

Encyclopedia Astronautica

Soyuz 10

Crew: Rukavishnikov, Shatalov, Yeliseyev.

Intended first space station mission. Hard dock with station could not be achieved. Then stuck and could separate from the station only after repeated attempts. Toxic fumes in air supply during landing overcame one astronaut.

Backup crew: Kolodin, Kubasov, Leonov. Support crew: Dobrovolsky, Patsayev, Volkov.

Intended first space station mission; soft docked with Salyut 1. Soyuz 10 approached to 180 m from Salyut 1 automatically. It was hand docked after failure 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 provide 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. During the landing, the Soyuz air supply became toxic, and Rukavishnikov (much like the case of Vance Brand during the Apollo ASTP return) was overcome and became unconscious. Recovered April 25, 1971 23:40 GMT. Landed 120 km NW Karaganda. Film and photos indicated that the docking system on the Salyut was not damaged, setting the stage for the Soyuz 11 mission.

AKA: Granit (Granite).

First Launch: 1971.04.23.

Last Launch: 1971.04.25.

Duration: 1.99 days.



Soyuz-10A recovery
Credit: © Mark Wade



Soyuz 10
Credit: - www.spacefacts.de

[More... - Chronology...](#)

Associated People

- **Shatalov Shatalov, Vladimir Aleksandrovich** (1927-) Russian pilot cosmonaut. Flew on Soyuz 4, Soyuz 8, Soyuz 10. Made first Soviet space docking. [More...](#)
- **Dobrovolsky Dobrovolsky, Georgi Timofeyevich** (1928-1971) Russian pilot cosmonaut. Flew on Soyuz 11. Member of first crew to stay aboard a space station, however perished during landing. [More...](#)
- **Kolodin Kolodin, Pyotr Ivanovich** (1930-) Russian engineer cosmonaut, 1963-1983. [More...](#)
- **Rukavishnikov Rukavishnikov, Nikolai Nikolayevich** (1932-2002) Russian engineer cosmonaut. Flew on Soyuz 10, Soyuz 16, Salyut 6 EP-5-1. [More...](#)
- **Patsayev Patsayev, Viktor Ivanovich** (1933-1971) Russian engineer cosmonaut. Civilian Engineer, Korolev OKB. Flew on Soyuz 11. Member of first crew to stay aboard a space station, however perished

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during landing. A street in Kaluga and Asteroid 1791 were named for him. [More...](#)

- **Leonov Leonov, Aleksei Arkhipovich** (1934-) Russian pilot cosmonaut. First person to walk in space. Flew on Voskhod 2, Soyuz 19 (ASTP). Cancelled missions included command of first Soviet circumlunar flight in 1969 and first military space station mission in 1973. [More...](#)
- **Yeliseyev Yeliseyev, Aleksei Stanislavovich** (1934-) Russian engineer cosmonaut. Flew on Soyuz 4/5, Soyuz 8, Soyuz 10. Member of first crew to transfer between spacecraft. [More...](#)
- **Kubasov Kubasov, Valeri Nikolayevich** (1935-) Russian engineer cosmonaut. Flew on Soyuz 6, Soyuz 19 (ASTP), Salyut 6 EP-5. Flew in first docking mission between American and Soviet spacecraft. Missed two chances to be first engineer on a Soviet space station (Cosmos 557 and Soyuz 11). [More...](#)
- **Volkov Volkov, Vladislav Nikolayevich** (1935-1971) Russian engineer cosmonaut. Flew on Soyuz 7, Soyuz 11. Member of first space station crew, however perished during landing. From 1958 a civilian engineer, Korolev OKB, involved in the development of the Vostok and Voskhod spacecraft. [More...](#)

Associated Countries

- **USSR** [USSR More...](#)

Associated Spacecraft

- **Soyuz 7KT-OK** Russian manned spacecraft. 2 launches, 1971.04.23 (Soyuz 10) to 1971.06.06 (Soyuz 11). This was a modification of Soyuz 7K-OK with a lightweight docking system and a crew transfer tunnel. [More...](#)

See also

- **Manned spaceflight** Category of spacecraft. [More...](#)

Associated Manufacturers and Agencies

- **MOM** Russian agency overseeing development of spacecraft. Ministry of General Machine Building (Moskva, Russia), Moscow, Russia. [More...](#)

Associated Programs

- **Salyut** The world's first space station, developed in one year by the Soviet Union on the basis of Chelomei's Almaz station, in an attempt to upstage the American Skylab after the loss of the moon landing race to the Americans. [More...](#)

Associated Launch Sites

- **Baikonur** Russia's largest cosmodrome, the only one used for manned launches and with facilities for the larger Proton, N1, and Energia launch vehicles. The spaceport ended up on foreign soil after the break-up of Soviet Union. The official designations NIIP-5 and GIK-5 are used in official Soviet histories. It was also universally referred to as Tyuratam by both Soviet military staff and engineers, and the US intelligence agencies. Since the dissolution of the Soviet Union the Russian Federation has insisted on continued use of the old Soviet 'public' name of Baikonur. In its Kazakh (Kazak) version this is rendered Baykonur. [More...](#)

Soyuz 10 Chronology

1970 February 7 - .

- **Soyuz 10 and 11 crew selections; Soyuz 9 experiment review** - . *Nation: USSR. Program: Salyut; Soyuz. Flight: Soyuz 10; Soyuz 11; Soyuz 9. Spacecraft: Salyut 1.* Kamanin meets with nine generals involved in supervising aspects of the space programme. Only one is from the VVS aviation, the rest have artillery or rocket backgrounds. Naturally they have no bad words for the RSVN or TsUKOS. At the centre, crew selection for the Soyuz 10 and Soyuz 11 missions to the DOS space station are underway. A review is conducted of the biomedical and zero-G studies planned for Soyuz 9. This is followed by a meeting with General Komarov and the cosmonauts on plans for the new cosmonaut training building and a nine-story apartment building.

