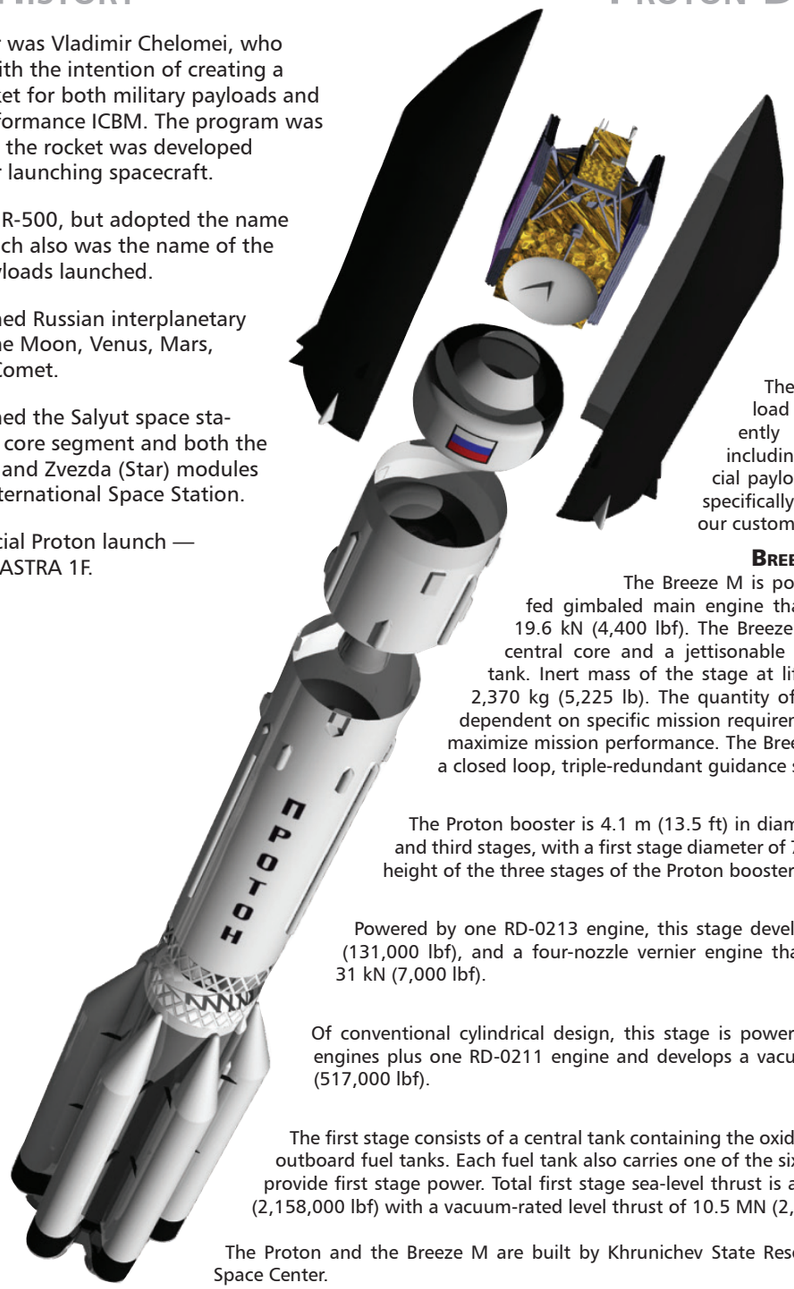
THE VEHICLE

Proton History

- Lead designer was Vladimir Chelomei, who designed it with the intention of creating a powerful rocket for both military payloads and as a high-performance ICBM. The program was changed, and the rocket was developed exclusively for launching spacecraft.
- First named UR-500, but adopted the name "Proton," which also was the name of the first three payloads launched.
- Proton launched Russian interplanetary missions to the Moon, Venus, Mars, and Halley's Comet.
- Proton launched the Salyut space stations, the Mir core segment and both the Zarya (Dawn) and Zvezda (Star) modules for today's International Space Station.
- First commercial Proton launch — 9 April 1996, ASTRA 1F.

Proton Description



Total Height
58.2 m (191 ft)

Gross Liftoff Weight
702,000 kg
(1,547,000 lb)

Propellant
UDMH and N_2O_4

Initial Launch
16 July 1965
Proton-1 Spacecraft

Payload Fairings
There are multiple payload fairing designs presently qualified for flight, including standard commercial payload fairings developed specifically to meet the needs of our customers.

