*: Bion-M. *Decay Date*: 2013-05-19 . *USAF Sat Cat*: 39130 . *COSPAR*: 2013-015A. *Apogee*: 579 km (359 mi). *Perigee*: 471 km (292 mi). *Inclination*: 64.8800 deg. *Period*: 95.14 min.

  The biosat combined a Vostok spherical pressurized reentry capusle and a Yantar service module. The capsule carried mice, gerbils, geckos, and snails; microorganisms in FRAGMENTER and BIOKONT-B containers; fish and algae in an OMEGAHAB aquarium; plants in FITO plant containers; and some microgravity materials experiments. Landed 82 km north of Orenburg at 03:12 GMT on 19 May. The gerbils had perished due to equipment failure; all of the geckos and half of the mice were alive

- **OSSI-1** - . *Mass*: 1.00 kg (2.20 lb). *Nation*: Korea South. *Spacecraft*: Cubesat. *Decay Date*: 2013-07-08 . *USAF Sat Cat*: 39131 . *COSPAR*: 2013-015B. *Apogee*: 348 km (216 mi). *Perigee*: 218 km (135 mi). *Inclination*: 64.8600 deg. *Period*: 90.17 min. Cubesat developed by a Korean artist..

- **Dove-2** - . *Mass*: 3.00 kg (6.60 lb). *Nation*: USA. *Spacecraft*: Cubesat. *USAF Sat Cat*: 39132 . *COSPAR*: 2013-015C. *Apogee*: 575 km (357 mi). *Perigee*: 564 km (350 mi). *Inclination*: 64.8700 deg. *Period*: 96.06 min. 3U cubesat, a demonstration satellite for Cosmogia, designed to return on-board system health data and validate the design for future Dove satellites, which will carry remote sensing payloads..

- **Aist 2** - . *Mass*: 39 kg (85 lb). *Nation*: Russia. *Spacecraft*: Aist. *USAF Sat Cat*: 39133 . *COSPAR*: 2013-015D. *Apogee*: 575 km (357 mi). *Perigee*: 564 km (350 mi). *Inclination*: 64.8800 deg. *Period*: 96.05 min. Small satellite released from the side of Bion-M's service module, developed by TsSKB-Progress and the Samara Aerospace University; carried a magnetometer, acclerometers and a micrometeor experiment..

- **BEESAT-3** - . *Mass*: 1.00 kg (2.20 lb). *Nation*: Germany. *Spacecraft*: Cubesat. *USAF Sat Cat*: 39134 . *COSPAR*: 2013-015E. *Apogee*: 574 km (356 mi). *Perigee*: 558 km (346 mi). *Inclination*: 64.8800 deg. *Period*: 95.97 min. 1U cubesat from the Technical University of Berlin. Reaction wheel technology qualification. Successful..

- **SOMP** - . *Mass*: 1.00 kg (2.20 lb). *Nation*: Germany. *Spacecraft*: Cubesat. *USAF Sat Cat*: 39135 . *COSPAR*: 2013-015F. *Apogee*: 574 km (356 mi). *Perigee*: 558 km (346 mi). *Inclination*: 64.8800 deg. *Period*: 95.98 min. Student Oxygen Measurement 1U cubesat from Technical University of Dresden. Mission: Education, testing software defined radio, measuring atomic oxygen concentration, demonstrating TFSC ..

- **BEESAT-2** - . *Mass*: 1.00 kg (2.20 lb). *Nation*: Germany. *Spacecraft*: Cubesat. *USAF Sat Cat*: 39136 . *COSPAR*: 2013-015G. *Apogee*: 574 km (356 mi). *Perigee*: 558 km (346 mi). *Inclination*: 64.8800 deg. *Period*: 95.98 min. 1U cubesat from the Technical University of Berlin. Mission: Reaction wheel technology qualification. Successful..

2013 April 24 - . 10:12 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-19M** - . *Payload*: Progress M s/n 419 / ISS-51P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 56.00 days. *Decay Date*: 2013-06-19 . *USAF Sat Cat*: 39148 . *COSPAR*: 2013-017A. *Apogee*: 418 km (259 mi). *Perigee*: 360 km (220 mi). *Inclination*: 51.6500 deg. *Period*: 92.34 min.

  Although one of the spacecraft's rendezvous antennae did not deploy, it docked successfully with the aft port of the ISS Zvezda module at 12:25 GMT on 26 April. Undocked from the Zvezda module at 13:58 GMT on 11 June to clear the port for the ATV resupply vehicle. Maneuvered to a 416 km x 456 km orbit for Radar-Progress ionospheric experiments.

2013 April 26 - . 05:23 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2485** - . *Payload*: Glonass-M No. 47. *Mass*: 1,415 kg (3,119 lb). *Nation*: Russia. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Glonass. *USAF Sat Cat*: 39155 . *COSPAR*: 2013-019A. *Apogee*: 19,176 km (11,915 mi). *Perigee*: 19,084 km (11,858 mi). *Inclination*: 64.7600 deg. *Period*: 675.73 min. Part of launch series to bring Glonass navigation satellite constellation up to full operation..

2013 May 28 - . 20:31 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-09M** - . *Call Sign*: Olympus. *Crew*: Nyberg, Parmitano, Yurchikhin. *Backup Crew*: Mastracchio, Tyurin, Wakata. *Payload*: Soyuz TMA s/n 709. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-09M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 166.26 days. *Decay Date*: 2013-11-11 . *USAF Sat Cat*: 39170 . *COSPAR*: 2013-025A. *Apogee*: 421 km (261 mi). *Perigee*: 409 km (254 mi). *Inclination*: 51.6500 deg. *Period*: 92.88 min.

  Docked with the Rassvet module of the ISS at 02:10 GMT on 29 May after a 5 hour 39 minute flight. On 1 November 2013 Yurchikin, Nyberg and Parmitano, undocked from the Rassvet module at 08:33 GMT and flew around the station at a distance of 200 m to redock at 08:54 GMT with the Zvezda aft port freed up by ATV-4. Undocked from the Zvezda module on 10 November at 23:26 GMT and landed in Kazakhstan at 02:49 GMT on 11 November.

2013 June 7 - . 18:37 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43. *Launch Pad*: LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2486** - . *Mass*: 7,100 kg (15,600 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft*: Persona. *USAF Sat Cat*: 39177 . *COSPAR*: 2013-028A. *Apogee*: 733 km (455 mi). *Perigee*: 714 km (443 mi). *Inclination*: 98.3000 deg. *Period*: 99.26 min. Second Persona reconnaisance satellite, in sun-synchronous orbit with 10:31 local time descending node. Said to have failed after a short time in orbit..

2013 June 25 - . 17:28 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: LC31/6. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Resurs-P** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Resurs-Spektr. *USAF Sat Cat*: 39186 . *COSPAR*: 2013-030A. *Apogee*: 473 km (293 mi). *Perigee*: 459 km (285 mi). *Inclination*: 97.2800 deg. *Period*: 93.91 min. Civilian imaging satellite with a Geoton-L1 telescope with 1-meter resolution multispectral imager and a 25m resolution hyperspectral imager..

2013 June 25 - . 19:27 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-B.

- **O3b SC4/FM5** - . *Payload*: O3B FM5. *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 39188 . *COSPAR*: 2013-031A. *Apogee*: 7,838 km (4,870 mi). *Perigee*: 7,808 km (4,851 mi). *Inclination*: 0.0400 deg. *Period*: 280.71 min. O3b (the other 3 billion) satellite providing Ka-band communications with steerable antennas for broadband internet capacity in the developing world..

- **O3b SC3/FM4** - . *Payload*: O3B FM4. *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 39189 . *COSPAR*: 2013-031B. *Apogee*: 7,838 km (4,870 mi). *Perigee*: 7,820 km (4,850 mi). *Inclination*: 0.0400 deg. *Period*: 280.88 min.

- **O3b SC2/FM2** - . *Payload*: O3B FM2. *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 39190 . *COSPAR*: 2013-031C. *Apogee*: 7,838 km (4,870 mi). *Perigee*: 7,828 km (4,864 mi). *Inclination*: 0.0400 deg. *Period*: 281.00 min.

- **O3b SC1/PFM** - . *Payload*: O3B PFM. *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 39191 . *COSPAR*: 2013-031D. *Apogee*: 8,007 km (4,975 mi). *Perigee*: 7,843 km (4,873 mi). *Inclination*: 0.0300 deg. *Period*: 283.73 min.

