

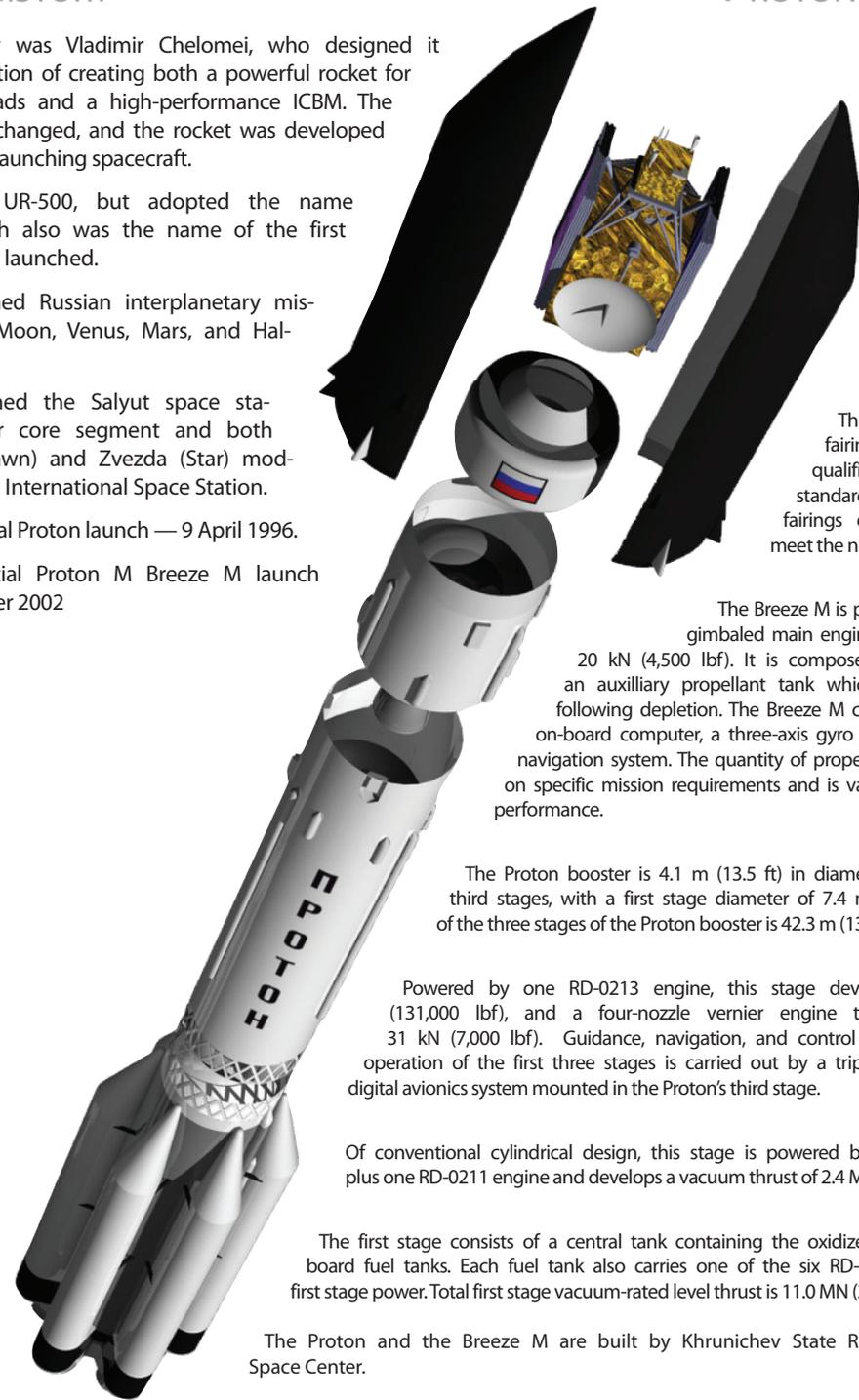
# THE VEHICLE

# THE SATELLITE

## 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.
- First commercial Proton M Breeze M launch — 30 December 2002

## PROTON DESCRIPTION



**TOTAL HEIGHT**  
58.2 m (191 ft)

**GROSS LIFT-OFF WEIGHT**  
705,000 kg  
(1,554,000 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 auxiliary 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 out-board fuel tanks. Each fuel tank also carries one of the six RD-276 engines that provide first stage power. Total first stage vacuum-rated level thrust is 11.0 MN (2,500,000 lbf).

