

# Uragan-M (GLONASS-M, 14F113)

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**Uragan-M** spacecraft are the second generation of GLONASS satellites with an increased lifetime of 7 years following up the first generation [Uragan](#) spacecraft.

**GLONASS** (Globalnaya Navigatsionnaya Sputnikovaya Sistema, Global Orbiting Navigation Satellite System) is a Russian space-based navigation system comparable to the American GPS system, which consists of Uragan spacecraft. The operational system contains 21 satellites in 3 orbital planes, with 3 on-orbit spares. GLONASS provides 100 meters accuracy with its C/A (deliberately degraded) signals and 10-20 meter accuracy with its P (military) signals.

The Uragan-M spacecraft are 3-axis stabilized, nadir pointing with dual solar arrays. The payload consists of L-Band navigation signals in 25 channels separated by 0.5625 MHz intervals in 2 frequency bands: 1602.5625 - 1615.5 MHz and 1240 - 1260 MHz. EIRP 25 to 27 dBW. Right hand circular polarized. On-board cesium clocks provide time accuracy to 1000 nanoseconds. A civil reference signal on L2 frequency is to be added after the completion of flight testing of Glonass-M in 2004 to substantially increase the accuracy of navigation relaying on civil signals.

The spacecraft can be launched in triplets using [Proton-K Blok-DM-2](#), [Proton-K Briz-M](#), [Proton-M Blok-DM-2](#) or [Proton-M Blok-DM-03](#) boosters. Single launches on [Soyuz-2-1b Fregat-M](#) boosters are also planned. At least one single launch using an indian [GSLV Mk.2C](#) was also planned, but never conducted.

The Urgan-M satellites will be replaced by the smaller [Uragan-K1](#) and [Uragan-K2](#) satellites.



Uragan-M [NPO PM]

<b>Nation:</b>	Russia
<b>Type / Application:</b>	Navigation
<b>Operator:</b>	
<b>Contractors:</b>	NPO Prikladnoi Mekhaniki (NPO PM)
<b>Equipment:</b>	?
<b>Configuration:</b>	3-Axis stabilized Uragan-M bus
<b>Propulsion:</b>	?
<b>Power:</b>	2 deployable solar arrays, batteries
<b>Lifetime:</b>	7 years
<b>Mass:</b>	1415 kg
<b>Orbit:</b>	19100 km × 19100 km, 64.8°

Satellite	COSPAR	Date	LS	Launch Vehicle	Remarks
Kosmos 2382 (Uragan-M #1, №711)	2001-053A	01.12.2001	Ba LC-81/24	<a href="#">Proton-K Blok-DM-2</a>	with <a href="#">Kos. 2380 (Uragan #78)</a> , <a href="#">Kos. 2381 (Uragan #79)</a>
Kosmos 2404 (Uragan-M #2, №701)	2003-056C	10.12.2003	Ba LC-81/24	<a href="#">Proton-K Briz-M</a>	with <a href="#">Kos. 2402 (Uragan #83)</a> / <a href="#">Kos. 2403 (Uragan #84)</a>
Kosmos 2413 (Uragan-M #3, №712)	2004-053B	26.12.2004	Ba LC-200/39	<a href="#">Proton-K Blok-DM-2</a>	with <a href="#">Kos. 2411 (Uragan #85)</a> / <a href="#">Kos. 2412 (Uragan #86)</a>
Kosmos 2417 (Uragan-M #5, №713)	2005-050C	25.12.2005	Ba LC-81/23	<a href="#">Proton-K Blok-DM-2</a>	with Kos. 2418 (Uragan-M #4), <a href="#">Kos. 2419 (Uragan #87)</a>
Kosmos 2418 (Uragan-M #4, №714)	2005-050B	25.12.2005	Ba LC-81/23	<a href="#">Proton-K Blok-DM-2</a>	with Kos. 2419 (Uragan-M #5), <a href="#">Kos. 2419 (Uragan #87)</a>
Kosmos 2424 (Uragan-M #6, №715)	2006-062A	25.12.2006	Ba LC-81/24	<a href="#">Proton-K Blok-DM-2</a>	with Kos. 2425 (Uragan-M #7), Kos. 2426(Uragan-M #8)
Kosmos 2425 (Uragan-M #7, №716)	2006-062B	25.12.2006	Ba LC-81/24	<a href="#">Proton-K Blok-DM-2</a>	with Kos. 2424 (Uragan-M #6), Kos. 2426 (Uragan-M #8)
Kosmos 2426 (Uragan-M #8, №717)	2006-062C	25.12.2006	Ba LC-81/24	<a href="#">Proton-K Blok-DM-2</a>	with Kos. 2424 (Uragan-M #6), Kos. 2425 (Uragan-M #7)
Kosmos 2431 (Uragan-M #9, №718)	2007-052A	26.10.2007	Ba LC-81/24	<a href="#">Proton-K Blok-DM-2</a>	with Kos. 2432 (Uragan-M #10), Kos. 2433 (Uragan-M #11)
Kosmos 2432 (Uragan-M #10, №719)	2007-052B	26.10.2007	Ba LC-81/24	<a href="#">Proton-K Blok-DM-2</a>	with Kos. 2431 (Uragan-M #9), Kos. 2433 (Uragan-M #11)
Kosmos 2433 (Uragan-M #11, №720)	2007-052C	26.10.2007	Ba LC-81/24	<a href="#">Proton-K Blok-DM-2</a>	with Kos. 2431 (Uragan-M #9), Kos. 2432 (Uragan-M #10)
Kosmos 2434 (Uragan-M #12, №721)	2007-065A	25.12.2007	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2435 (Uragan-M #13), Kos. 2436 (Uragan-M #14)