2013 July 27 - . 20:45 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-20M** - . *Payload*: Progress M s/n 420 / ISS-52P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 199.00 days. *Decay Date*: 2014-02-11 . *USAF Sat Cat*: 39219 . *COSPAR*: 2013-039A. *Apogee*: 414 km (257 mi). *Perigee*: 361 km (224 mi). *Inclination*: 51.6500 deg. *Period*: 92.30 min.

  Docked with the Pirs module of the ISS 5 hr 41 min after launch. Payload delivered to the station included a 1U cubesat, Chasqui 1 from Peru's Universidad Nacional de Ingenieria. Undocked from the Pirs module of the ISS at 16:21 GMT on 3 February 2014. Deorbited on February 11 following a week of independent operations, with impact in the South Pacifc at 15:55 GMT.

2013 September 25 - . 20:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-10M** - . *Call Sign*: Pulsar. *Crew*: Hopkins, Kotov, Ryazansky. *Backup Crew*: Artemyev, Skvortsov, Swanson. *Payload*: Soyuz TMA s/n 710. *Mass*: 7,200 kg

(15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-10M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 166.27 days. *Decay Date*: 2014-03-11 . *USAF Sat Cat*: 39263 . *COSPAR*: 2013-054A. *Apogee*: 415 km (257 mi). *Perigee*: 411 km (255 mi). *Inclination*: 51.6500 deg. *Period*: 92.82 min. Docked with the Poisk module of the ISS 5 hours 46 minutes after launch. Undocked from the Poisk module of the ISS at 00:02 GMT on 11 March, landing in Kazakhstan at 03:24 GMT..

2013 November 7 - . 04:14 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-11M** - . *Call Sign*: Vostok. *Crew*: Mastracchio, Tyurin, Wakata. *Backup Crew*: Gerst, Surayev, Wiseman. *Payload*: Soyuz TMA s/n 711. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-11M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 187.91 days. *Decay Date*: 2014-05-14 . *USAF Sat Cat*: 39373 . *COSPAR*: 2013-061A. *Apogee*: 418 km (259 mi). *Perigee*: 415 km (257 mi). *Inclination*: 51.6500 deg. *Period*: 92.90 min. Docked with the Rassvet module of the ISS at 10:27 GMT the day of launch. Undocked from the Rassvet module at 22:36 GMT on May 13 and made the deorbit burn at 01:05 GMT May 14. Landing in Kazakhstan came at 01:58:30 GMT on May 14..

2013 November 25 - . 20:53 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-21M** - . *Payload*: Progress M s/n 421 / ISS-53P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 196.00 days. *Decay Date*: 2014-06-09 . *USAF Sat Cat*: 39456 . *COSPAR*: 2013-069A. *Apogee*: 418 km (259 mi). *Perigee*: 412 km (256 mi). *Inclination*: 51.6500 deg. *Period*: 92.87 min.

  It made a 1.5 km flyby of ISS at 21:50 GMT on November 27 to test the new Kurs-NA rendezvous system, and then a re-rendezvous on November 29. A glitch forced a switch to manual TORU control for the last 60 m to docking with the Zvezda module at 22:30 GMT. Undocked from Zvezda on June 9 at 13:30 GMT and was deorbited the same day, with debris falling in the South Pacific around 17:23 GMT.

2013 December 19 - . 09:12 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-B.

- **Gaia** - . *Mass*: 2,000 kg (4,400 lb). *Nation*: Europe. *Class*: Astronomy. *Type*: Astronomy satellite. *Spacecraft*: Gaia. *USAF Sat Cat*: 39479 . *COSPAR*: 2013-074A.

  European Space Agency Gaia spacecraft to measure the three-dimensional positions and velocities of galactic stars, placed in Lagrangian Point 2. As Gaia rotated, a

gigapixel detector array consisting of a complex arrangement of mirrors, CCD's, and photometers measured stellar positions, brightness and color; and Doppler shifts of stars with unprecedented accuracy. The Gaia catalog, when it is available in the 2020's, was expected to put the whole field of astrophysics on a firmer footing. Soyuz ST-B with upper stage Fregat-MT No. 1039 from Kourou-Sinnamary. The Fregat upper stage separated from the Soyuz booster at suborbital velocity. It then made a first burn to a 175 x 175 km parking orbit, then reignited for a 16-minute burn from 09:33 GMT to propel Gaia to a 344 km x 962,690 km x 15.0 deg orbit, on its way to the Sun-Earth L2 point. Gaia fired its own propulsion system of 6 10-N thrusters to raise apogee to around 1.5 million km towards midnight; after a few weeks it entered a Lissajous orbit around the L2 point and began observations. Gaia's data will take years to process and was to result in the best yet catalog of galactic stars.

2013 December 28 - . 12:30 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1V.

- **Cosmos 2492** - . *Payload*: SKRL-756 No. 1. *Mass*: 45 kg (99 lb). *Nation*: Russia. *Class*: Science. *Type*: Science satellite. *Spacecraft*: SKRL. *USAF Sat Cat*: 39490 . *COSPAR*: 2013-078A. *Apogee*: 626 km (388 mi). *Perigee*: 597 km (370 mi). *Inclination*: 82.4200 deg. *Period*: 96.92 min. Calibration sphere. Announced as 'SKRL-756 No. 1' at time of launch. First launch of a new rocket, the Soyuz-2-1V..

- **Cosmos 2493** - . *Payload*: SKRL-756 No. 2. *Mass*: 45 kg (99 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Radar calibration target. *Spacecraft*: SKRL. *USAF Sat Cat*: 39491 . *COSPAR*: 2013-078B. *Apogee*: 625 km (388 mi). *Perigee*: 590 km (360 mi). *Inclination*: 82.4200 deg. *Period*: 96.85 min. Calibration sphere. Announced as 'SKRL-756 No. 2' at time of launch..

- **Aist 1** - . *Mass*: 53 kg (116 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Radar calibration target. *Spacecraft*: Aist. *USAF Sat Cat*: 39492 . *COSPAR*: 2013-078C. *Apogee*: 626 km (388 mi). *Perigee*: 595 km (369 mi). *Inclination*: 82.4200 deg. *Period*: 96.91 min. Small satellite developed by TsSKB-Progress and the Samara Aerospace University; carried a magnetometer, acclerometers and a micrometeor experiment..

2014 February 5 - . 16:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-22M** - . *Payload*: Progress M s/n 422 / ISS-54P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 72.00 days. *Decay Date*: 2014-04-18 . *USAF Sat Cat*: 39506 . *COSPAR*: 2014-005A. *Apogee*: 418 km (259 mi). *Perigee*: 361 km (224 mi). *Inclination*: 51.6500 deg. *Period*: 92.34 min.

  ISS mission 54P; docked at the Pirs module of the ISS at 22:22 GMT the same day as

launch. Undocked from the Pirs module at 13:58 GMT April 7; it remained in a 360 x 417 km orbit for Radar-Progress ionospheric studies until April 18, when it was deorbited over the Pacific.

2014 March 23 - . 22:54 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2494** - . *Payload*: Glonass-M No. 54. *Mass*: 1,415 kg (3,119 lb). *Nation*: Russia. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Glonass. *USAF Sat Cat*: 39620 . *COSPAR*: 2014-012A. *Apogee*: 19,174 km (11,914 mi). *Perigee*: 19,085 km (11,858 mi). *Inclination*: 64.8400 deg. *Period*: 675.73 min. Glonass-M No. 54 (Uragan-M No. 754) navigation satellite. Incorrectly announced as Cosmos 2491 at time of launch due to confusion in designations applied to three previous classified military launches..

2014 March 25 - . 21:17 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-12M** - . *Call Sign*: Cliff. *Crew*: Artemyev, Skvortsov, Swanson. *Backup Crew*: Samokutyayev, Serova, Wilmore. *Payload*: Soyuz TMA s/n 712. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-12M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 169.21 days. *Decay Date*: 2014-09-11 . *USAF Sat Cat*: 39622 . *COSPAR*: 2014-013A. *Apogee*: 417 km (259 mi). *Perigee*: 412 km (256 mi). *Inclination*: 51.6500 deg. *Period*: 92.85 min.

  The third planned rendezvous burn at 23:48 GMT was cancelled due to a software problem, leaving the spacecraft in a 297 x 333 km x 51.7 deg orbit. Rendezvous with the ISS was rescheduled to 27 March. It maneuvered to a 414 x 425 km orbit on 26 March. Docking with the ISS at the Poisk module was at 23:53 GMT on 27 March. On September 10 at 23:01 GMT Skvortsov, Artemev and Swanson undocked from the Poisk module in Soyuz TMA-12M. The deorbit burn at 01:30 GMT September 11 was followed by module separation at 01:58, atmosphere entry at 02:01, and landing in Kazakhstan at 02:23.