Breeze M Upper Stage
The Breeze M is powered by one pump-fed gimbaled main engine that develops thrust of 19.6 kN (4,400 lbf). The Breeze M is composed of a central core and a jettisonable additional propellant tank. Inert mass of the stage at liftoff is approximately 2,370 kg (5,225 lb). The quantity of propellant carried is dependent on specific mission requirements and is varied to maximize mission performance. The Breeze M is controlled by a closed loop, triple-redundant guidance system.

Proton Booster
The Proton booster is 4.1 m (13.5 ft) in diameter along its second and third stages, with a first stage diameter of 7.3 m (24.0 ft). Overall height of the three stages of the Proton booster is 42.3 m (138.8 ft).

Third Stage
Powered by one RD-0213 engine, this stage develops thrust of 583 kN (131,000 lbf), and a four-nozzle vernier engine that produces thrust of 31 kN (7,000 lbf).

Second Stage
Of conventional cylindrical design, this stage is powered by three RD-0210 engines plus one RD-0211 engine and develops a vacuum thrust of 2.3 MN (517,000 lbf).

First Stage
The first stage consists of a central tank containing the oxidizer surrounded by six outboard fuel tanks. Each fuel tank also carries one of the six RD-275 engines that provide first stage power. Total first stage sea-level thrust is approximately 9.6 MN (2,158,000 lbf) with a vacuum-rated level thrust of 10.5 MN (2,360,000 lbf).

The Proton and the Breeze M are built by Khrunichev State Research and Production Space Center.

THE SATELLITE

Satellite Operator
SES ASTRA
www.ses-astra.com

Satellite Manufacturer
EADS Astrium
www.astrium.eads.net

Platform
Eurostar E3000

Separated Mass
5,320 kg

Satellite Design Life
15 Years

Mission
ASTRA 1M will be positioned at SES ASTRA's prime orbital position, 19.2 degrees East, where it will provide pan-European coverage. It will primarily deliver direct-to-home services, including high-definition television. The launch of the spacecraft will allow SES ASTRA to move capacity to its increasingly important orbital position, 23.5 degrees East. ASTRA 1M will carry 36 transponders covering the FSS and BSS frequency bands.

ILS
www.ilslaunch.com

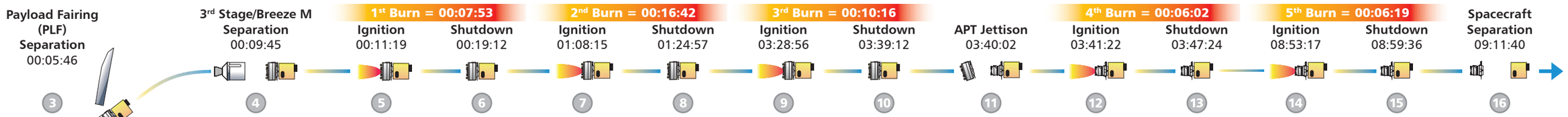
October 2008

ASTRA 1M

Mission Overview

- **5th** ILS launch of 2008
- **48th** Proton launch for ILS
- **7th** ILS Proton launch for SES ASTRA
- **11th** Eurostar satellite launched on Proton

