

# THE VEHICLE

# THE SATELLITE



www.ilslaunch.com

## 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**  
705,000 kg  
(1,554,000 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 20 kN (4,500 lbf). It's 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 Khrunichev State Research and Production Space Center.



**SATELLITE OPERATOR**  
Eutelsat Communications  
www.eutelsat.com

**SATELLITE MANUFACTURER**  
Thales Alenia Space  
www.thalesaleniaspace.com

**PLATFORM**  
Spacebus 4000 C4

**SEPARATED MASS**  
5,900 kg

**SATELLITE DESIGN LIFE**  
15 Years

### SATELLITE MISSION

W2A has a triple band mission (Ku-band, C-band and S-band), expanding one of Eutelsat's most important and longstanding orbital neighbourhoods, 10° East. Extending Ku-band capacity for telecommunications services, W2A will serve Europe, North Africa and the Middle East via a fixed widebeam footprint and southern Africa and Indian Ocean islands via a second Ku-band fixed beam. Boosting Eutelsat's C-band resources, W2A will increase the fleet's C-band capacity for broadband and telecommunications services in Europe, Africa, the Middle East, India and Latin America, enabling interconnections across these continents. W2A will also feature a major innovation, carrying Europe's first S-band capacity. This state-of-the-art payload will be an essential building-block for a hybrid infrastructure over Europe, combining satellite and terrestrial networks, to provide universal coverage for mobile TV services and direct communications services such as security communications or crisis management. The S-band payload will be commercialised by Solaris Mobile, a venture jointly owned by Eutelsat and SES Astra.