2014 April 3 - . 21:02 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-A.

- **Sentinel-1A** - . *Mass*: 2,157 kg (4,755 lb). *Nation*: Europe. *Class*: Surveillance. *Type*: Military surveillance radar satellite. *Spacecraft*: Prima. *USAF Sat Cat*: 39634 . *COSPAR*: 2014-016A. *Apogee*: 692 km (429 mi). *Perigee*: 690 km (420 mi). *Inclination*: 98.1600 deg. *Period*: 98.58 min.

  First satellite in the European Commission's Sentinel/Copernicus Earth observing program. Sentinel-1A's C-band SAR was 13.3 x 0.8m in size. The satellite was only a quarter the mass of its predecessor Envisat which carried a wider array of

instruments; in the Sentinel program there will be a series of smaller, more specialized satellites. At 05:14 GMT on April 5, Sentinel made a maneuver to avoid a very close pass by NASA's defunct ACRIMSAT satellite, which failed on December 14 2013 after suffering battery issues.

2014 April 9 - . 15:26 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-23M** - . *Payload*: Progress M s/n 427 / ISS-55P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 113.00 days. *Decay Date*: 2014-07-31 . *USAF Sat Cat*: 39648 . *COSPAR*: 2014-018A. *Apogee*: 417 km (259 mi). *Perigee*: 412 km (256 mi). *Inclination*: 51.6500 deg. *Period*: 92.85 min.

  Docked with the Pirs module of the ISS at 21:14 GMT the same day as launch. Undocked from at 21:44 GMT on July 21 and then carried out 10 days of independent operations as part of the Radar-Progress experiment program. Deorbited on July 31 with impact at 22:43 GMT in the South Pacific.

2014 April 16 - . 16:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Egyptsat-2** - . *Mass*: 1,050 kg (2,310 lb). *Nation*: Egypt. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft Bus*: USP (Victoria). *Spacecraft*: Yamal. *USAF Sat Cat*: 39678 . *COSPAR*: 2014-021A. *Apogee*: 710 km (440 mi). *Perigee*: 649 km (403 mi). *Inclination*: 51.6200 deg. *Period*: 98.34 min. Bult by RKK Energia for Egypt's National Authority for Remote Sensing and Space Science using the 559GK bus; carried a 1-meter resolution imager..

2014 May 6 - . 13:49 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Cosmos 2495** - . *Payload*: Kobalt-M. *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Decay Date*: 2014-09-03 . *USAF Sat Cat*: 39732 . *COSPAR*: 2014-025A. *Apogee*: 253 km (157 mi). *Perigee*: 203 km (126 mi). *Inclination*: 81.4000 deg. *Period*: 89.06 min. Kobalt-M spy satellite, serial number 564. Ninth launch of an 11F695M Kobalt-M film-return satellite and the first to use the Soyuz-2-1A rocket instead of the older Soyuz-U. By May 17 the satellite was in a 207 x 248 km x 81.4 deg orbit..

2014 May 28 - . 19:57 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-13M** - . *Call Sign*: Cepheus. *Crew*: Gerst, Surayev, Wiseman. *Backup Crew*: Cristoforetti, Shkaplerov, Virts. *Payload*: Soyuz TMA s/n 713. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-13M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 165.33 days. *Decay Date*: 2014-11-10 . *USAF Sat Cat*: 39775 . *COSPAR*: 2014-031A. *Apogee*: 417 km (259 mi). *Perigee*: 412 km (256 mi). *Inclination*: 51.6500 deg. *Period*: 92.85 min. Docked with the Rassvet module of the ISS at 01:44 GMT May 29. Undocked from Rassvet at 00:31 GMT on November 10. The deorbit burn at 03:05 GMT reduced velocity by 128 m/s, dipping perigee into the atmosphere. Landed in Kazakhstan at 03:58 GMT..

2014 June 14 - . 17:16 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2500** - . *Payload*: Glonass-M No. 55. *Mass*: 1,415 kg (3,119 lb). *Nation*: Russia. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Glonass. *USAF Sat Cat*: 40001 . *COSPAR*: 2014-032A. *Apogee*: 19,262 km (11,968 mi). *Perigee*: 19,145 km (11,896 mi). *Inclination*: 64.7800 deg. *Period*: 678.67 min. Glonass-M satellite No. 55 to supplement the Russian navigation satellite constellation..

2014 July 8 - . 15:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Meteor M2** - . *Mass*: 2,700 kg (5,900 lb). *Nation*: Russia. *Spacecraft*: Meteor. *USAF Sat Cat*: 40069 . *COSPAR*: 2014-037A. *Apogee*: 827 km (513 mi). *Perigee*: 820 km (500 mi). *Inclination*: 98.8000 deg. *Period*: 101.37 min. Second in series of replacements for Meteor-M weather satellites..

- **MKA PN2 (Relek)** - . *Mass*: 250 kg (550 lb). *Nation*: Russia. *Spacecraft Bus*: Karat. *Spacecraft*: Relek. *USAF Sat Cat*: 40070 . *COSPAR*: 2014-037B. *Apogee*: 821 km (510 mi). *Perigee*: 622 km (386 mi). *Inclination*: 98.3800 deg. *Period*: 99.22 min. Carried magnetosphere instruments..

- **DX 1** - . *Mass*: 27 kg (59 lb). *Nation*: Russia. *Spacecraft*: DX 1. *USAF Sat Cat*: 40071 . *COSPAR*: 2014-037C. *Apogee*: 638 km (396 mi). *Perigee*: 624 km (387 mi). *Inclination*: 98.4000 deg. *Period*: 97.33 min. Experimental small satellite bus; carried an Automatic Identification System (AIS) receiver for tracking ships..

- **Skysat 2** - . *Mass*: 100 kg (220 lb). *Nation*: USA. *Spacecraft*: Skysat. *USAF Sat Cat*: 40072 . *COSPAR*: 2014-037D. *Apogee*: 635 km (394 mi). *Perigee*: 624 km (387 mi). *Inclination*: 98.4000 deg. *Period*: 97.31 min. Commercial earth optical surveillance satellite by Skybox..

- **Dummy sat** - . *Nation*: Russia. *USAF Sat Cat*: 40073 . *COSPAR*: 2014-037E. *Apogee*: 634 km (393 mi). *Perigee*: 624 km (387 mi). *Inclination*: 98.4000 deg. *Period*: 97.29 min.

- **Ukube 1** - . *Mass*: 3.00 kg (6.60 lb). *Nation*: UK. *Spacecraft*: Cubesat. *USAF Sat Cat*: 40074 . *COSPAR*: 2014-037F. *Apogee*: 633 km (393 mi). *Perigee*: 623 km (387 mi). *Inclination*: 98.4000 deg. *Period*: 97.27 min. 3U cubesat sponsored by the UK Space Agency; first of a series to be launched annually to promote space technology in the UK..

- **Aissat 2** - . *Mass*: 6.00 kg (13.20 lb). *Nation*: Norway. *Spacecraft*: Toronto GNB. *USAF Sat Cat*: 40075 . *COSPAR*: 2014-037G. *Apogee*: 633 km (393 mi). *Perigee*: 623 km (387 mi). *Inclination*: 98.4000 deg. *Period*: 97.27 min. Satellite-based Automatic Identification System (AIS) payload to track maritime assets worldwide (all vessels over 300 metric tons are equipped with AIS transponders)..

- **TDS 1** - . *Mass*: 150 kg (330 lb). *Nation*: UK. *Spacecraft*: SSTL-150. *USAF Sat Cat*: 40076 . *COSPAR*: 2014-037H. *Apogee*: 633 km (393 mi). *Perigee*: 623 km (387 mi). *Inclination*: 98.3900 deg. *Period*: 97.27 min. TechDemoSat-1 by Surrey Satellite Technology carrying technology payloads from various UK universities..

2014 July 10 - . 18:55 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-B.

- **O3b FM3** - . *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 40079 . *COSPAR*: 2014-038A. *Apogee*: 8,069 km (5,013 mi). *Perigee*: 8,062 km (5,009 mi). *Inclination*: 0.0300 deg. *Period*: 287.93 min.

- **O3b FM7** - . *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 40080 . *COSPAR*: 2014-038B. *Apogee*: 8,071 km (5,015 mi). *Perigee*: 8,061 km (5,008 mi). *Inclination*: 0.0300 deg. *Period*: 287.93 min.

- **O3b FM6** - . *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 40081 . *COSPAR*: 2014-038C. *Apogee*: 8,069 km (5,013 mi). *Perigee*: 8,063 km (5,010 mi). *Inclination*: 0.0300 deg. *Period*: 287.93 min.