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



**SATELLITE OPERATOR**  
Yahsat  
[www.yahsat.ae](http://www.yahsat.ae)

**SATELLITE MANUFACTURER**  
Astrium  
[www.astrium.eads.net](http://www.astrium.eads.net)

Thales Alenia Space  
[www.thalesaleniaspace.com](http://www.thalesaleniaspace.com)

**PLATFORM**  
Eurostar E3000

**SEPARATED MASS**  
< 6,100 kg

**SATELLITE MISSION LIFETIME**  
15 Years

**SATELLITE MISSION**  
Second Yahsat satellite to be launched in one year, Y1B will deliver communications in Ka band for both commercial and governmental users. It will provide high-data rate internet services for public and private users in the Middle East, Africa and Southwest Asia above the limitations of existing terrestrial and satellite systems. Y1B commercial communication payload uses state of the art Ka-band multi spot-beam technology, achieving cost-effective bandwidth supply through 61 narrow spot beams. The governmental mission will bring a substantial increase in the total capacity available for the UAE secured communications over Middle East in complement to the Y1A satellite.



## Mission Overview



Experience ILS: Achieve Your Mission  
QUALITY | PERFORMANCE | EXPERIENCE | DEDICATION

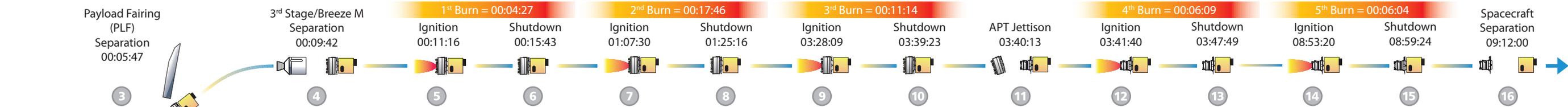


[www.ilslaunch.com](http://www.ilslaunch.com)

## Y1B

- 1st Yahsat Satellite Launched on ILS Proton
- 3rd ILS Proton Launch in 2012
- 14th Eurostar Satellite Launched on ILS Proton
- 72nd ILS Proton Launch Overall