1970 February 18 - .

- **Kamanin opposes DOS** - . *Nation: USSR. Related Persons: Belyayev; Mishin; Ustinov; Smirnov; Kozlov. Program: Soyuz; Salyut; Almaz. Flight: Soyuz 10; Soyuz 11. Spacecraft: Salyut 1; Soyuz 7KT-OK; Almaz OPS; Soyuz OB-VI; Soyuz VI.* Kamanin recommends the death benefit to be awarded to Belyayev's

Mir - UR-700M - N204/MMH - Mir-2 - von Braun - Delta IV Heavy - Resnik - Man-high - Mars 5M - Taming the Fire - X-15A - Almaz OPS - Jules Verne Moon Gun - Plesetsk - Treaty - SALT 1 - J-2 - CZ - Discovery - CXV - Barbarian MM - Lucid - L1 Launch Windows - Ares - Skylon - Apollo Lunar Landing - Ariane 5 - German Diaspora - A9/A10/A11/A12 - Titan 2 - MiG 105-11 - Tsien - Shuttle MMU - Yang Liwei - Salyut 1 - Voskhod 3 - A7L - The Space Explorers - Moon Race! - German Civilian Rocketry - Kamanin Diaries - Apollo 16 - Soyuz TM - V-2 VTOHL - Enterprise - Luna - Minotaur - Paris Gun - Raketenflugplatz - Tu-2000 - H-2 HTOHL - Tian Jiao 1 - DC-X - Molniya-1 - Cooper - Project Orion: Its Life, Death, and Possible Rebirth - Ley - Vostok 6 - CEV - Grissom - MOOSE - DSE-Alpha - STS-1 - Mercury - Black Mesa - Jiuquan - Project 921-2 - Shenzhou-5 - Quick Facts - LK-3 - Mars 5M - MK-700 - CZ- NGLV - Ride - Key Meetings in Soviet Spaceflight - S-400 - NK-33 - Gemini Lunar Surface Rescue Spacecraft - X-30 - BOR-4 - X-38 - TMK-1 - DLB Lunar Base - Chang Cheng 1 - R-7 - Pegasus - PSLV - Orion - Salyut 7 - Soyuz - Kummersdorf - The Year in Space - 2005 - Uragan Space Interceptor - Lunar L3 - Chertok's Memoirs - Apollo Spacecraft Systems Development Diaries - Von Braun Mars Expedition - 1952 - Mars Direct - Gemini 4 - Gemini 3 - Skylab's Untimely Fate - Priroda - Lunar Orbiters - Jupiter - Black Brant - Winged - Navaho - Saturn IB - Tsiklon - Voskhod 2 - RD-170 - Rescue - Apollo LRV - Leonov - Manned Circumlunar - Space Station 1984 - Gemini 7 - VLS - Lunokhod - A9/A10/A11 - Insat - Aries - Gemini 6 - RD-0120 - Tu-2000 - R-16 - Mercury MR-3 - IMIS 1968 - Double Base Solid Propellants - Apollo 19 - Man-In-Space-Soonest - RS-68 - Boris Chimp 504 - Nerva - X-43 - Von Braun Mars Expedition - 1969 - Burya - Mercury Space Suit - R-1 - Voskhod 1 - Gemini 9 - Lunar Flyers - RD-0410 - R-2 - MAKS - Von Braun Station - Collins - Gemini 5 - Apollo LM Truck - Vanguard - Apollo D-2 - Zenit - Chawla - R-5 - Space Cruiser - R-11 - Winkler - Space Station - Spiral OS - Winged Gemini - Chang-Diaz - Young - Lovell - Meteosat - Luch - GSLV - R-36M - Shuttle C - Goddard - Swigert - Rombus - Cost, Price, and the Whole Darn Thing - Voyager - Bomarc - Glonass - Nike Hercules - Gemini Lunar Lander - Orion OLV - Gemini 12 - Echo - Soviet Mars Propulsion - Nuclear Thermal - Terrier - Nebel - Rockoon - European Space Stations - Titov - Shuttle EMU - ESRO - Pioneer 10-11 - A4b - Orlan - Aerobee - Chinese Manned Space Program: Behind Closed Doors - Saturn V - Apollo 204 - Countdown to the Launch of Shenzhou-5 - White - Gemini Agena Target Vehicle - RL-10 - UR-100N - Soyuz 5 - Mercury MA-9 - H2O2/Kerosene - Belokonyov - Luna Ye-8 - Mattingly - Surveyor - Nowak - Sullivan - V-2 - UR-100 - Gemini 11 - Sputnik 3 - Topol - HOTOL - Gemini LOR - Apollo ALSEP - Chinese Manned Spacecraft - Zarya - McAuliffe - Nitric acid/UDMH - LK-1 - Salyut 6 - A3 - Progress - Anders - Kosmos 3 - Apollo

family. There is to be a one-time payment of 2,000 roubles to his wife; 1,100 roubles to his daughter; 180 roubles/month pension to the wife; 75 roubles/month to the daughter; access to cosmonaut centre sanatoriums; and a seven-room apartment in Moscow.