- **O3b FM8** - . *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 40082 . *COSPAR*: 2014-038D. *Apogee*: 8,071 km (5,015 mi). *Perigee*: 8,061 km (5,008 mi). *Inclination*: 0.0300 deg. *Period*: 287.93 min.

2014 July 18 - . 20:50 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Foton M4** - . *Mass*: 6,840 kg (15,070 lb). *Nation*: Russia. *Agency*: FKA. *Class*: Materials. *Type*: Materials science satellite. *Spacecraft*: Vostok. *Decay Date*: 2014-09-01 . *USAF Sat Cat*: 40095 . *COSPAR*: 2014-041A. *Apogee*: 530 km (320 mi). *Perigee*: 248 km (154 mi). *Inclination*: 64.8800 deg. *Period*: 92.34 min.

  Foton-M, using the Vostok reentry capsule, but a new extended length service module. Microgravity and life sciences experiments were on board, including geckos and tardigrades. The return capsule included samples exposed on the exterior for

reentry studies. On July 24 it was revealed that the satellite was not responding to ground commands, although it continued to send back telemetry. Control was later reported to have been regained, but a scheduled orbit raise burn was cancelled, and on August 12 the orbit was still 250 x 542 km. Landed in the Orenburg district on September 1 at 09:18 GMT. The geckos carried as part of the payload were found to have died.

2014 July 23 - . 21:44 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-24M** - . *Payload*: Progress M s/n 423 / ISS-56P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 120.00 days. *Decay Date*: 2014-11-20 . *USAF Sat Cat*: 40097 . *COSPAR*: 2014-042A. *Apogee*: 419 km (260 mi). *Perigee*: 413 km (256 mi). *Inclination*: 51.6500 deg. *Period*: 92.89 min. Docked with the Pirs module of the ISS at 03:31 GMT on July 24. Undocked from Pirs at 05:38 GMT on October 27..

2014 August 22 - . 03:15 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-B.

- **GalileoSat-5** - . *Payload*: Galileo FOC FM01 / Doresa. *Mass*: 733 kg (1,615 lb). *Nation*: Europe. *Agency*: AE. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 40128 . *COSPAR*: 2014-050A. *Apogee*: 25,918 km (16,104 mi). *Perigee*: 13,721 km (8,525 mi). *Inclination*: 49.6900 deg. *Period*: 703.33 min.

  Europe's first two Galileo FOC (Full Operational Capability) navigation satellites were put on a suborbital trajectory by the booster. The Fregat-MT No. 1039 upper stage made a first burn to put the stack in elliptical transfer orbit, and then began the coast to apogee. At apogee at 16:05 GMT the Fregat made a second burn intended to circularize the orbit at 23500 km x and 55.0 deg inclination. The satellites separated from the Fregat at 16:15 GMT. Unfortunately the Fregat was wrongly oriented and the orbit actually reached was 13,700 x 25,900 km x 49.7 deg. An attitude control thrusters may have failed during the coast, leaving Fregat pointing the wrong way at second main engine ignition.

- **GalileoSat-6** - . *Payload*: Galileo FOC FM02 / Milena. *Mass*: 733 kg (1,615 lb). *Nation*: Europe. *Agency*: AE. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 40129 . *COSPAR*: 2014-050B. *Apogee*: 25,906 km (16,097 mi). *Perigee*: 13,702 km (8,514 mi). *Inclination*: 49.6900 deg. *Period*: 702.69 min.

2014 September 25 - . 20:25 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-14M** - . *Call Sign*: Tarkhany. *Crew*: Samokutyayev, Serova, Wilmore. *Backup Crew*: Kelly, Scott, Korniyenko, Padalka. *Payload*: Soyuz TMA s/n 714.

Mass: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-14M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 167.24 days. *Decay Date*: 2015-03-12 . *USAF Sat Cat*: 40246 . *COSPAR*: 2014-057A. *Apogee*: 408 km (253 mi). *Perigee*: 396 km (246 mi). *Inclination*: 51.6500 deg. *Period*: 92.60 min.

Expedition 42 crew transported to the ISS (Samokutyaev, Wilmore and Serova). The port solar array failed to deploy after Soyuz separated from the launch vehicle third stage, but this did not impact the rendezvous. Soyuz TMA-14M docked with the Poisk module of the ISS at 02:11 GMT on September 26. Serova was the fourth Russian woman in space but the first since 1997. On March 11 2015 at 22:44 GMT Soyuz TMA-14M undocked from the Poisk module with the same crew aboard. It performed its deorbit burn at 01:16 GMT March 12 and landed in Kazakhstan at around 02:08 GMT.

2014 October 29 - . 07:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1a.

- **Progress M-25M** - . *Payload*: Progress M s/n 424 / ISS-57P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 179.00 days. *Decay Date*: 2015-04-26 . *USAF Sat Cat*: 40292 . *COSPAR*: 2014-067A. *Apogee*: 403 km (250 mi). *Perigee*: 396 km (246 mi). *Inclination*: 51.6400 deg. *Period*: 92.56 min. Docked with the ISS Pirs module at 13:08 GMT 29 October. Undocked from the Pirs module at 06:41 GMT on April 25 and was deorbited on April 26, with debris falling in the South Pacific at 13:00 GMT..

2014 October 30 - . 01:43 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Meridian No. 17L** - . *Mass*: 2,000 kg (4,400 lb). *Nation*: Russia. *Class*: Communications. *Type*: Communications satellite. *Spacecraft Bus*: Glonass. *Spacecraft*: Meridian. *USAF Sat Cat*: 40296 . *COSPAR*: 2014-069A. *Apogee*: 39,296 km (24,417 mi). *Perigee*: 1,056 km (656 mi). *Inclination*: 62.8300 deg. *Period*: 717.73 min. Seventh in the series of communications satellites for the Russian Ministry of Defense in 12-hour Molniya orbits..

2014 November 23 - . 21:01 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-15M** - . *Call Sign*: Astraeus. *Crew*: Cristoforetti, Shkaplerov, Virts. *Backup Crew*: Yui, Kononenko, Lindgren. *Payload*: Soyuz TMA s/n 715. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-15M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 199.70 days. *Decay Date*: 2015-06-11 . *USAF Sat Cat*: 40312 . *COSPAR*:

2014-074A. *Apogee*: 404 km (251 mi). *Perigee*: 399 km (247 mi). *Inclination*: 51.6400 deg. *Period*: 92.59 min.

Docked at the Rassvet module of the ISS at 02:49 GMT on 24 November 2014 with the crew of Shkaplerov, Virts, and Cristoforetti. Return was delayed over a month before the booster for the Soyuz TMA-16M crew could be cleared for flight following the third-stage explosion of the booster for Progress TMA-11M. Undocked on 11 June 2015 with the same crew at 10:20 GMT and then landed at 13:43 in Kazakhstan.

2014 November 30 - . 21:52 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2501** - . *Payload*: Glonass-K1 No. 12L. *Mass*: 935 kg (2,061 lb). *Nation*: Russia. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Ekspress-1000. *USAF Sat Cat*: 40315 . *COSPAR*: 2014-075A. *Apogee*: 19,179 km (11,917 mi). *Perigee*: 19,081 km (11,856 mi). *Inclination*: 64.7100 deg. *Period*: 675.73 min. Second Glonass-K satellite, vehicle No. 12. The Glonass-K series are the third generation of Russian high orbit navigation satellites, following the original Uragan/Glonass and their successors, the Uragan-M/Glonass-M vehicles..

2014 December 18 - . 18:37 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz ST / Fregat ST.

- **O3b FM9** - . *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 40351 . *COSPAR*: 2014-083D. *Apogee*: 8,071 km (5,015 mi). *Perigee*: 8,061 km (5,008 mi). *Inclination*: 0.0500 deg. *Period*: 287.93 min. Second quartet of O3b satellites for broadband internet distribution. Each satellite carried an array of 12 Ka-band spot beam dishes and provided capacity for internet providers in the developing world..

- **O3b FM10** - . *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 40349 . *COSPAR*: 2014-083B. *Apogee*: 8,070 km (5,010 mi). *Perigee*: 8,061 km (5,008 mi). *Inclination*: 0.0400 deg. *Period*: 287.93 min. O3b satellites launched as part of a constellation for broadband internet distribution..

- **O3b FM11** - . *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 40349 . *COSPAR*: 2014-083B. *Apogee*: 8,070 km (5,010 mi). *Perigee*: 8,061 km (5,008 mi). *Inclination*: 0.0400 deg. *Period*: 287.93 min.

