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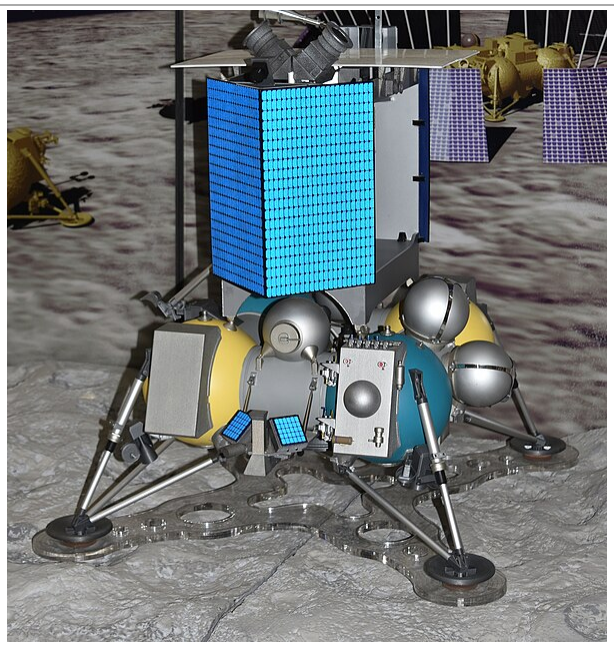
Luna 25

Coordinates: 57.865°S 61.360°E

Luna-25



Luna 25 lunar lander mock-up

Names	Luna-Glob lander
Mission type	Technology, reconnaissance
Operator	SRI RAS (IKI RAN)
COSPAR ID	2023-118A (https://nssdc.gsfc.nasa.gov/nmc/spacecraft/display.action?id=2023-118A)
SATCAT no.	57600
Website	iki.cosmos.ru/missions/luna-25 (https://iki.cosmos.ru/missions/luna-25)
Mission duration	1 year (planned) Actual: c. 9 days (mission failure)[1]
Spacecraft properties	
Spacecraft type	Robotic lander
Manufacturer	NPO Lavochkin
Launch mass	1,750 kg (3,860 lb)[2]
Payload mass	30 kg (66 lb)

Start of mission	
Launch date	23:10:57.189, 10 August 2023 (UTC)[3][4]
Rocket	Soyuz-2.1b / Fregat[5]
Launch site	Vostochny Cosmodrome[6]
Contractor	
Lunar lander	
Landing date	11:57, 19 August 2023 (UTC) (crashed)
Landing site	near-Lunar south pole (intended) 57.865°S 61.360°E (crash site) (Pontécoulant G crater)

Luna 25 mission patch

Luna-Glob programme

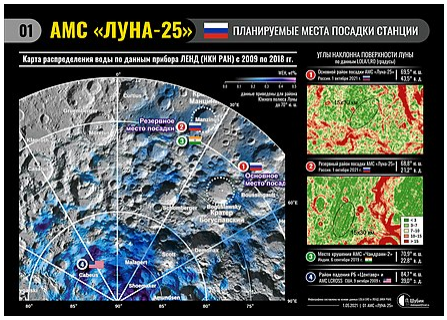
Luna 25 (or **Luna-25**; Russian: Луна-25) was a failed Russian lunar lander mission by Roscosmos[7] in August 2023 that planned to land near the lunar south pole, in the vicinity of the crater Boguslawsky.[8]

Initially called the **Luna-Glob lander** (Russian: Луна-Глоб), it was renamed Luna 25 to emphasize continuity with the Soviet Luna programme from the 1970s, though it was still part of what was at one point conceptualized as the Luna-Glob lunar exploration programme. It was the first lunar lander that the Russian space agency Roscosmos has sent to the Moon (notwithstanding the ones sent by the Soviet space program) and would have been the first lander to land on the lunar south pole.[9]

The Luna 25 mission lifted off on 10 August 2023, 23:10 UTC, atop a Soyuz-2.1b rocket from the Vostochny Cosmodrome in Russia's far eastern Amur Region,[3][10] and on 16 August entered lunar orbit. On 19 August at 11:57 UTC, the lander crashed on the Moon's surface after a failed orbital manoeuvre.[11][2][12]

History

The previous lunar lander in the series was a Soviet craft, Luna 24, launched in 1976. Nascent plans for what became Luna 25 began in the late 1990s, with the evaluation of two spacecraft designs having taken place by 1998. Attempts to revive and complete the project continued throughout the 2000s and were punctuated by an aborted attempt at international cooperation via a merger with JAXA's now-cancelled Lunar-A orbiter, and pressure from another attempted cooperative lunar mission with Indian Space Research Organisation (ISRO) (which continued without Russia's involvement).[13]