Kosmos 2435 (Uragan-M #13, №722)	2007-065B	25.12.2007	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2434 (Uragan-M #12), Kos. 2436 (Uragan-M #14)
Kosmos 2436 (Uragan-M #14, №723)	2007-065C	25.12.2007	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2434 (Uragan-M #12), Kos. 2435 (Uragan-M #13)
Kosmos 2442 (Uragan-M #15, №724)	2008-046A	25.09.2008	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2443 (Uragan-M #16), Kos. 2444 (Uragan-M #17)
Kosmos 2443 (Uragan-M #16, №725)	2008-046B	25.09.2008	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2442 (Uragan-M #15), Kos. 2444 (Uragan-M #17)
Kosmos 2444 (Uragan-M #17, №726)	2008-046C	25.09.2008	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2442 (Uragan-M #15), Kos. 2443 (Uragan-M #16)
Kosmos 2447 (Uragan-M #18, №727)	2008-067A	25.12.2008	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2448 (Uragan-M #19), Kos. 2449(Uragan-M #20)
Kosmos 2448 (Uragan-M #19, №728)	2008-067C	25.12.2008	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2447 (Uragan-M #18), Kos. 2449 (Uragan-M #20)
Kosmos 2449 (Uragan-M #20, №729)	2008-067B	25.12.2008	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2447 (Uragan-M #18), Kos. 2448 (Uragan-M #19)
Kosmos 2456 (Uragan-M #21, №730)	2009-070A	14.12.2009	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2457 (Uragan-M #22), Kos. 2458 (Uragan-M #23)
Kosmos 2457 (Uragan-M #22, №733)	2009-070B	14.12.2009	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2456 (Uragan-M #21), Kos. 2458 (Uragan-M #23)
Kosmos 2458 (Uragan-M #23, №734)	2009-070C	14.12.2009	Ba LC-81/24	<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2456 (Uragan-M #21), Kos. 2457 (Uragan-M #22)

Kosmos 2459 (Uragan-M #24, №731)	2010-007A	01.03.2010	Ba LC-81/24		<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2460 (Uragan-M #25), Kos. 2461 (Uragan-M #26)
Kosmos 2460 (Uragan-M #25, №732)	2010-007C	01.03.2010	Ba LC-81/24		<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2459 (Uragan-M #24), Kos. 2461 (Uragan-M #26)
Kosmos 2461 (Uragan-M #26, №735)	2010-007B	01.03.2010	Ba LC-81/24		<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2459 (Uragan-M #24), Kos. 2460 (Uragan-M #25)
Kosmos 2464 (Uragan-M #27, №736)	2010-041A	02.09.2010	Ba LC-81/24		<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2465 (Uragan-M #28), Kos. 2466 (Uragan-M #29)
Kosmos 2465 (Uragan-M #28, №737)	2010-041B	02.09.2010	Ba LC-81/24		<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2464 (Uragan-M #27), Kos. 2466 (Uragan-M #29)
Kosmos 2466 (Uragan-M #29, №738)	2010-041C	02.09.2010	Ba LC-81/24		<a href="#">Proton-M Blok-DM-2</a>	with Kos. 2464 (Uragan-M #27), Kos. 2465 (Uragan-M #28)
<i>Kosmos (2470) (Uragan-M #30, №739)</i>	<i>2010-F03</i>	<i>05.12.2010</i>	<i>Ba LC-81/24</i>	<i>F</i>	<i><a href="#">Proton-M Blok-DM-03</a></i>	<i>with Kos. (2471) (Uragan-M #31), Kos. (2472) (Uragan-M #32)</i>
<i>Kosmos (2471) (Uragan-M #31, №740)</i>	<i>2010-F03</i>	<i>05.12.2010</i>	<i>Ba LC-81/24</i>	<i>F</i>	<i><a href="#">Proton-M Blok-DM-03</a></i>	<i>with Kos. (2470) (Uragan-M #30), Kos. (2472) (Uragan-M #32)</i>
<i>Kosmos (2472) (Uragan-M #32, №741)</i>	<i>2010-F03</i>	<i>05.12.2010</i>	<i>Ba LC-81/24</i>	<i>F</i>	<i><a href="#">Proton-M Blok-DM-03</a></i>	<i>with Kos. (2470) (Uragan-M #30), Kos. (2471) (Uragan-M #31)</i>
Kosmos 2474 (Uragan-M #33, №742)	2011-055A	02.10.2011	PI LC-43/4		<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 2475 (Uragan-M #34, №743)	2011-064A	04.11.2011	Ba LC-81/24		<a href="#">Proton-M Briz-M (Ph.1 mod. 1)</a>	with Kos. 2476 (Uragan-M #35), Kos. 2477 (Uragan-M #36)