- **O3b FM12** - . *Mass*: 700 kg (1,540 lb). *Nation*: UK. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: ELiTeBus. *USAF Sat Cat*: 40350 . *COSPAR*: 2014-083C. *Apogee*: 8,070 km (5,010 mi). *Perigee*: 8,062 km (5,009 mi). *Inclination*: 0.0400 deg. *Period*: 287.93 min.

2014 December 25 - . 03:01 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2502** - . *Payload*: Lotos-S No. 802. *Mass*: 6,000 kg (13,200 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: ELINT. *Spacecraft*: Lotos-S. *USAF Sat Cat*: 40358 . *COSPAR*: 2014-086A. *Apogee*: 910 km (560 mi). *Perigee*: 901 km (559 mi). *Inclination*: 67.1500 deg. *Period*: 103.10 min.

  Russian military satellite that initially entered a 240 km x 899 km x 67.1 deg orbit. Russian press reports and official announcements did not give any name for the satellite, not even a Cosmos cover name, the first time this had happened since 1963. Believed to be the second Lotos-S signals intelligence satellite. The Lotos-S satellites had a payload similar to the Tselina-2, but used a Russian Yantar-type spacecraft bus from TsSKB-Progress instead of the Tselina-2's Okean class bus from the Ukranian Yuzhnoye organization. The spacecraft circularized its orbit to 899 km x 909 km on December 26, joining Lotos-S No. 801 which was in a 903 km x 907 km x 67 deg orbit.

2014 December 26 - . 18:55 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *Launch Pad*: Baikonur LC31/6. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Resurs-P No. 2** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Resurs-Spektr. *USAF Sat Cat*: 40360 . *COSPAR*: 2014-087A. *Apogee*: 475 km (295 mi). *Perigee*: 463 km (287 mi). *Inclination*: 97.2900 deg. *Period*: 93.98 min.

  Resurs-P 47KS No. 2 civil imaging spacecraft. The main payload was the Geoton-L1 imager with 0.5m aperture and 38 km swath, 1.0 m panchromatic and 3 to 4m color resolution. Geoton-L1 had 7 passbands and a 216-channel hyperspectral imager. The KShMSA wide field multispectral camera was also part of the Resurs-P primary payload; an AIS ship tracking receiver from OAO RKS and Lomonosov Federal State Univ.'s Nuklon cosmic ray detector were secondary payloads. Nuklon detected cosmic ray nuclei with atomic number 1 to 30 in the 1 to 1000 TeV energy range. Resurs-P went into a 190 km x 428 km initial orbit that was raised to its operational height of 330 km x 471 km on December 29. Sun synchronous orbit; 1150 GMT local time of the descending node.

2015 February 17 - . 11:00 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-26M** - . *Payload*: Progress M s/n 426 / ISS-58P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Decay Date*: 2015-08-14 . *USAF Sat Cat*: 40392 . *COSPAR*: 2015-008A. *Apogee*: 237 km (147 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg.

Docked with the ISS Zvezda module at 16:57 GMT the same day as launched. Progress M-26M's engines were used to move the ISS out of the path of some space debris on 23 April and (following a malfunction on May 16) made an ISS orbit reboost on 18 May 18. Progress M-26M undocked 14 August at 10:19 GMT; was deorbited at 13:28 GMT; and impacted the Pacific around 141:7 GMT.

2015 February 27 - . 11:01 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Cosmos 2503** - . *Payload*: COSMOS 2503. *Mass*: 4,000 kg (8,800 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Bars. *USAF Sat Cat*: 40420 . *COSPAR*: 2015-009A. *Apogee*: 577 km (358 mi). *Perigee*: 566 km (351 mi). *Inclination*: 97.6700 deg. *Period*: 96.09 min. Believed to be a new-generation electro-optical reconnaisance satellite based on a heavily modified Yantar bus. Sun synchronous orbit; 0245 GMT local time of the descending node..

2015 March 27 - . 19:42 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-16M** - . *Call Sign*: Altair. *Crew*: Kelly, Scott, Korniyenko, Padalka. *Backup Crew*: Ovchinin, Volkov, Sergey, Williams, Jeffrey. *Return Crew*: Aimbetov, Mogensen, Padalka. *Payload*: Soyuz TMA s/n 716. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-16M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 168.21 days. *Decay Date*: 2015-04-05 . *USAF Sat Cat*: 40540 . *COSPAR*: 2015-016A. *Apogee*: 213 km (132 mi). *Perigee*: 198 km (123 mi). *Inclination*: 51.6000 deg.

  Docked with the Poisk module of the ISS at 5 hours 50 minutes after launch. Padalka was the commander, and Kelly and Kornienko were part of a long-duration crew that would spend nearly a year aboard the space station. On 28 August Padalka, Kelly and Kornienko flew Soyuz TMA-16M from the Poisk to Zvezda docking ports. Undocking from Poisk was at 07:12 GMT and docking with Zvezda was at 07:30 GMT. This freed the Poisk port for the TMA-18M arrival, and freed Zvezda for a refuelling spacecraft once TMA-16M returned to Earth. ISS EO- 44 concluded when Soyuz TMA-16M undocked from the Zvezda aft port at 21:29 GMT on 11 September, carrying Expedition 44 commander Padalka and EP-18 visiting crew members Mogensen and Aimbetov. Soyuz TMA-16M landed in Kazakhstan at 00:51:36 GMT on 12 September.

2015 March 27 - . 21:46 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz ST / Fregat ST.

- **GalileoSat-7** - . *Payload*: Galileo FOC FM03 / Adam. *Mass*: 733 kg (1,615 lb). *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo

Navsat. *USAF Sat Cat*: 40544 . *COSPAR*: 2015-017A. *Apogee*: 23,234 km (14,436 mi). *Perigee*: 23,210 km (14,420 mi). *Inclination*: 55.1900 deg. *Period*: 844.70 min. European navigation satellite..

- **GalileoSat-8** - . *Payload*: Galileo FOC FM04 / Anastasia. *Mass*: 733 kg (1,615 lb). *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 40545 . *COSPAR*: 2015-017B. *Apogee*: 23,234 km (14,436 mi). *Perigee*: 23,210 km (14,420 mi). *Inclination*: 55.2000 deg. *Period*: 844.69 min. European navigation satellite..

2015 April 28 - . 07:09 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1a. *FAILURE*: The third stage did not shut down correctly and damaged the spacecraft during separation.. *Failed Stage*: 3.

- **Progress M-27M** - . *Payload*: Progress M s/n 425 / ISS-59P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Duration*: 10.00 days. *Decay Date*: 2015-05-08 . *USAF Sat Cat*: 40619 . *COSPAR*: 2015-024A. *Apogee*: 258 km (160 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. Limited telemetry was obtained from the Progress, but Russian mission control was unable to control the damaged, spinning spacecraft. The Progress reentered over the South Pacific off the southwest coast of Chile at 02:20 GMT on May 8..

2015 June 5 - . 15:23 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Cosmos 2505** - . *Mass*: 6,700 kg (14,700 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Yantar-4K1. *Decay Date*: 2015-09-18 . *USAF Sat Cat*: 40667 . *COSPAR*: 2015-027A. *Apogee*: 285 km (177 mi). *Perigee*: 177 km (109 mi). *Inclination*: 81.4000 deg.

  Kobal't-M spy satellite s/n 565, maneuvered on 8 and 13 June from an initial orbit of 177 km x 285 km x 81.4 deg to 203 km x 264 km. Current version of the Yantar satellite which returns its main section, with film and camera, to Earth at the end of its flight. It also carried two small ejectable film canisters which can return some data to Earth during the mission.

2015 June 23 - . 16:44 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2506** - . *Mass*: 7,000 kg (15,400 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft*: Persona. *USAF Sat Cat*: 40699 . *COSPAR*: 2015-029A. *Apogee*: 725 km (450 mi). *Perigee*: 706 km (438 mi). *Inclination*: 98.2900 deg. *Period*: 99.09 min.

Third Persona-1 spy satellite, built by TsSKB-Progress in Samara and equipped with electro-optical imaging cameras. Said to be the first to return its data via an optical communications link to an unidentified geosynchronous satellite. On June 28 the satellite manuevered from an elliptical transfer orbit to a circular sun synchronous orbit with 0840 GMT local time of the descending node.

2015 July 3 - . 14:21 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-28M** - . *Payload*: Progress M s/n 428 / ISS-60P. *Mass*: 7,250 kg (15,980 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Decay Date*: 2015-12-19 . *USAF Sat Cat*: 40713 . *COSPAR*: 2015-031A. *Apogee*: 290 km (180 mi). *Perigee*: 262 km (162 mi). *Inclination*: 51.6300 deg. *Period*: 90.03 min.

