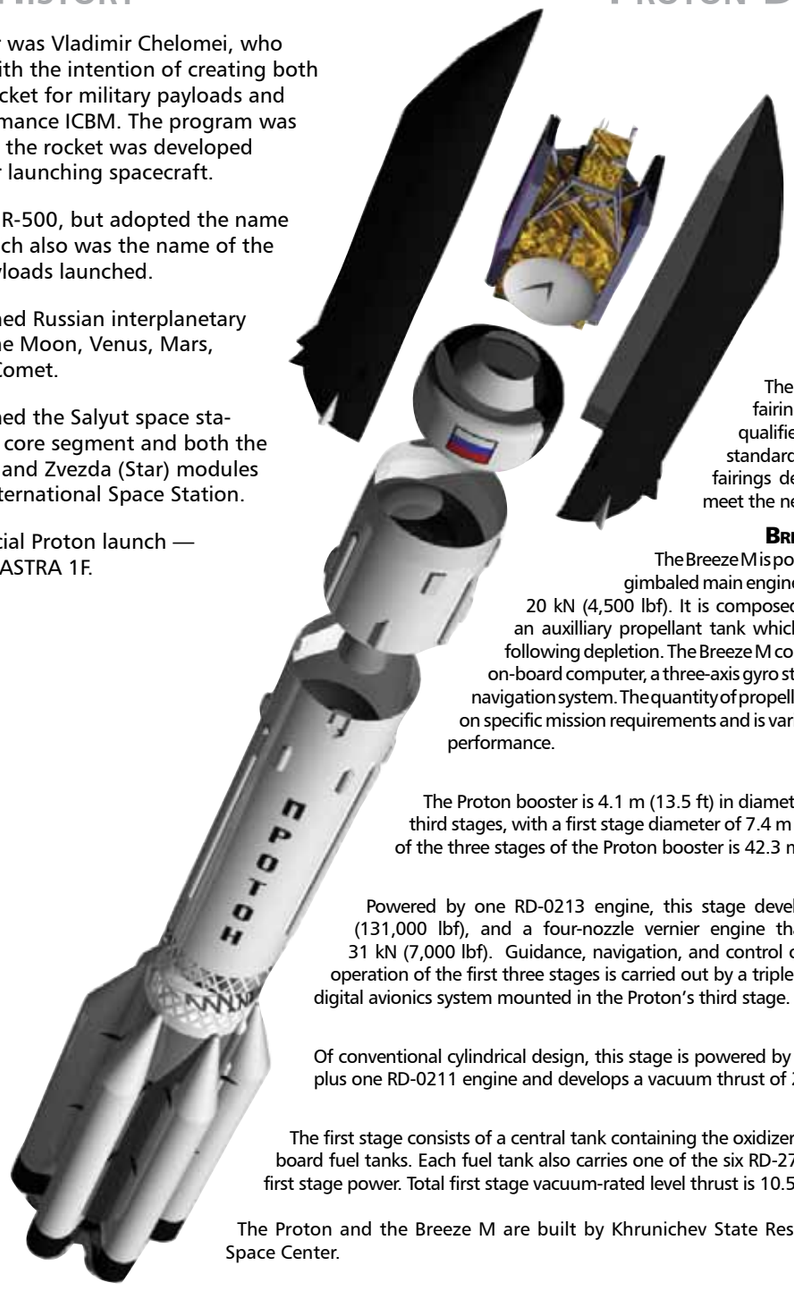
THE VEHICLE

Proton History

- Lead designer was Vladimir Chelomei, who designed it with the intention of creating both a powerful rocket for military payloads and 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
56.2 m (184 ft)

Gross Liftoff Weight
691,000 kg
(1,523,000 lb)

Propellant
UDMH and NTO

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 20 kN (4,500 lbf). It is composed of a central core and an auxilliary propellant tank which is jettisoned in flight following depletion. The Breeze M control system includes an on-board computer, a three-axis gyro stabilized platform, and a navigation system. The quantity of propellant carried is dependent on specific mission requirements and is varied to maximize mission performance.

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 7.4 m (24.3 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). Guidance, navigation, and control of the Proton M during operation of the first three stages is carried out by a triple redundant closed-loop digital avionics system mounted in the Proton's third stage.

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 2.4 MN (540,000 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 vacuum-rated level thrust is 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
Intelsat
www.intelsat.com

Satellite Manufacturer
Orbital Sciences Corporation
www.orbital.com

Platform
Star 2.4

Separated Mass
2056.6 kg

Satellite Design Life
16 Years

Satellite Mission
The Intelsat 16 satellite (IS-16) will be located at 58 degrees West Longitude. The high-power Ku-band payload will provide expansion capacity for SKY Mexico offering High Definition (HD) services and delivering news, sports and entertainment programming to its direct-to-home viewers. In addition, IS-16 will be available to provide backup capacity for SKY Brazil.

ILS
www.ilslaunch.com

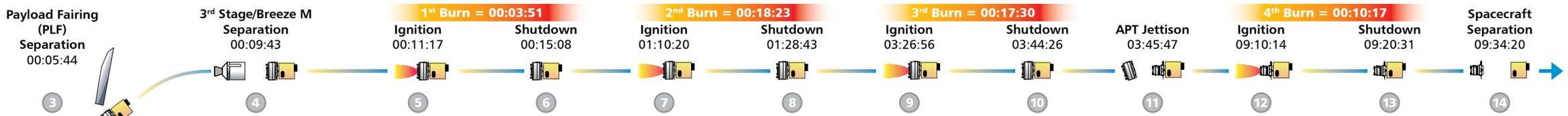
Intelsat 16

Mission Overview

- **1st** ILS Proton Launch in 2010
- **57th** Proton Launch for ILS
- **2nd** Orbital Satellite Launched on Proton
- **3rd** Intelsat Satellite Launched with ILS