Kosmos 2476 (Uragan-M #35, №744)	2011-064B	04.11.2011	Ba LC-81/24		<a href="#">Proton-M Briz-M (Ph.1 mod. 1)</a>	with Kos. 2475 (Uragan-M #34), Kos. 2477 (Uragan-M #36)
Kosmos 2477 (Uragan-M #36, №745)	2011-064C	04.11.2011	Ba LC-81/24		<a href="#">Proton-M Briz-M (Ph.1 mod. 1)</a>	with Kos. 2475 (Uragan-M #34), Kos. 2476 (Uragan-M #35)
Kosmos 2478 (Uragan-M #37, №746)	2011-071A	28.11.2011	PI LC-43/4		<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 2485 (Uragan-M #38, №747)	2013-019A	26.04.2013	PI LC-43/4		<a href="#">Soyuz-2-1b Fregat-M</a>	
<i>Kosmos (2488) (Uragan-M #39, №748)</i>	<i>2013-F02</i>	<i>02.07.2013</i>	<i>Ba LC-81/24</i>	<i>F</i>	<i><a href="#">Proton-M Blok-DM-03</a></i>	<i>with Kos. (2489) (Uragan-M #40), Kos. (2489) (Uragan-M #41)</i>
<i>Kosmos (2489) (Uragan-M #40, №749)</i>	<i>2013-F02</i>	<i>02.07.2013</i>	<i>Ba LC-81/24</i>	<i>F</i>	<i><a href="#">Proton-M Blok-DM-03</a></i>	<i>with Kos. (2488) (Uragan-M #39), Kos. (2489) (Uragan-M #41)</i>
<i>Kosmos (2490) (Uragan-M #41, №750)</i>	<i>2013-F02</i>	<i>02.07.2013</i>	<i>Ba LC-81/24</i>	<i>F</i>	<i><a href="#">Proton-M Blok-DM-03</a></i>	<i>with Kos. (2488) (Uragan-M #39), Kos. (2489) (Uragan-M #40)</i>
Kosmos 2494 (Uragan-M #42, №754)	2014-012A	23.03.2014	PI LC-43/4		<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 2500 (Uragan-M #43, №755)	2014-032A	14.06.2014	PI LC-43/4		<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 2514 (Uragan-M #44, №751)	2016-008A	07.02.2016	PI LC-43/4		<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 2516 (Uragan-M #45, №753)	2016-032A	29.05.2016	PI LC-43/4		<a href="#">Soyuz-2-1b Fregat-M</a>	

Kosmos 2522 (Uragan-M #46, №752)	2017-055A	22.09.2017	PI LC-43/4	<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 2527 (Uragan-M #47, №756)	2018-053A	16.06.2018	PI LC-43/4	<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 2529 (Uragan-M #48, №757)	2018-086A	03.11.2018	PI LC-43/4	<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 25xx (Uragan-M #48, №7xx)	-	20xx	PI LC-43/4	<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 25xx (Uragan-M #xx, №7xx)	-	20xx	PI LC-43/4	<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 25xx (Uragan-M #xx, №7xx)	-	20xx	PI LC-43/4	<a href="#">Soyuz-2-1b Fregat-M</a>	
Kosmos 25xx (Uragan-M #xx, №7xx)	-	2019	PI LC-43/4	<a href="#">Soyuz-2-1b Fregat-M</a>	

**Further Uragan / GLONASS missions:**

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