  Carried critical supplies to the ISS after consecutive failures of all three primary resupply spacecraft to reach orbit a prior Progress, a Cygnus, and a Dragon. Docking was at the Pirs module of the ISS on 5 July at 07:11 GMT. This launch used the older Soyuz-U rocket instead of the newer Soyuz-2-1a which ran into problems on the Progress M-27M launch. Undocked from Pirs at 0735 UTC Dec 19 and was deorbited over the South Pacific, with debris impact at 1128 UTC.

2015 July 22 - . 21:02 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-17M** - . *Call Sign*: Antares. *Crew*: Kononenko, Yui, Lindgren. *Backup Crew*: Kopra, Malenchenko, Peake. *Return Crew*: Kononenko, Yui, Lindgren. *Payload*: Soyuz TMA s/n 717. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-17M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 112.67 days. *Decay Date*: 2015-11-12 13:12:00 . *USAF Sat Cat*: 40744 . *COSPAR*: 2015-035A. *Apogee*: 406 km (252 mi). *Perigee*: 398 km (247 mi). *Inclination*: 51.6500 deg. *Period*: 92.60 min. One solar panel of the Soyuz failed to deploy after launch. Docked with the Rassvet module of the ISS at 02:45 GMT on 22 July..

2015 September 2 - . 04:37 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-18M** - . *Call Sign*: Eridanus. *Crew*: Aimbetov, Mogensen, Volkov, Sergey. *Backup Crew*: Skripochka, Pesquet, Prokopyev. *Return Crew*: Volkov, Sergey, Kelly, Scott, Korniyenko. *Payload*: Soyuz TMA s/n 718. *Mass*: 7,200 kg (15,800 lb). *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-18M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 181.99 days. *Decay Date*: 2016-03-02 04:25:00 . *USAF Sat Cat*: 40885 . *COSPAR*: 2015-043A. *Apogee*: 406 km (252 mi). *Perigee*: 398 km (247 mi).

Inclination: 51.6500 deg. *Period*: 92.60 min.

Docked with ISS at the Poisk port at 07:39 GMT on 4 September. On Mar 2 at 0102 UTC Volkov, Kornienko and Kelly, aboard Soyuz TMA-18M, undocked from the Poisk module, concluding Expedition 46. Tim Kopra then became commander of Expedition 47, with flight engineers Yuriy Malenchenko and Tim Peake. Soyuz TMA-18M made the deorbit burn at 0332 UTC and landed in Kazakhstan at 0426 UTC. Soyuz commander Volkov had spent six months in space, while Kornienko and Kelly completed 340d 8h 21min in space, or about 0.93 years.

2015 September 11 - . 02:08 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ZLS. *LV Family*: R-7. *Launch Vehicle*: Soyuz ST / Fregat ST.

- **GalileoSat-9** - . *Payload*: Galileo FOC FM05 / Alba. *Mass*: 733 kg (1,615 lb). *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 40889 . *COSPAR*: 2015-045A. *Apogee*: 23,233 km (14,436 mi). *Perigee*: 23,211 km (14,422 mi). *Inclination*: 57.3800 deg. *Period*: 844.70 min. Two European navigation satellites in the Galileo system. The Fregat upper stage deployed them in plane A of the system, at an inclination of 57.4 degrees (satellites in the existing B and C planes are in 55.0 degree orbits)..

- **GalileoSat-10** - . *Payload*: Galileo FOC FM06 / Orlana. *Mass*: 733 kg (1,615 lb). *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 40890 . *COSPAR*: 2015-045B. *Apogee*: 23,231 km (14,435 mi). *Perigee*: 23,213 km (14,423 mi). *Inclination*: 57.3800 deg. *Period*: 844.70 min.

2015 October 1 - . 16:49 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress M-29M** - . *Mass*: 7,283 kg (16,056 lb). *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress M. *Decay Date*: 2016-04-08 . *USAF Sat Cat*: 40944 . *COSPAR*: 2015-055A. *Apogee*: 406 km (252 mi). *Perigee*: 398 km (247 mi). *Inclination*: 51.6500 deg. *Period*: 92.60 min.

  Docked with the ISS Zvezda module at 22:52 GMT on 1 October. The spacecraft delivered a variety of supplies and maintenance equipment to the station. Progress M-29M undocked from the Zvezda module on Mar 30 at 1415 UTC and performed attitude control experiments in a 373 x 401 km orbit. Progress M-29M was deorbited on Apr 8, reentered around 1416 UTC over the S Pacific.

2015 November 17 - . 06:34 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2510** - . *Nation*: Russia. *Class*: Surveillance. *Type*: Early warning satellite. *Spacecraft Bus*: USP (Victoria). *Spacecraft*: Yamal. *USAF Sat Cat*: 41032 . *COSPAR*:

2015-066A. *Apogee*: 38,551 km (23,954 mi). *Perigee*: 1,625 km (1,009 mi). *Inclination*: 63.8000 deg. The first EKS early warning satellite, launched into a Molniya orbit. The satellite, developed by Energiya and Kometa, replaced the defunct Lavochkin/Kometa 'Oko' system..

2015 December 5 - . 14:09 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1V.

- **Cosmos 2511** - . *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft*: Kanopus. *Decay Date*: 2015-12-08 . *USAF Sat Cat*: 41098 . *COSPAR*: 2015-071A. *Apogee*: 694 km (431 mi). *Perigee*: 685 km (425 mi). *Inclination*: 98.2000 deg.

  Russia carried out the second launch of the Soyuz-2-1V rocket, carrying the 440 kg Kanopus-ST military satellite as its primary payload. Kanopus-ST carried optical, infrared and microwave imagers to test technology to locate submerged submarines. The two-stage core of Soyuz-2-1V reached a 208 x 681 km x 98.2 deg transfer orbit. The Volga upper stage coasted to apogee and at about 1503 UTC made a circularization burn to reach a 684 x 693 km sun-synchronous orbit. The KYuA-1 satellite was successfully ejected at about 1540 UTC, but one of several latches on the Kanopus-ST failed to open, and the payload failed to separate.The two payloads were given the public cover names Kosmos-2511 (Kanopus-ST/Volga) and Kosmos-2512 (KYuA-1). Following the failure, at about 0200 UTC Dec 6 the Volga reignited in an attempt to deorbit the Kanopus/Volga stack and prevent it becoming long-lived space debris. This burn reached an orbit of 106 x 655 km. Natural orbital decay from atmospheric drag quickly set in. On Dec 7, with the orbit at 90 x 348 km, the spacecraft split into two pieces, possibly but not certainly the Kanopus satelite and the Volga stage. The two pieces reached an orbit of 88 x 297 km on Dec 8 before reentry.

- **Cosmos 2512** - . *Nation*: Russia. *Class*: Surveillance. *Type*: Radar calibration target. *USAF Sat Cat*: 41099 . *COSPAR*: 2015-071B. *Apogee*: 693 km (430 mi). *Perigee*: 684 km (425 mi). *Inclination*: 98.2000 deg. Secondary payload; KYuA-1, a 16 kg sphere used to calibrate anti-ballistic-missile radars. Placed in sun synchronous orbit with 06:00 Equator crossing time..

2015 December 15 - . 11:03 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-19M** - . *Call Sign*: Agat. *Crew*: Malenchenko, Kopra, Peake. *Backup Crew*: Ivanishin, Onishi, Rubins. *Return Crew*: Malenchenko, Kopra, Peake. *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-19M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 185.92 days. *Decay Date*: 2016-06-18 09:15:00 . *USAF Sat Cat*: 41124 . *COSPAR*: 2015-076A. *Apogee*: 418 km (259 mi). *Perigee*: 404 km (251 mi). *Inclination*: 51.6000 deg.

Docked with ISS. On Jun 18 Expedition 47 crew members Yuriy Malenchenko, Tim Kopra and Tim Peake transferred from the Rassvet module to Soyuz TMA-19, closing hatches at 0235 UTC and undocking at 0552 UTC. Soyuz TMA-19M made its deorbit burn at 0822 UTC and reentered for a safe landing in Kazakhstan at 0915 UTC.

2015 December 17 - . 11:51 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-B.

- **GalileoSat-11** - . *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 41174 . *COSPAR*: 2015-079A. *Apogee*: 23,568 km (14,644 mi). *Perigee*: 23,511 km (14,609 mi). *Inclination*: 55.0000 deg. Adriana.