Proposed landing sites

Initial mission plans called for a lander and orbiter, with the latter also deploying impact penetrators. In its final form, Luna 25 was a lander only, with a primary mission of testing the landing technology. The mission carried 30 kg (66 lb) of scientific instruments, including a robotic arm for soil samples and possible drilling hardware.[2][14]

Delays in the 2010s came first from the significant rework and delay brought on by the failure of Phobos-Grunt in 2011. At this point the modern Luna 25 design was developed. Later work on the lander was slowed by resource pressures being placed upon spacecraft developer NPO Lavochkin, such as the weather satellite Elektro-L No.2 and the Spektr-RG observatory,[15] as well the landing platform Russia was contributing to ExoMars 2020.[16]

By 2017, the propulsion system for the spacecraft was in assembly.[17]

The intended landing site was located at 69.545°S 43.544°E (north of the crater Boguslavsky), with two backup locations at 68.773°S 21.210°E (southwest of the Manzini crater) and 68.648°S 11.553°E (south of Pentland A crater).[18]

The planned mission duration of the lander on the surface of the Moon was to be at least one Earth year.[18]

At least 12.5 billion roubles (over US$130 million) had been spent on the project.[19][20]

Science payload

The lander featured a 30 kg (66 lb) payload comprising eight Russian science instruments:[21][22]

- ADRON-LR, active neutron and gamma-ray analysis of regolith
- ARIES-L, measurement of plasma in the exosphere
- LASMA-LR, laser mass-spectrometer
- LIS-TV-RPM, infrared spectrometry of minerals and imaging
- PmL, measurement of dust and micro-meteorites
- THERMO-L, measurement of the thermal properties of regolith
- STS-L, panoramic and local imaging
- Laser retroreflector, Moon libration and ranging experiments

LINA-XSAN, a Swedish payload, was originally to fly with Luna 25, but delays to the launch date caused Sweden to cancel this plan. Instead, LINA-XSAN flew on Chang'e 4 in 2019.[23]

ESA's PILOT-D navigation demonstration camera was planned to be flown on this mission, but flew instead with a commercial service provider,[24] due to continued international collaboration having been thrown into doubt by the 2022 Russian invasion of Ukraine and related sanctions on Russia.[25][26] The demonstration instrument was supposed to collect data for the landing of other missions and was therefore not part of the lander's operating system.[27]

Flight

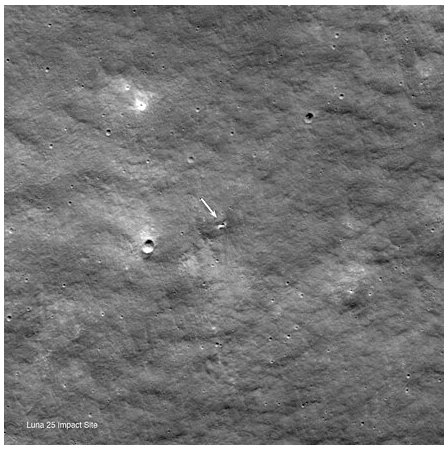
External video

Luna-25 launch (https://www.youtube.com/watch?v=eYVEKggrZUM)

The launch took place on 10 August 2023 from Vostochny Cosmodrome on a Soyuz-2 rocket with a Fregat upper stage.[3][28][29][30] On 16 August, the lander entered lunar orbit, with a scheduled landing date of 21 August.[31]

Crash

On 19 August, Roscosmos declared an "abnormal situation" after commanding the lander to move into a pre-landing orbit.[32][33] According to Director General of Roscosmos Yuri Borisov, a maneuvering engine could not be shut down, and ran for 127 seconds instead of 84.[34] The lander crashed on the lunar surface following the failed maneuver,[11][35][36] which created a trajectory that intersected with the Moon instead of a planned elliptical orbit with a minimum distance of 18km.[37]



Luna 25 impact site (arrowed), photographed by NASA's Lunar Reconnaissance Orbiter on 26 August 2023. The field of view is 1,100 meters wide, with lunar north at the top.

Roscosmos said that it had lost contact with the spacecraft 47 minutes after the start of the engine firing.[38] Attempts on 19 and 20 August to locate and re-establish contact with the spacecraft were unsuccessful,[36] and a commission was formed to investigate the crash.[36]

The LRO camera team located the likely location of the impact crater, after an estimate was published by Russian researchers. The crash site is situated on the steep inner rim of the Pontécoulant G crater, which is only 400 kilometers short of Luna 25's intended landing point if it did attempt a landing procedure.[39]

See also

- Chandrayaan-3
- SLIM
- Chang'e 6
- Lunar water
- List of missions to the Moon

Spaceflight portal

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External links

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