

Proton

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 outboard 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 Khronichev State Research and Production Space Center.

Satellite

SATELLITE OPERATOR
Eutelsat S.A
www.eutelsat.com

SATELLITE MANUFACTURER
Airbus Defence and Space
www.airbus.com

PLATFORM
Eurostar 3000

SEPARATED MASS
5162 kg

SATELLITE DESIGN LIFETIME
15 Years



SATELLITE MISSION

EUTELSAT 9B is a high-capacity Ku-band satellite to be located at Eutelsat's 9° East position. The 56-transponder satellite will take 9° East to a new level of performance, increasing resources by 12 additional transponders. Capacity will be spread across five footprints, with frequency reuse optimising overall bandwidth. EUTELSAT 9B will address high-growth digital TV markets through one pan-European footprint delivering wide coverage and four regional footprints.

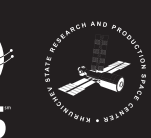
EUTELSAT 9B also hosts the first data relay payload for the European Data Relay System (EDRS) being implemented through a Public Private Partnership (PPP) between ESA and Airbus Defence & Space.

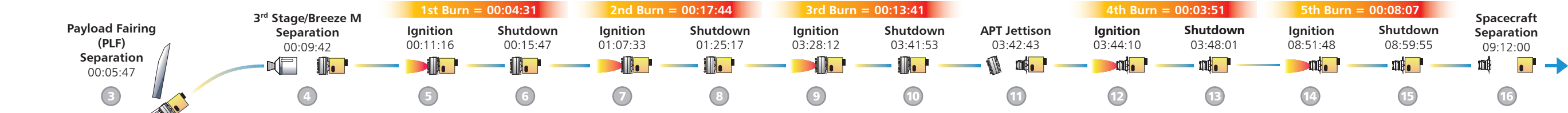
Mission Overview



- 1st ILS Proton Launch in 2016
- 92nd ILS Proton Launch Overall
- 11th Eutelsat Satellite Launched on ILS Proton
- 21st Airbus Satellite Launched on ILS Proton

EUTELSAT 9B

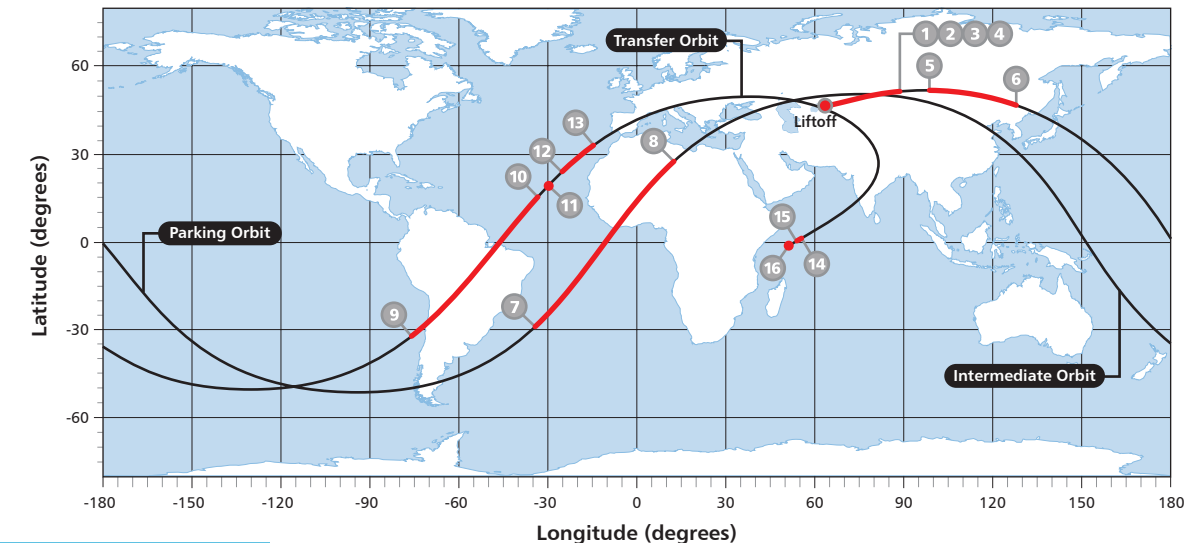




EUTELSAT 9B

Mission Description

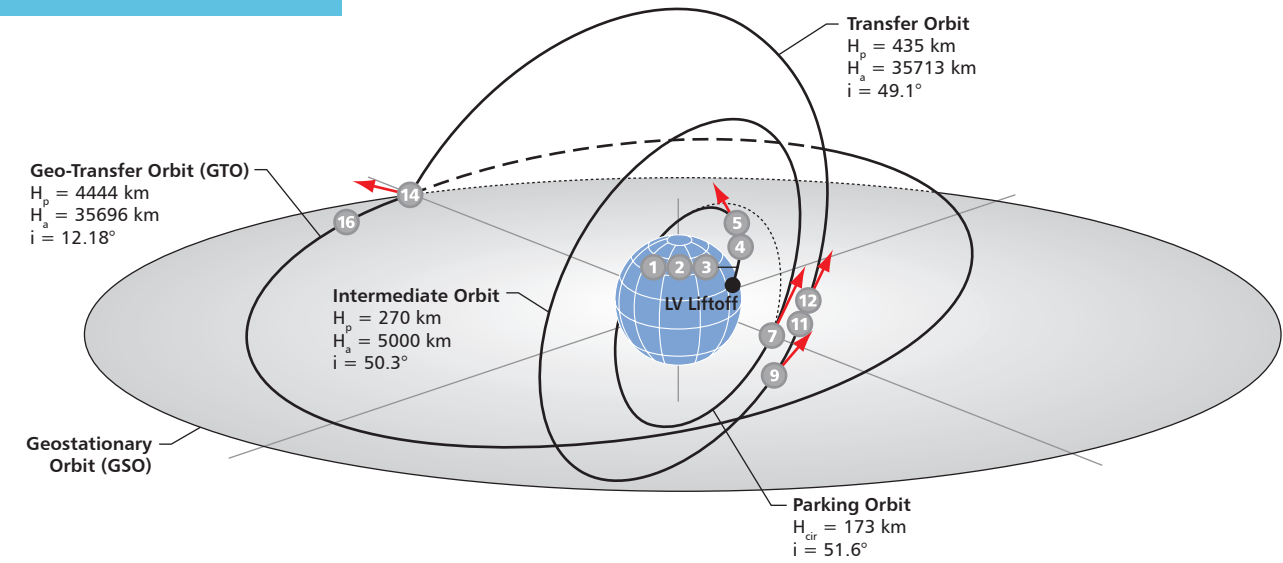
The Proton M launch vehicle, utilizing a 5-burn Breeze M mission design, will lift off from Pad 39 at the Baikonur Cosmodrome in Kazakhstan, with the EUTELSAT 9B satellite on board. The first three stages of the Proton will use a standard ascent profile to place the orbital unit (Breeze M upper stage and the EUTELSAT 9B 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 EUTELSAT 9B satellite is scheduled to occur approximately 9 hours, 12 minutes after liftoff.



Ground Track

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
- 400th Proton launch — 15 December 2014
- 50th year in service in 2015



Flight Design



Launch Pad

39

LIFTOFF

39

Ascent Profile

- ◀ 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