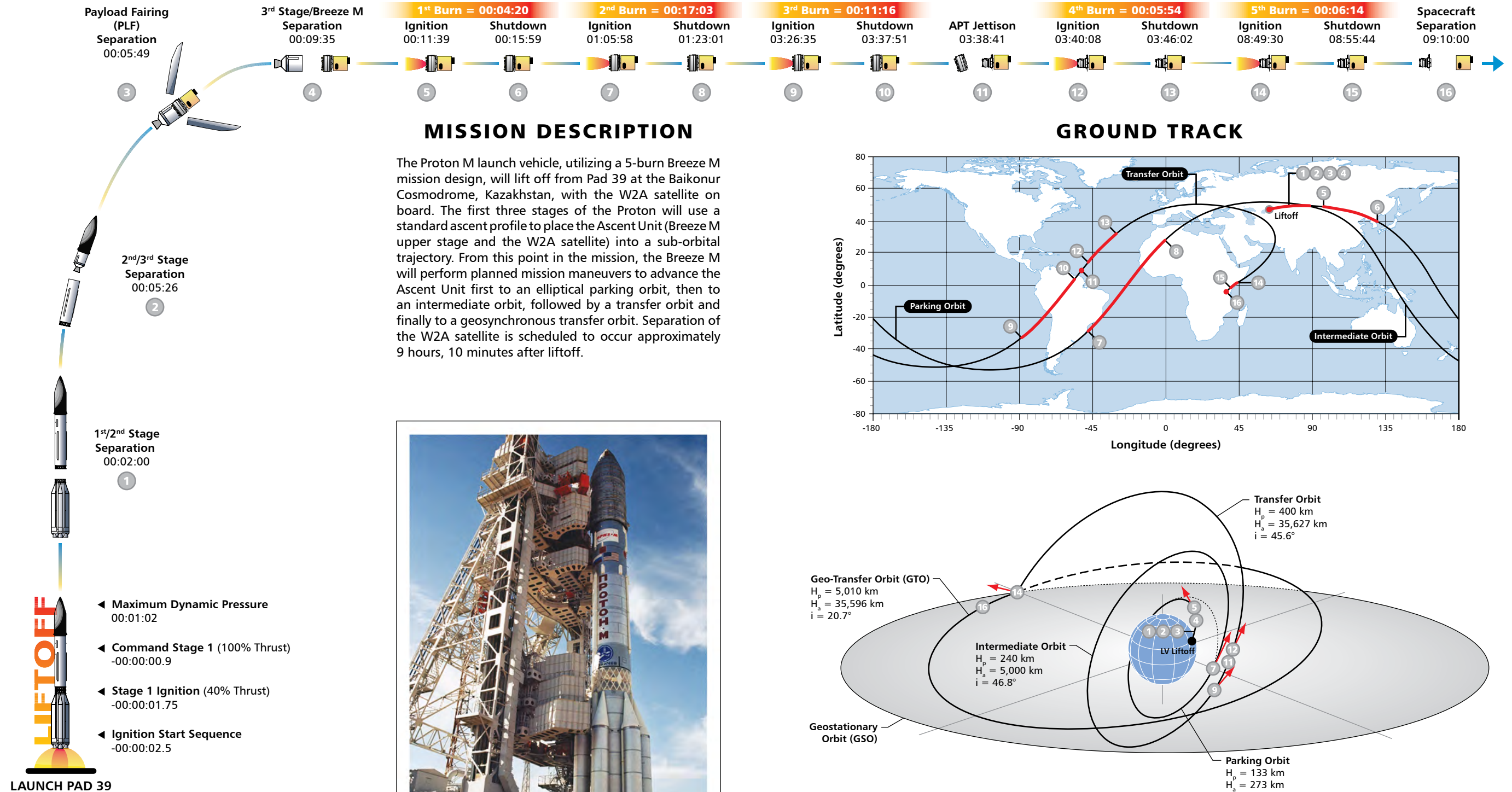
## W2A

## MISSION OVERVIEW

- 50th Proton Launch for ILS
- 4th Proton Launch for Eutelsat
- 4th Spacebus 4000 Launched on a Proton
- 1st S-band Satellite for Europe



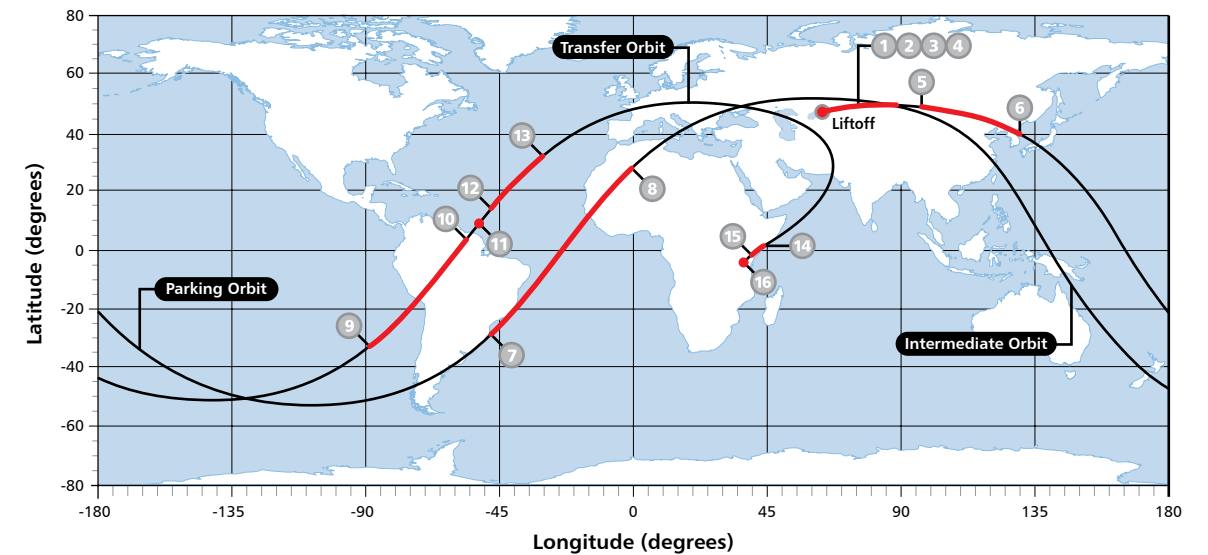
# THE MISSION



## 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, Kazakhstan, with the W2A satellite on board. The first three stages of the Proton will use a standard ascent profile to place the Ascent Unit (Breeze M upper stage and the W2A satellite) into a sub-orbital trajectory. From this point in the mission, the Breeze M will perform planned mission maneuvers to advance the Ascent Unit first to an elliptical parking orbit, then to an intermediate orbit, followed by a transfer orbit and finally to a geosynchronous transfer orbit. Separation of the W2A satellite is scheduled to occur approximately 9 hours, 10 minutes after liftoff.

## GROUND TRACK



## ASCENT PROFILE

## PROTON M ON PAD 39

## ORBIT INSERTION