Kamanin also reviews the government decree on the DOS-7K space station program. The Ministry of Defence is against it - they want to continue with the Almaz and Soyuz VI projects already underway. DOS will bring both of these to a halt. This is a repeat of the situation in 1967. Kozlov was making good progress on the original Soyuz VI, when it was killed by Mishin. Now three years later Mishin's Soyuz VI is put on the back burner. The Soyuz 7K-OK is still the only manned program brought to completion. Kamanin blames all this on Ustinov and Smirnov's stupid political manoeuvring. The DOS decree has not one word on the training of cosmonauts for these space station missions...

1970 February 26 - .

- **Kamanin views DOS, continuation of N1-L3 with dismay** - . *Nation: USSR. Related Persons: Mishin. Program: Soyuz; Salyut; Lunar L3; Almaz. Flight: Soyuz 10; Soyuz 11. Spacecraft: Salyut 1; Soyuz 7K-LOK; LK; Almaz OPS; Soyuz OB-VI; Soyuz VI.* The Ministry of Defence and VVS approve the draft DOS resolution. Kamanin has fought against it. He would prefer to develop a single reliable Soyuz spacecraft model by building and flying ten more (there are only four left of the original production lot in assembly). Instead the space leadership keep dreaming up new projects. In Kamanin's view, the DOS and its new Soyuz ferry design join Almaz, Soyuz VI, and the L3 as 'paper spacecraft'. Mishin still thinks he will 'teach the N1 to fly' and complete the L3, but Kamanin thinks the chances of this are nil. There is no coherent plan for Soviet spaceflight.

1970 February 27 - .

- **DOS schedules, Soyuz Kontakt flights still in play** - . *Nation: USSR. Related Persons: Mishin; Bogomolov. Program: Soyuz; Salyut; Lunar L3; Almaz. Flight: Soyuz 10; Soyuz 11; Soyuz n 17; Soyuz n 18; Soyuz n 19; Soyuz n 20. Spacecraft: Soyuz Kontakt; Almaz OPS; Soyuz OB-VI; Soyuz VI.* A meeting is held on the DOS project. The Central Committee and Soviet Ministers have directed that two DOS space stations be completed by the end of 1970. TsNIIMASH thinks this is impossible - the task can be accomplished in no less than 18 to 24 months. Mishin insists it can be done in ten months, as directed. Kamanin believes he won't even have it ready by the second half of 1971. It took five to seven years to just bring the Almaz, Soyuz VI, and L1 to flight status. This DOS will stop work on all other projects. Mishin still wants to fly two Soyuz spacecraft to test Bogomolov's Kontakt docking system for the L3.

1970 April 23 - .

- **Mishin proposes crews for Soyuz 10 and 11.** - . *Nation: USSR. Related Persons: Mishin; Shatalov; Yeliseyev; Rukavishnikov; Shonin; Kubasov; Kolodin; Volynov; Feoktistov; Patsayev; Khrunov; Volkov; Sevastyanov. Program: Salyut. Flight: Soyuz 10; Soyuz 11.* Two months after first raising the issue, Mishin has proposed crews for the flights to the DOS station, still planned to occur before the end of the year. Mishin is still pushing Feoktistov, who Kamanin believes is not only seriously ill, but immoral, being on his second wife. Kamanin now has 20 spacecraft crews, but they will have to wait six years or more for a trip to space at the current mission rate. Mishin's proposed DOS crews are as follows: 1 - Shatalov, Yeliseyev, Rukavishnikov; 2 - Shonin, Kubasov, Kolodin; 3 - Volynov, Feoktistov, Patsayev; 4 - Khrunov, Volkov, Sevastyanov.

1970 May 6 - .

- **Soyuz 10 / 11 crew discussions.** - . *Nation: USSR. Related Persons: Mishin; Feoktistov; Shonin; Yeliseyev; Rukavishnikov; Leonov; Kubasov; Kolodin; Shatalov; Volkov; Patsayev; Dobrovolsky; Sevastyanov; Voronov. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1.* Meeting on DOS crews. Kamanin will agree to Mishin's proposed crews with the following provisions: 1) Feoktistov is eliminated from the list; 2) Military cosmonauts must be on 3 of the 4 crews, with the overall ratio six military to six civilian cosmonauts. The proposed crews: 1 - Shonin, Yeliseyev, Rukavishnikov; 2 - Leonov, Kubasov, Kolodin; 3 - Shatalov Volkov, Patsayev; 4- Dobrovolsky, Sevastyanov, Voronov. Mishin is opposed to Dobrovolsky and Volkov.

1970 May 13 - .

- **DOS crew assignments** - . *Nation: USSR. Related Persons: Mishin. Program: Salyut. Flight: Soyuz 10; Soyuz 11. Summary:* Mishin and Kamanin sign a decree setting out the DOS crew assignments. The first DOS will not be orbited earlier than May-June 1971, probably even later. Kamanin played tennis with the Soyuz 9 crew..

1970 October 30 - .

- **Shatalov and Yeliseyev selected for first space station flight.** - . *Nation: USSR. Program: Salyut. Flight: Soyuz 10.* Shatalov and Yeliseyev are selected as the prime crew to man DOS#1. This selection is made even though they have both made two flights already and other cosmonauts have been waiting six

Direct 2-Man - Black Powder Solid Propellants - Woomera - The Foundations of the Space Age - Soyuz A - H2O2 - Ariane - Whitson - China - USAF - NASA - Korolev - Baikonur LC1 - Rocketdyne - France - Soyuz 11A511U - Spacelab - Von Braun - Dual Keel Space Station - 1985 - USSR - Lunar L1 - Buran - Power Tower Space Station - 1984 - Flight Telerobotic Servicer - Japan - STS-51-L - Wallops Island - Soviet Manned Lunar Projects - MOM - US-A - Space Station Fred - Voskhod - Kosmos 11K65M - ALSS Lunar Base - HS 601 - HS 376 - F-1A - ESA ACRV - Tiangong - Chinese Space Station - X-Prince - Phantom Cosmonaut - Project Horizon - Female - CZ - Chinese Cargo Spaceship -

years with no flight assignment. The choice is due to the role of the pilot, who it is felt must have prior docking experience. Kamanin reviews the training schedule for the pair, plus a tour of India they will have to make before the flight.