- **GalileoSat-12** - . *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 41175 . *COSPAR*: 2015-079B. *Apogee*: 23,617 km (14,674 mi). *Perigee*: 23,552 km (14,634 mi). *Inclination*: 55.0000 deg. Liene.

2015 December 21 - . 08:44 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Progress MS-01** - . *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress MS. *Decay Date*: 2016-07-03 . *USAF Sat Cat*: 41177 . *COSPAR*: 2015-080A. *Apogee*: 279 km (173 mi). *Perigee*: 270 km (160 mi). *Inclination*: 51.6000 deg.

  First Progress-MS cargo ship. Progress-MS was similar to previous Progress ships but with improved onboard systems. It docked with the Pirs module at 1027 UTC Dec 23. Progress MS-01 undocked from the Pirs module at 0536 UTC on Jul 1, backed off to 180m, and redocked at 0605 UTC under TORU remote control. During redocking there was an incorrect thruster firing that made the vehicle swing visibly from side to side. The problem was reportedly under investigation but did not affect Progress MS-01's final undocking, which happened at 0348 UTC Jul 3. Progress MS-01 was deorbited and destroyed over the South Pacifc at 0750 UTC Jul 3.

2016 February 7 - . 00:21 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2514** - . *Payload*: Glonass-M No. 51. *Nation*: Russia. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Glonass. *USAF Sat Cat*: 41330 . *COSPAR*: 2016-008A. *Apogee*: 19,158 km (11,904 mi). *Perigee*: 19,132 km (11,888 mi). *Inclination*: 64.8000 deg. Glonass-M No. 51 (Uragan-M 751, Kosmos-2514) was launched to supplement the Russian navigation constellation..

2016 March 13 - . 18:56 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur

LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Resurs-P No. 3** - . *Mass*: 6,600 kg (14,500 lb). *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Resurs-Spektr. *USAF Sat Cat*: 41386 . *COSPAR*: 2016-016A. *Apogee*: 452 km (280 mi). *Perigee*: 279 km (173 mi). *Inclination*: 97.3000 deg. Third Resurs-P civil remote sensing satellite. The first two satellites in the series were still operating; Resurs-P No. 1 made an orbit adjust burn on Feb 22. The Resurs-P No. 3 spacecraft, however, failed to deploy one of its solar panels..

2016 March 18 - . 21:26 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz TMA-20M** - . *Call Sign*: Kazbek. *Crew*: Ovchinin, Skripochka, Williams, Jeffrey. *Backup Crew*: Ryzhikov, Borisenko, Kimbrough. *Return Crew*: Ovchinin, Skripochka, Williams, Jeffrey. *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz TMA-20M. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz TMA. *Duration*: 172.16 days. *Decay Date*: 2016-09-07 01:13:00 . *USAF Sat Cat*: 41391 . *COSPAR*: 2016-018A. *Apogee*: 230 km (140 mi). *Perigee*: 193 km (119 mi). *Inclination*: 51.6000 deg.

  Soyuz TMA-20M was launched carrying Alexey Ovchinin, Oleg Skripochka and Jeff Williams. This was the last of the 11F732A47 Soyuz TMA-M series, which were replaced by the improved Soyuz-MS variant. On Sep 6 at 2151 UTC Soyuz TMA-20M undocked from the Poisk module with Ovchinin, Skripochka and Williams. The spacecraft laded in Kazakhstan at 0113 UTC on Sep 7.

2016 March 24 - . 09:42 GMT - . *Launch Site*: Plesetsk. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Cosmos 2515** - . *Payload*: Bars-M No. 2. *Nation*: Russia. *Class*: Surveillance. *Type*: Cartographic satellite. *Spacecraft Bus*: Yantar. *Spacecraft*: Bars. *USAF Sat Cat*: 41394 . *COSPAR*: 2016-020A. *Apogee*: 540 km (330 mi). *Perigee*: 332 km (206 mi). *Inclination*: 97.6000 deg. Bars-M cartography satellite; joined the No. 1 satellite (Kosmos-2503) launched in 2015. 1325LT SSO..

2016 March 31 - . 16:23 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Progress MS-02** - . *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress MS. *Decay Date*: 2016-10-14 . *USAF Sat Cat*: 41436 . *COSPAR*: 2016-022A. *Apogee*: 267 km (165 mi). *Perigee*: 261 km (162 mi). *Inclination*: 51.6000 deg. Docked with Zvezda on Apr 2 at 1758 UTC..

2016 April 25 - . 21:02 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-A.

- **Sentinel-1B** - . *Mass*: 2,157 kg (4,755 lb). *Nation*: Europe. *Class*: Surveillance. *Type*: Military surveillance radar satellite. *Spacecraft*: Prima. *USAF Sat Cat*: 41456 . *COSPAR*: 2016-025A. *Apogee*: 700 km (430 mi). *Perigee*: 695 km (431 mi). *Inclination*: 98.2000 deg.

  Arianespace flight VS14. The Fregat stage first burn reached an initial orbit of 695 x 700 km and deployed the Sentinel-1B radar imaging satellite for ESA. It then made a burn to 442 x 690 km and deployed three 1U cubesats. The ASAP-S adapter was ejected into the same orbit. Next, the Fregat stage made two more burns to reach 711 x 714 km and released the Microscope satellite. Finally, at 0118 UTC, Fregat made a deorbit burn and reentered over the S Atlantic. 1800LT SSO.

- **Microscope** - . *Nation*: Europe. *Class*: Science. *Type*: Science satellite. *USAF Sat Cat*: 41457 . *COSPAR*: 2016-025B. *Apogee*: 714 km (443 mi). *Perigee*: 711 km (441 mi). *Inclination*: 98.2000 deg. 1800LT SSO.Operated by the French space agency CNES, Microscope uses the Myriade bus and contains drag-free test masses to test the Equivalence Principle..

- **OUFTI-1** - . *Nation*: Europe. *Class*: Technology. *Type*: Technology satellite. *Spacecraft*: Cubesat. *USAF Sat Cat*: 41458 . *COSPAR*: 2016-025C. *Apogee*: 686 km (426 mi). *Perigee*: 442 km (274 mi). *Inclination*: 98.2000 deg. University of Liege 1U cubesat.

- **AAUSAT-4** - . *Payload*: E-STAR-2. *Nation*: Europe. *Class*: Communications. *Type*: Search and rescue satellite. *Spacecraft*: Cubesat. *USAF Sat Cat*: 41459 . *COSPAR*: 2016-025D. *Apogee*: 686 km (426 mi). *Perigee*: 442 km (274 mi). *Inclination*: 98.2000 deg. Aalborg University 1U cubesat.

- **ESt@r-II** - . *Nation*: Europe. *Class*: Technology. *Type*: Technology satellite. *Spacecraft*: Cubesat. *USAF Sat Cat*: 41460 . *COSPAR*: 2016-025E. *Apogee*: 686 km (426 mi). *Perigee*: 442 km (274 mi). *Inclination*: 98.2000 deg. Politecnico di Torino 1U cubesat.

2016 April 28 - . 02:01 GMT - . *Launch Site*: Vostochniy. *Launch Complex*: Vostochniy PU1S. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1A.

- **Lomonosov** - . *Payload*: MVL 300. *Nation*: Russia. *Class*: Astronomy. *Type*: Astronomy satellite. *USAF Sat Cat*: 41464 . *COSPAR*: 2016-026A. *Apogee*: 486 km (301 mi). *Perigee*: 471 km (292 mi). *Inclination*: 97.3000 deg.

  Lomonosov (Mikhailo-Lomonosov-300) science satellite was orbited from the new Vostochniy spaceport. The old GIK-2 (2nd State Test Cosmodrome) at Svobodniy was shut down in 2007; its reopening as Vostochniy marks a planned shift away from the Kazakhstan launch site of Baikonur. Lomonosov's main experiment, TUS,

was an ultraviolet camera to observe the flashes from cosmic rays hitting the Earth's upper atmosphere. 2314LT SSO.

- **AIST-2D** - . *Nation*: Russia. *Class*: Surveillance. *Type*: Surveillance satellite. *USAF Sat Cat*: 41465 . *COSPAR*: 2016-026B. *Apogee*: 485 km (301 mi). *Perigee*: 471 km (292 mi). *Inclination*: 97.3000 deg. Samara State Aerospace University's AIST-2D imaging satellite;, the student-built Samsat-218/D failed to transmit properly..

- **Kontakt-NS** - . *Payload*: SAMSAT 218D. *Nation*: Russia. *Class*: Technology. *Type*: Technology satellite. *Spacecraft*: Cubesat. *USAF Sat Cat*: 41466 . *COSPAR*: 2016-026C. *Apogee*: 485 km (301 mi). *Perigee*: 471 km (292 mi). *Inclination*: 97.3000 deg. Samara State Aerospace University Kontakt-Nanosputnik (Samsat-218/D) cubesat. 2314LT SSO.