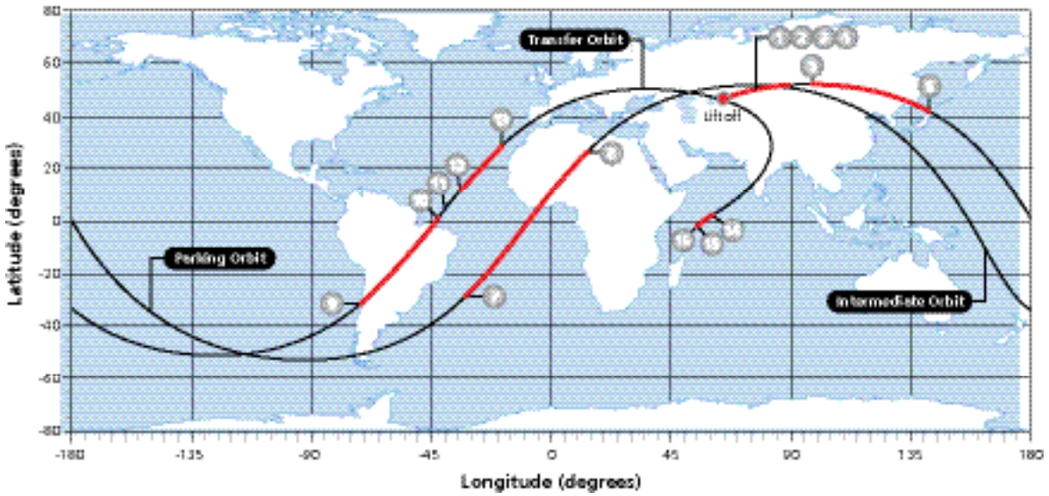
THE **MISSION**

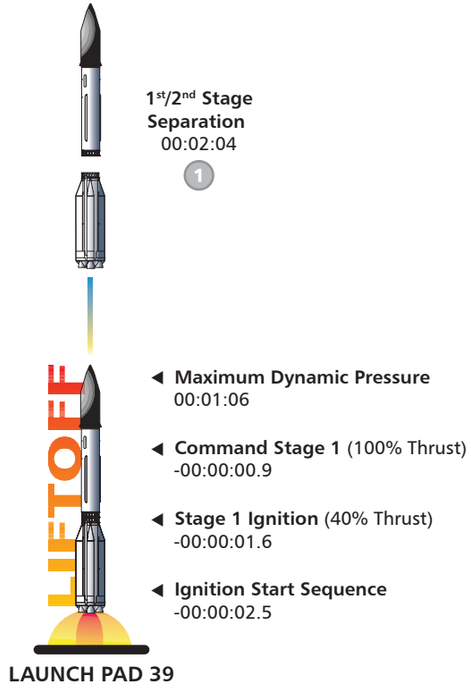


MISSION DESCRIPTION

The Proton M launch vehicle, utilizing a 5-burn Breeze M mission design, will lift off from Pad 39 at Baikonur Cosmodrome, Kazakhstan, with the ASTRA 1M satellite on board. The first three stages of the Proton will use a standard ascent profile to place the orbital unit (Breeze M upper stage and the ASTRA 1M satellite) into a sub-orbital trajectory. From this point in the mission, the Breeze M will perform planned mission maneuvers to advance the orbital unit first to a circular parking orbit, then to an intermediate orbit, followed by a transfer orbit, and finally to a geosynchronous transfer orbit. Separation of the ASTRA 1M satellite is scheduled to occur approximately 9 hours, 12 minutes after liftoff.

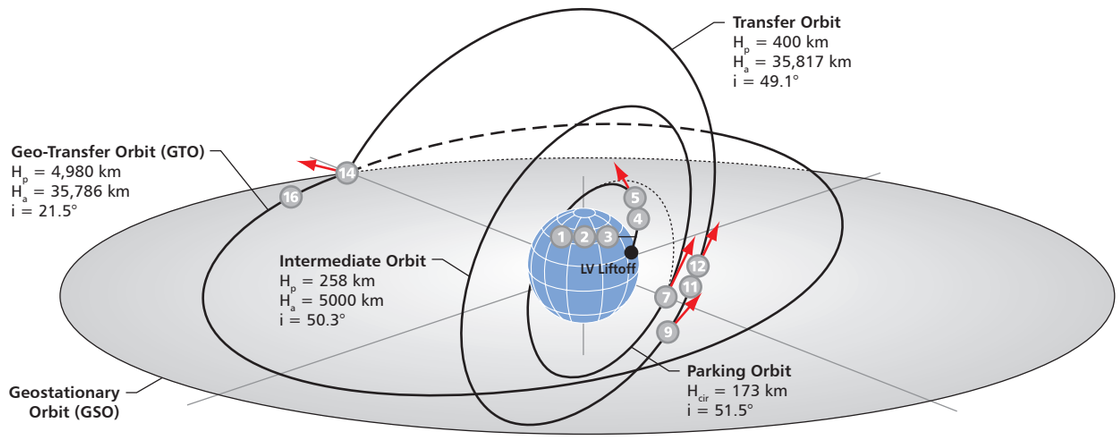
GROUND TRACK





ASCENT PROFILE

PROTON M ON PAD 39



ORBIT INSERTION