1970 December 19 - .

- **Differences between VVS and Mishin enumerated.** - . *Nation: USSR. Related Persons: Mishin; Smirnov; Ustinov; Stroganov. Program: Salyut; Lunar L3. Flight: Soyuz 10.* Lunokhod-1 and Venera-7 missions continue well. The NIITsPK conference is completed, final total 88 papers. The conference has recommended a cautious build-up in manned flight durations - the next mission should be 22 days long, then 26, then 30. But Ustinov has ordered Mishin to ensure that the first flight to DOS will be 30 days long. Kamanin is categorically opposed to this. Kamanin runs through the principal differences between himself and Mishin:
 - Mishin wants to continue work on the N1-L3 moon project. Kamanin thinks the whole thing should be cancelled
 - Kamanin wants the L3 to land on Soviet territory. Mishin wants it to land in the Indian Ocean
 - Mishin wants to make the next manned flight 30 days long. Kamanin wants to limit it to 18 days
 Mishin has the Soviet Ministers (Smirnov), and the Central Committee (Ustinov, Stroganov, etc) behind him. Kamanin has only shaky support from the VVS...

1971 March 2 - .

- **Cosmonaut press conference.** - . *Nation: USSR. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1. Summary: Nothing is said of plans for launch of the DOS station, only a month away..*

1971 March 3 - .

- **Soviet of Chief Designers.** - . *Nation: USSR. Related Persons: Mishin; Glushko. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1; Soyuz 7KT-OK.* DOS-7K #1 completed its factory testing on 3 March. Checkout at Baikonur is to be completed by 9 April, and launch is scheduled for 15 April. The first crew to the station will be launched aboard a Soyuz on 18-20 April. Remaining items to be cleared:
 - Vibration qualification test of the station test article are not complete. They will only begin on 5 March and will take two months using 3-shift work. Mishin wants the preliminary results on 20 March.
 - Four complete Igla systems are required. Five have been completed and are working satisfactorily.
 - The expiration date on the parachute installed in the Soyuz 10 capsule is 15 April. It will have to be repacked before the flight.
 - There were numerous failures in the first phase of environmental control system qualification tests. They have to be repaired before the second phase can even be started.
 - Mishin wants the first crew to stay on the station for 30 days, the second crew 45 days. Glushko and the doctors say this is a grave risk.

1971 March 5 - .

- **Launch of DOS#1 is set for 15 April.** - . *Nation: USSR. Related Persons: Smirnov; Serbin; Mishin; Shonin. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1.* Kamanin is still fighting the issue of mission length - he doesn't want to risk lives. Soyuz 9 landed virtually in the laps of the doctors, but what if they had made an emergency landing in the ocean, or taiga? They were in no condition to save themselves before assistance arrived. Every day over 20-22 days is a risk to the life of the crew, in Kamanin's view. Smirnov, Serbin, Mishin - they don't care about this. Meanwhile the doctor's verdict is in on Shonin. He is to be sent to a sanatorium for rehabilitation.

1971 March 6 - .

- **Space Plan for 1971 unrealistic.** - . *Nation: USSR. Program: Salyut; Almaz. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1; Almaz OPS; TKS; Spiral OS.* The space plan for 1971 has finally been approved. There are to be three space stations launched, manned by ten Soyuz launches and a total of over 12 different crewmembers in space during the year. But it is clear to Kamanin that the second DOS and first Almaz station will not really be ready this year. And there won't be more than two Soyuz and two TKS transports available by the end of the year. Ranazomov says that Chelomei's TKS, being designed to fly to the Almaz, will cover many of the same requirements of the Spiral spaceplane. He proposes that Mikoyan should collaborate with Chelomei on Spiral. Meanwhile simulators at TsPK remain underfunded.

1971 March 9 - .

- **Major DOS training exercise by first crew.** - . *Nation: USSR. Related Persons: Shatalov; Yeliseyev;*

Rukavishnikov; Anders. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1. A major training session is held with Shatalov, Yeliseyev, and Rukavishnikov. They make a 15 hour simulated 'flight' aboard the DOS trainer from 09:15 to 22:45. All operations expected in a thirty-day mission to the station are gone through. This includes simulation of emergencies to test the reactions of both the crew and ground controllers. Kamanin receives a letter from Anders, thanking him for the tour of Star City. Representatives from the Swedish firm are in town to negotiate the contract for the TsF-18 18-metre radius centrifuge. Both Korolev and Mishin fought against the VVS getting such a centrifuge.

1971 March 11 - .

- **Major DOS training exercise by second crew.** - . Nation: USSR. Related Persons: Leonov; Kubasov; Kolodin. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1. Summary: Leonov, Kubasov, and Kolodin train in the DOS simulator..