2016 May 24 - . 08:48 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-B.

- **GalileoSat-13** - . *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 41550 . *COSPAR*: 2016-030B. *Apogee*: 23,566 km (14,643 mi). *Perigee*: 23,551 km (14,633 mi). *Inclination*: 57.4000 deg. Daniele.

- **GalileoSat-14** - . *Nation*: Europe. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Galileo Navsat. *USAF Sat Cat*: 41549 . *COSPAR*: 2016-030A. *Apogee*: 23,616 km (14,674 mi). *Perigee*: 23,553 km (14,635 mi). *Inclination*: 57.4000 deg. Alizee.

2016 May 29 - . 08:44 GMT - . *Launch Site*: Plesetsk. *Launch Complex*: Plesetsk LC43/4. *LV Family*: R-7. *Launch Vehicle*: Soyuz-2-1B.

- **Cosmos 2516** - . *Nation*: Russia. *Class*: Navigation. *Type*: Navigation satellite. *Spacecraft*: Glonass. *USAF Sat Cat*: 41554 . *COSPAR*: 2016-032A. *Apogee*: 19,152 km (11,900 mi). *Perigee*: 19,124 km (11,883 mi). *Inclination*: 64.8000 deg. Glonass-M No. 53 to replenish the Russian navigation satellite system.

2016 July 7 - . 01:36 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz MS-01** - . *Call Sign*: Irkut. *Crew*: Ivanishin, Onishi, Rubins. *Backup Crew*: Novitskiy, Pesquet, Whitson. *Return Crew*: Ivanishin, Onishi, Rubins. *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz MS-01. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz MS. *Duration*: 115.10 days. *Decay Date*: 2016-10-30 03:58:00 . *USAF Sat Cat*: 41639 . *COSPAR*: 2016-044A. *Apogee*: 239 km (148 mi). *Perigee*: 181 km (112 mi). *Inclination*: 51.7000 deg.

  Launched on into a 181 x 239 km orbit; docked with the ISS Rassvet module at 0406

UTC Jul 9. The Soyuz MS was a new variant of the ferry ship with upgraded onboard systems. Crew was Anatoliy Ivanishin (Roscosmos), Takuya Onishi (JAXA) and Kate Rubins (NASA). On Oct 30 at 0035 UTC Ivanishin, Onishi and Rubins undocked from Rassvet in Soyuz MS-01; they landed in Kazakhstan at 0358 UTC.

2016 July 16 - . 21:41 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress MS-03** - . *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress MS. *Decay Date*: 2017-01-31 . *USAF Sat Cat*: 41670 . *COSPAR*: 2016-045A. *Apogee*: 225 km (139 mi). *Perigee*: 182 km (113 mi). *Inclination*: 51.6000 deg.

  Progress MS-03 cargo ship docked with the Pirs module at 0020 UTC Jul 19. It carried 2405 kg of cargo (including 705 kg of ISS propellant) as well as 880 kg of its own onboard propellant. Undocked at 1425 UTC and was deorbited at 1734 UTC with impact in the South Pacific at 1824 UTC.

2016 October 19 - . 08:05 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC31. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz MS-02** - . *Call Sign*: Favor. *Crew*: Ryzhikov, Borisenko, Kimbrough. *Backup Crew*: Misurkin, Tikhonov, Vande Hei. *Return Crew*: Ryzhikov, Borisenko, Kimbrough. *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz MS-02. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz MS. *Duration*: 173.14 days. *Decay Date*: 2017-04-10 11:20:00 . *USAF Sat Cat*: 41820 . *COSPAR*: 2016-063A. *Apogee*: 306 km (190 mi). *Perigee*: 289 km (179 mi). *Inclination*: 51.6000 deg.

  Soyuz MS-02 with astronauts Sergey Ryzhikov, Andrey Borisenko and Shane Kimbrough. They docked with the Poisk module at 0952 UTC Oct 21. On Apr 10, Soyuz MS-02 undocked from Poisk at 0757 UTC and landed in Kazakhstan at 1120 UTC, returing Ryzhikov, Borisenko and Kimbrough to Earth. Peggy Whitson became ISS commander of Expedition 51.

2016 November 17 - . 20:20 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz MS-03** - . *Call Sign*: Kazbek. *Crew*: Novitskiy, Pesquet, Whitson. *Backup Crew*: Yurchikhin, Fischer, Nespoli. *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz MS-03. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz MS. *USAF Sat Cat*: 41864 . *COSPAR*: 2016-070A. *Apogee*: 228 km (141 mi). *Perigee*: 195 km (121 mi). *Inclination*: 51.6000 deg. Soyuz MS-03 was launched with the crew of Oleg Novitskiy (Roskosmos), Thomas Pesquet (ESA) and Peggy Whitson (NASA). The Soyuz docked with the ISS Rassvet module at 2158 UTC Nov 19..

2016 December 1 - . 14:51 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U. *FAILURE*: Third stage continued burning after payload separation.. *Failed Stage*: 3.

- **Progress MS-04** - . *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress MS. *COSPAR*: 2016-0F02. *Apogee*: 190 km (110 mi). *Perigee*: -4,000 km (-4,000 mi). *Inclination*: 51.6000 deg.

  The launch vehicle failed during third stage burn and its debris fell in the Tuva Republic. Lost with the rest of the cargo was the first Orlan-MKS spacesuit. Reports suggested the Progress separated from the rocket third stage prematurely and the accelerating stage then crashed into the Progress.

2017 January 28 - . 01:03 GMT - . *Launch Site*: Kourou. *Launch Complex*: Kourou ELS. *LV Family*: R-7. *Launch Vehicle*: Soyuz-ST-B.

- **Hispasat 36W-1** - . *Nation*: Spain. *Class*: Communications. *Type*: Communications satellite. *Spacecraft*: SmallGEO. *USAF Sat Cat*: 41942 . *COSPAR*: 2017-006A. *Apogee*: 35,754 km (22,216 mi). *Perigee*: 252 km (156 mi). *Inclination*: 5.4000 deg. Spanish Hispasat 36W-1 communications satellite (3220 kg at launch, 1700 kg dry) was the first SmallGEO bus, made by OHB of Bremen, Germany. It was launched to geotransfer orbit by a Soyuz ST-B/Fregat in the first GTO launch by a Soyuz from Kourou..

2017 February 22 - . 05:58 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-U.

- **Progress MS-05** - . *Nation*: Russia. *Agency*: RKA. *Program*: ISS. *Class*: Manned. *Type*: Manned logistics spacecraft. *Spacecraft Bus*: Soyuz. *Spacecraft*: Progress MS. *USAF Sat Cat*: 42056 . *COSPAR*: 2017-010A. *Apogee*: 210 km (130 mi). *Perigee*: 186 km (115 mi). *Inclination*: 51.6000 deg. Launched of the final Soyuz-U-PVB rocket. Among other cargo the Progress cargo craft carried a new Orlan-MKS spacesuit. The ship docked with the Pirs module at 0830 UTC Feb 24..

2017 April 20 - . 07:13 GMT - . *Launch Site*: Baikonur. *Launch Complex*: Baikonur LC1. *LV Family*: R-7. *Launch Vehicle*: Soyuz-FG.

- **Soyuz MS-04** - . *Crew*: Yurchikhin, Fischer. *Backup Crew*: Ryazansky, Bresnik. *Nation*: Russia. *Program*: ISS. *Class*: Manned. *Type*: Manned spacecraft. *Flight*: Soyuz MS-04. *Spacecraft Bus*: Soyuz. *Spacecraft*: Soyuz MS. *USAF Sat Cat*: 42682 . *COSPAR*: 2017-020A. *Apogee*: 409 km (254 mi). *Perigee*: 399 km (247 mi). *Inclination*: 51.6000 deg.

  Soyuz MS-04 docked with the ISS Poisk module 6hr 4min after launch. Soyuz commander was Fyodor Yurchikin and flight engineer was Jack Fischer. This was the

first two-person Soyuz mission in 14 years (Soyuz TMA-2 in Apr 2003), as Russia scaled back its ISS crew pending completion of the delayed Nauka module.

Home - Search - Browse - Alphabetic Index: 0- 1- 2- 3- 4- 5- 6- 7- 8- 9
A- B- C- D- E- F- G- H- I- J- K- L- M- N- O- P- Q- R- S- T- U- V- W- X- Y- Z