KHRUNICHEV STATE RESEARCH AND PRODUCTION SPACE CENTER

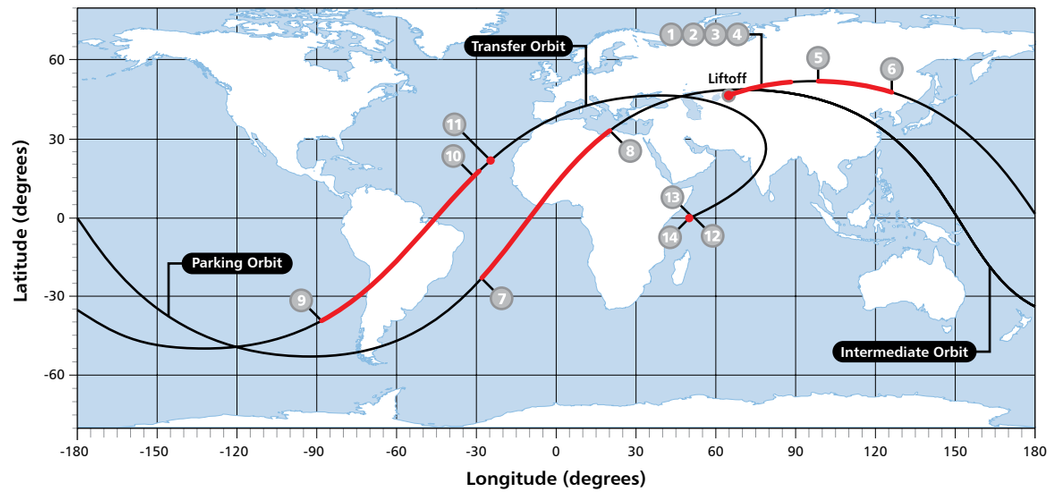
THE **MISSION**

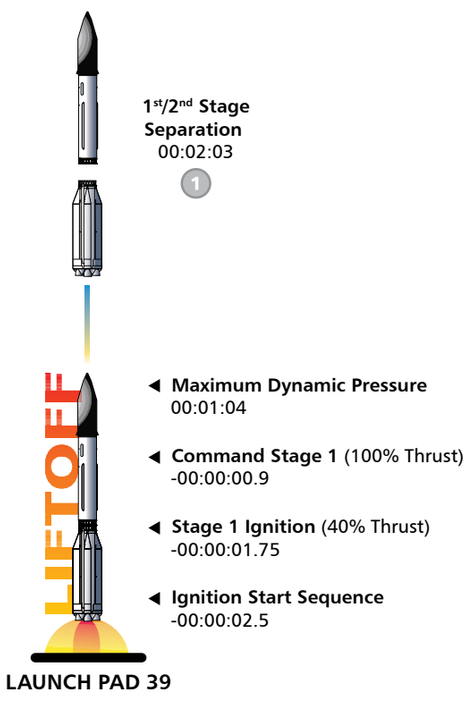


MISSION DESCRIPTION

The Proton M launch vehicle, utilizing a 4-burn Breeze M mission design, will lift off from Pad 39 at Baikonur Cosmodrome, Kazakhstan, with the Intelsat 16 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 Intelsat 16 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 near geostationary orbit. Separation of the Intelsat 16 satellite is scheduled to occur approximately 9 hours, 34 minutes after liftoff.

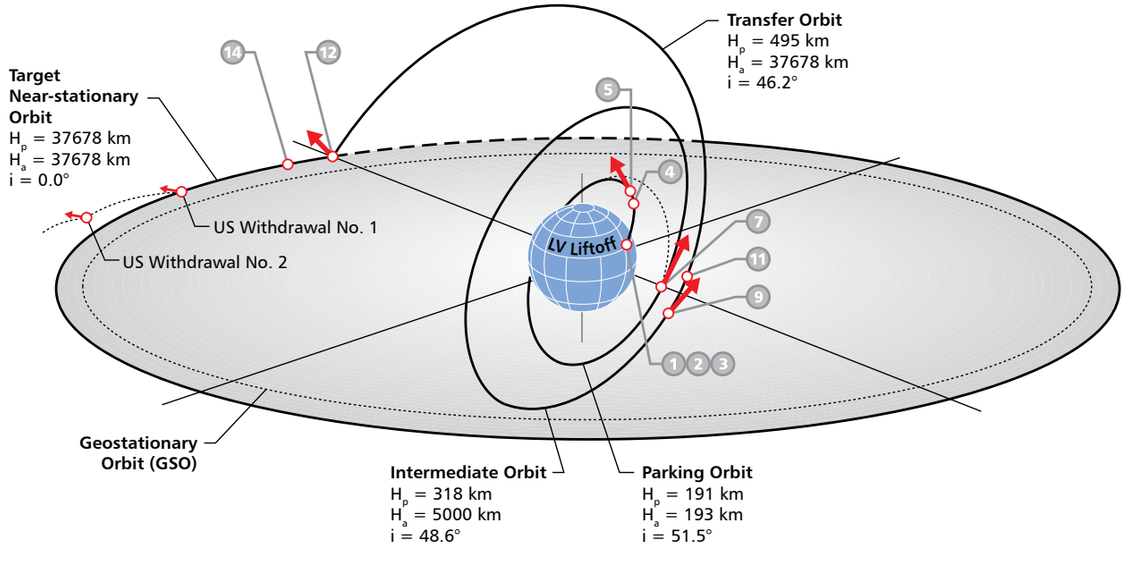
GROUND TRACK





ASCENT PROFILE

PROTON ON PAD 39



ORBIT INSERTION