1971 March 15 - .

- **Major DOS training exercise by third crew.** - . Nation: USSR. Related Persons: Dobrovolsky; Volkov; Patsayev; Shatalov; Yeliseyev; Sevastyanov. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1. The third, back-up DOS crew of Dobrovolsky, Volkov and Patsayev train in the DOS trainer. All of the crews have made good runs, with no mistakes or failures. Shatalov, after training on the DOS simulator, now supports Mishin's 30 day flight approach. He has also talked to Yeliseyev and Sevastyanov about the matter. He believes there may be a very different reaction to zero-G from individual to individual, and the Soyuz 9 crew may have been the wrong two individuals.

1971 March 17 - .

- **State Commission on DOS.** - . Nation: USSR. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1. Summary: The crews, station, and Soyuz spacecraft are all ready..

1971 March 19 - .

- **State Commission for Launch of DOS#1.** - . Nation: USSR. Related Persons: Mishin. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1. Summary: The VVS insists that the Soyuz 10 crew land in daylight. Mishin says that in order that the crew can land in daylight at the end of the 30-day mission, the spacecraft must be launched at 03:00 at night. Kamanin believes this also to be unsafe..

1971 March 20 - .

- **DOS crews arrives in Baikonur.** - . Nation: USSR. Related Persons: Shatalov; Yeliseyev; Dobrovolsky; Patsayev; Volkov; Kolodin; Leonov; Rukavishnikov. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1. Shatalov's crew arrived at 09:00 aboard a Tu-104 and were ensconced in Room 14 of the Hotel Kosmonavt. Two further Tu-104's arrived 20 and 30 minutes later with the second and third crews. At 18:00 they all went to the MIK assembly hall to view the two Soyuz spacecraft and the station. There were electrical problems with the station, and they finally returned to the hotel at 24:00 without the problem having been resolved. Kamanin notes two films are to be screened tomorrow - a Bulgarian movie and the Soviet film 'Diplomat'.

1971 March 21 - .

- **DOS communications tests at Baikonur** - . Nation: USSR. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1; Penguin. Due to problems with the electrical system aboard the station, the crews are unable to start their training aboard the actual station until 22:00. So after breakfast they work on their flight plans and logs and test the training suits to be used on this flight for the first time. This includes the Penguin suit which has elastic bands sewn into it to simulate the strain of gravity. At 17:00 the crews go to the MIK and start communications tests on the DOS. All proceeds normally. On the bus back, the crews discuss the new tracking ship Yuri Gagarin. It has a displacement of 45,000 tonnes and cost 120 million roubles. It will expand the time communications are possible with the ground during the long station flight.

1971 March 22 - .

- **Problems with Igla system on DOS.** - . Nation: USSR. Related Persons: Shabarov; Mishin. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1. There are problems with the Igla rendezvous system and also the stabilisation systems aboard DOS#1. The April 15 launch date is not realistic, according to Shabarov's deputies, although he himself says he can still meet the schedule. From 12:00 to 16:00 the cosmonauts participate in communications tests between the Soyuz spacecraft and the station. They go all right, but there are many problems with the ground segment. Mishin arrives in the evening. He has to give the VPK the final word on 27 March as to the launch date for the station. Shabarov is afraid to tell Mishin about the problems they are having with the Igla system.

1971 March 23 - .

- **Cosmonauts return to Moscow from Tyuratam.** - . *Nation: USSR. Related Persons: Shatalov; Yeliseyev; Dobrovolsky; Patsayev; Volkov; Kolodin; Leonov; Rukavishnikov. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1.* A four-story school burned down the previous night in Leninsk. The cosmonauts and space centre technicians watched the USA-USSR ice hockey match, which went from 23:00 until 02:00 the next morning. Kamanin returns to Moscow aboard a Tu-104. Aboard the flight the political intrigues surrounding selection of Kamanin's deputy are discussed.

1971 March 25 - .

- **DOS#1 Launch Commission.** - . *Nation: USSR. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1.* The launch date, time, and first mission duration are debated. The VVS specialists now say a night landing by a Soyuz is acceptable from a safety point of view. Only two months earlier they were rejecting the possibility - these are people without principles, in Kamanin's view. He believes the crew's lives will be at risk with the planned thirty day flight duration.

1971 March 26 - .

- **VPK meets at the Kremlin.** - . *Nation: USSR. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1.* The launch of DOS#1 is set for 15-20 April. The first crew will launch three days later on a thirty-day mission. 25 days after they return to earth the second crew will be launched. That crew will stay aboard for 30 to 45 days. The spaceships and crews are declared ready for both missions.

1971 April 5 - .

- **Salyut preparations** - . *Nation: USSR. Program: Salyut. Flight: Soyuz 10. Spacecraft: Salyut 1.* When DOS#1 was cleared for flight, it still had 182 discrepancies, of which only 10 were duplicates and 20 were purely cosmetic. Preparations for launch of Soyuz 10 were complicated by problems with the logic of the abort system. This was supposed to put the spacecraft in a purely ballistic re-entry mode. *Additional Details: [here....](#)*

1971 April 6 - .

- **DOS cosmonauts fly to Tyuratam.** - . *Nation: USSR. Related Persons: Shatalov; Yeliseyev; Dobrovolsky; Patsayev; Volkov; Kolodin; Leonov; Rukavishnikov. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1.* Kamanin, the DOS crews, and 40 VVS specialists fly to Tyuratam. VVS medical officers have to battle outbreaks of measles, rabies, and dysentery at the cosmodrome. The crews are medically isolated in the Hotel Kosmonavt. In the evening they watch the film '300 Spartans'.