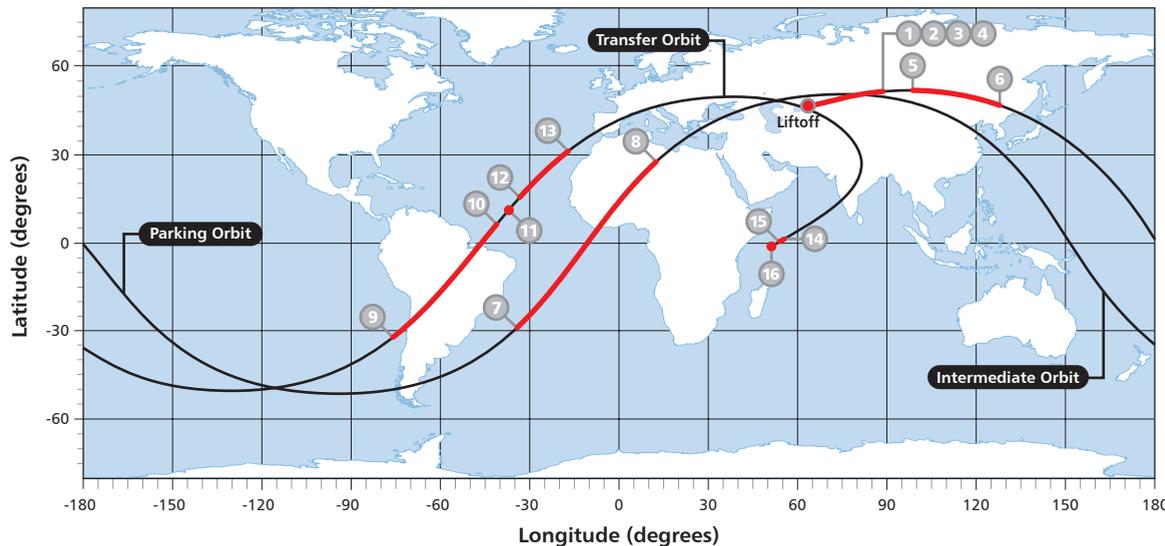
# THE MISSION



## 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 Y1B 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 Y1B 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 geostationary transfer orbit. Separation of the Y1B satellite is scheduled to occur approximately 9 hours, 12 minutes after liftoff.

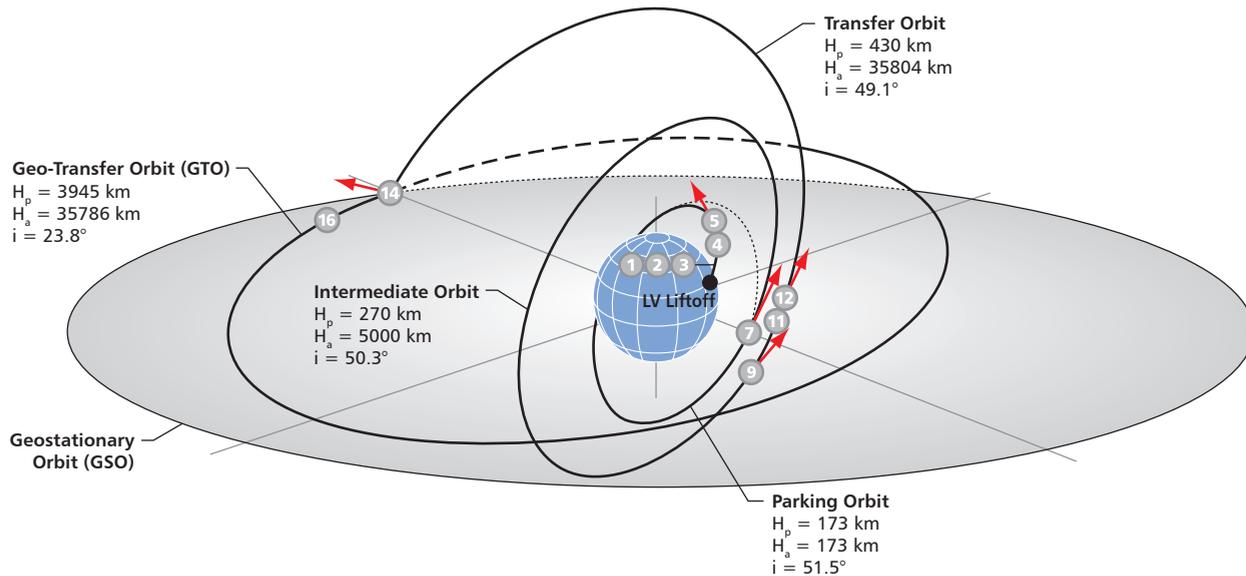
## GROUND TRACK



PROTON ON PAD 39

- Maximum Dynamic Pressure 00:01:02
- Command Stage 1 (100% Thrust) -00:00:00.9
- Stage 1 Ignition (40% Thrust) -00:00:01.75
- Ignition Start Sequence -00:00:02.5

ASCENT PROFILE



FLIGHT DESIGN

LAUNCH PAD 39

LIFTOFF