1971 April 7 - .

- **DOS crew commanders inspect completed DOS#1 station.** - . *Nation: USSR. Related Persons: Shatalov; Leonov; Dobrovolsky. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Salyut 1.* Shatalov, Leonov, and Dobrovolsky are all working hard on final preparations for DOS-7K. The station is fully complete. Only small defects have been noted. This is the first look by the crews at their future home in space in its fully completed version. On the bus back to the hotel the cosmonauts discuss the poor quality and inedibility of 'space food'.

1971 April 8 - .

- **Soyuz 10 crew preparations.** - . *Nation: USSR. Related Persons: Shatalov; Yeliseyev; Rukavishnikov. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Summary:* The DOS cosmonauts are working on their flight plans/logs at Area 17. Kamanin discusses the physical training of crews for long missions with Stepanov. They must do thirty minutes of vigorous exercise per day..

1971 April 9 - .

- **State Commission meets at new MIK.** - . *Nation: USSR. Related Persons: Shatalov; Yeliseyev; Rukavishnikov. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1.* DOS-7K#1 will be ready on 19 April. The first crew is completely trained. During the day the engineers of the second and third crews train aboard the station. Afterwards the technicians fix the defects they have noted. The evening film is 'Beginning'. There are many high-level guests at Area 2. After the film the brass try out the training machines that will be used aboard the station - they tire quickly.

1971 April 11 - .

- **Cosmonaut fishing trip cancelled.** - . *Nation: USSR. Related Persons: Leonov; Shatalov; Yeliseyev; Dobrovolsky; Patsayev; Volkov; Kolodin; Rukavishnikov. Program: Salyut. Flight: Soyuz 10; Soyuz 11;*

Soyuz 12 / DOS 1. Summary: Weather continues cold and windy, but clear, at the cosmodrome. Leonov wants to take the DOS crews fishing on the Syr Darya River, but he is vetoed by the doctors. They were afraid they might catch cold..

1971 April 13 - .

- **Cosmodrome jammed for series of historic launches.** - . *Nation:* [USSR](#). *Related Persons:* [Nikolayev](#); [Volynov](#). *Program:* [Salyut](#); [Lunar L3](#). *Flight:* [Soyuz 10](#). *Spacecraft:* [Salyut 1](#). Nikolayev and others are flying to the cosmodrome. All of the cosmonauts except Volynov will be present for the historic launch of the first space station., the first crew to the station, and the N1 launch planned for 1 May. Kamanin has an argument with the cosmonauts on the necessity of working out on the KTF trainer during the mission.

1971 April 14 - .

- **Salyut 1 cleared for roll-out.** - . *Nation:* [USSR](#). *Related Persons:* [Beregovoi](#); [Mishin](#); [Chelomei](#); [Grechko](#), [Andrei](#). *Program:* [Salyut](#). *Flight:* [Soyuz 10](#); [Soyuz 11](#); [Soyuz 12 / DOS 1](#). *Spacecraft:* [Salyut 1](#). Marshal Grechko has sent a telegram to Kamanin, informing him that the Gagarin Cosmonaut Training Centre has received the Order of Lenin. The UR-500K booster is mated to space station DOS-7K#1. Chelomei is ill. Mishin takes the opportunity to insult him by replacing Chelomei with Mishin's man on the commission that will judge the UR-500's readiness for launch. Nevertheless, the commission clears the booster to be moved out to the pad on 15 April, with launch set for 19 April at 06:40. In the evening Beregovoi's 50th birthday is celebrated.

1971 April 15 - .

- **Salyut 1 erected on pad.** - . *Nation:* [USSR](#). *Related Persons:* [Shatalov](#); [Yeliseyev](#); [Rukavishnikov](#); [Mishin](#). *Program:* [Salyut](#). *Flight:* [Soyuz 10](#); [Soyuz 11](#); [Soyuz 12 / DOS 1](#). *Spacecraft:* [Salyut 1](#). The Proton booster is erected on the pad. The decision is made to proceed despite a prediction of 15 m/s winds -- the prediction turns out to be wrong. All of the big brass are present for the rollout. Afterwards Mishin visits the cosmonauts. He says all is ready for the first space station mission, and promises them the N1-L3 will be available soon for lunar missions.

1971 April 16 - .

- **Soyuz 10 closed out.** - . *Nation:* [USSR](#). *Related Persons:* [Shatalov](#); [Yeliseyev](#); [Rukavishnikov](#). *Program:* [Salyut](#). *Flight:* [Soyuz 10](#). Soyuz s/n 31 is completed. The crew are given a final look at it in the afternoon. They spend four hours in the powered-down spacecraft. Kamanin notes that Nikolayev and Sevastyanov do not look out after their physical condition even on the ground -- no wonder they were so sick after their flight! Afterwards all three crews go to the sauna together.

1971 April 17 - .

- **Soyuz 10 crew preparations.** - . *Nation:* [USSR](#). *Related Persons:* [Shatalov](#); [Yeliseyev](#); [Rukavishnikov](#). *Program:* [Salyut](#). *Flight:* [Soyuz 10](#). The day dawns warm at Baikonur (7 deg C at 7 am). The cosmonauts' morning is spent in a review of the space station's guidance and control systems. In the afternoon there is a briefing by officers of IAKM-VVS on use of the vacuum facility 'Polinom' during the flight. The cosmonauts are against use of the device.

1971 April 19 - . 01:40 GMT - . *Launch Site:* [Baikonur](#). *Launch Complex:* [Baikonur LC81/24](#). *LV Family:* [Proton](#). *Launch Vehicle:* [Proton-K](#). *LV Configuration:* Proton-K 254-01.

- **Salyut 1** - . *Payload:* Zarya s/n 121. *Mass:* 18,500 kg (40,700 lb). *Nation:* [USSR](#). *Agency:* [MOM](#). *Program:* [Salyut](#). *Class:* [Manned](#). *Type:* Manned space station. *Flight:* [Soyuz 10](#); [Soyuz 11](#); [Soyuz 12 / DOS 1](#). *Spacecraft:* [Salyut 1](#). *Duration:* 179.93 days. *Decay Date:* 1971-10-11 . *USAF Sat Cat:* 5160 . *COSPAR:* 1971-032A. *Apogee:* 214 km (132 mi). *Perigee:* 180 km (110 mi). *Inclination:* 51.4000 deg. *Period:* 88.50 min. First manned space station. Salyut 1 included a number of military experiments, including the OD-4 optical visual ranger, the Orion ultraviolet instrument for characterising rocket plumes, and the highly classified Svinets radiometer. Primary objectives included photography of the earth, spectrographs of the earth's horizon, experiments with intense gamma rays, and studying manual methods for station orientation.

At 05:20 the State Commission and their guests arrive at the Area 95 observation point to view the launch. The booster takes off on schedule at 06:40 in light rain and 60 km/hr wind. The tracking station reports good orbital insertion, separation from the third stage, and antennae and solar panel deployment. But the cover of the scientific equipment bay does not separate. This will mean that many experiments cannot be accomplished. It is decided to launch the crew to the station anyway, since the station is otherwise functioning normally. The cosmonauts go to the baths in the evening. *Additional Details:* [here.....](#)

1971 April 20 - .

- **DOS State Commission.** - . *Nation:* [USSR](#). *Program:* [Salyut](#). *Flight:* [Soyuz 10](#); [Soyuz 11](#); [Soyuz 12 / DOS 1](#). *Spacecraft:* [Salyut 1](#). Six of eight fans in the ECS have failed. There are only two back-ups, which are not enough for the 90-day active mission life planned. But it is decided the problem could actually be failed sensors, and in any case the first crew can easily repair the fans. At 17:00 the State Commission meets publicly (radio and television coverage) to approve the launch of Soyuz 10. Launch is set for 22 April at 03:30.

1971 April 21 - .

- **Rain at the cosmodrome jeopardises Soyuz 10 launch.** - . *Nation:* [USSR](#). *Program:* [Salyut](#). *Flight:* [Soyuz 10](#).

1971 April 22 - .

- **Launch of Soyuz 10?** - . *Nation:* [USSR](#). *Related Persons:* [Shatalov](#); [Yeliseyev](#); [Rukavishnikov](#). *Program:* [Salyut](#). *Flight:* [Soyuz 10](#). *Summary:* nearly scrubbed due to weather.?..

1971 April 22 - . 23:54 GMT - . *Launch Site:* [Baikonur](#). *Launch Complex:* [Baikonur LC1](#). *LV Family:* [R-7](#). *Launch Vehicle:* [Soyuz 11A511](#). *LV Configuration:* [Soyuz 11A511 25](#).

- **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:* [USSR](#). *Related Persons:* [Rukavishnikov](#); [Shatalov](#); [Yeliseyev](#); [Kolodin](#); [Kubasov](#); [Leonov](#); [Dobrovolsky](#); [Patsayev](#); [Volkov](#). *Agency:* [MOM](#). *Program:* [Salyut](#). *Class:* [Manned](#). *Type:* [Manned spacecraft](#). *Flight:* [Soyuz 10](#). *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 failure 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 provide 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 April 23 - .

- **Soyuz 10 docking failure.** - . *Nation:* [USSR](#). *Related Persons:* [Shatalov](#); [Yeliseyev](#); [Rukavishnikov](#); [Mishin](#). *Program:* [Salyut](#). *Flight:* [Soyuz 10](#). *Spacecraft:* [Salyut 1](#). Soyuz 10 approached to 180 m from Salyut 1 automatically. It was hand docked after failure 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 provide 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 was 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. *Additional Details:* [here...](#)

1971 April 24 - .

- **Landing of Soyuz 10** - . *Return Crew:* [Rukavishnikov](#); [Shatalov](#); [Yeliseyev](#). *Nation:* [USSR](#). *Related Persons:* [Chertok](#); [Mishin](#); [Rukavishnikov](#); [Shatalov](#); [Yeliseyev](#). *Program:* [Salyut](#). *Flight:* [Soyuz 10](#). *Spacecraft:* [Soyuz 7KT-OK](#). Only a night landing on Soviet territory was possible, which meant the spacecraft could not be oriented for retrofire. The landing commission started planning for an emergency landing in South America, Africa, or Australia. But Shatalov reported the gyroscopes and orientation sensors were functioning well. He proposed that he orient on the dayside, spin up the gyro platform, and let the gyros orient the spacecraft on the nightside for retrofire. The plan is followed and the spacecraft was targeted for a landing area 80-100 km southwest of Karaganda.

PVO radars pick up the capsule as it soars over the Caspian Sea, and a Mi-4 helicopter sights the parachute even before it thumps down, upright, on the steppes. During the landing, the Soyuz air supply became toxic, and Rukavishnikov was overcome and became unconscious. Nevertheless the crew safely landed at 23:40 GMT, 120 km NW of Karaganda. At the cosmodrome, Chertok is assigned to head a special commission to find the cause of the docking failure and correct it before the next mission can be launched. The VVS aircraft leaves at 07:00 for Moscow. Mishin was to accompany the VPK on their aircraft back, but he is drunk and has to go separately at 15:00. The Soyuz 10 crew reaches Chkalovsky Air Base at 14:00 on 26 April and proceed to Star City for further debriefings. Film and photos indicated that the docking system on the Salyut was not damaged, setting the stage for the Soyuz 11 mission.

1971 May 3 - .

- **EVA to Salyut discussed.** - . *Nation: USSR. Related Persons: Shatalov; Yeliseyev; Rukavishnikov; Mishin. Program: Salyut. Flight: Soyuz 10; Soyuz 11. Spacecraft: Soyuz 7KT-OK; Salyut 1.* The Soyuz 10 crew receive awards at the Kremlin. Rukavishnikov is made a Hero of the Soviet Union, which means he will receive 5,000 roubles, a Volga automobile, and other privileges. Kamanin calls Mishin later in the day. Mishin wants to send up a two-man crew in Soyuz 11, in space suits. One of them will make a spacewalk to examine the docking collar on the Salyut station prior to docking and remove the cover from the scientific sensor bay. Kamanin is infuriated. Seven to eight months ago the VVS had asked Mishin about the possibility of carrying at least one spacesuit aboard the Soyuz or Salyut and the possibility of making an EVA. He categorically rejected the idea. At that time he said it was practically impossible. There are insufficient oxygen reserves aboard the station for a full depressurisation. It would reduce the oxygen to a 75-day supply, and 45 to 50 days worth of reserves are required by mission rules. A cosmonaut meeting is called to discuss the matter. This reveals that DOS#2 is planned to have spacesuits and all of the equipment necessary for an EVA. But an EVA on Soyuz 11 is not possible. There EVA equipment and have not been manufactured. Two to three months would be required to fabricate the suits and equipment and to train for the EVA. Salyut 1 can only last 60 to 70 days. A Soyuz 12 mission in the first part of June could not be ready for an EVA. All in all it would be better to incorporate the EVA hardware into the first mission to a new DOS#2 station.

1971 May 4 - .

- **Soyuz 11 EVA pushed.** - . *Nation: USSR. Related Persons: Shatalov; Yeliseyev; Rukavishnikov; Mishin. Program: Salyut. Flight: Soyuz 10; Soyuz 11. Spacecraft: Soyuz 7KT-OK; Salyut 1.* At 10:00 the Soyuz 10 crew has the traditional post-flight meeting with the Central Committee, followed by speeches at 15:00 before the workers and engineers at TskBEM. The truth about the flight is not revealed. Mishin is still pushing for an EVA on Soyuz 11; Kamanin tells him the idea is absurd. Kamanin fumes that Mishin still hasn't reliably solved the problem of automated space docking, on which he began work in 1962.

1971 May 6 - .

- **Almaz simulator delays.** - . *Nation: USSR. Related Persons: Shatalov; Yeliseyev; Rukavishnikov. Program: Salyut; Almaz. Flight: Soyuz 10; Soyuz 11. Spacecraft: Almaz OPS.* The Soyuz 10 cosmonauts hold a press conference. The truth behind the mission is concealed. Afterwards a simulator program review is held. Progress is being made, but all of the equipment needed for the simulators is not being funded. MAP is to deliver the Almaz simulator on 1 December 1971, but they can't guarantee it will include equipment that has to be delivered by a range of other ministries. Later a meeting is held on plans by the Moscow Soviet for a space museum. MOM, MAP, and VVS have to contribute to the final exposition plan.

1971 May 8 - .

- **Soyuz 11 / Soyuz 12 plans.** - . *Nation: USSR. Related Persons: Mishin. Program: Salyut. Flight: Soyuz 10; Soyuz 11; Soyuz 12 / DOS 1. Spacecraft: Soyuz 7KT-OK; Salyut 1.* Frolov reports to Kamanin on a meeting of the general designers. Mishin has planned the Soyuz 11 launch for June, to be followed by Soyuz 12 in July. The reworked docking mechanism will be ready for installation on Soyuz 11 by 18 May. Mishin recommends a full automated docking for the next mission.

1971 May 10 - .

- **Cause of Soyuz 10's failure to dock.** - . *Nation: USSR. Related Persons: Chertok. Program: Salyut. Flight: Soyuz 10; Soyuz 11. Spacecraft: Soyuz 7KT-OK.* A sunny day in Moscow. Chertok's investigative commission has found that the likely cause of Soyuz 10's failure to dock was a dented sleeve on the active part of the docking mechanism. In repeated tests the sleeve bent at 130 kg force 60% of the time. The real force of docking was estimated at 160 to 200 kg. Therefore for Soyuz 11 and subsequent models the sleeve will be reinforced by a factor of two. The crew will also be given the capability of steering the docking probe and of operating the orientation engine to improve the chances of docking when difficulties do occur.

1971 May 15 - .

- **Party line on Soviet space program.** - . *Nation: USSR. Related Persons: Popovich; Sevastyanov; Shatalov. Program: Salyut; Lunar L3; Luna. Flight: Soyuz 10; Soyuz 11.* Shatalov is actively pushing his candidacy for the position of Kamanin's deputy. Popovich and Sevastyanov prepare for a trip to the Paris Air show on 2 June. They need 'correct' replies to inevitable questions about the moon race, the Salyut 1 station, and Soyuz 10's failure to dock. The line they are to follow is that the Soviet Union is fulfilling its safe and systematic exploration of space. The robots Luna-16 and Lunokhod 1 safely surveyed the moon. After the Soyuz 9 long-duration flight, Salyut 1 was launched and Soyuz 10 tested the rendezvous equipment. The line is that the USSR is not behind the USA, but is exploring space in a safe and responsible way.

