

Proton

TOTAL HEIGHT
42.95 m (141 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

This mission will utilize the standard PLF-BR-15255 commercial payload fairing which is 4.1 meters in diameter and 15.255 meters in length. The PLF encapsulates the EchoStar XXI satellite along with the Breeze M upper stage to provide protection from the dense atmosphere for the first 5 minutes and 45 seconds after launch.

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 consists of three stages (described below). The overall height of the three stages of Proton is 42.3 meters (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 Khrunichev State Research and Production Space Center.

Satellite

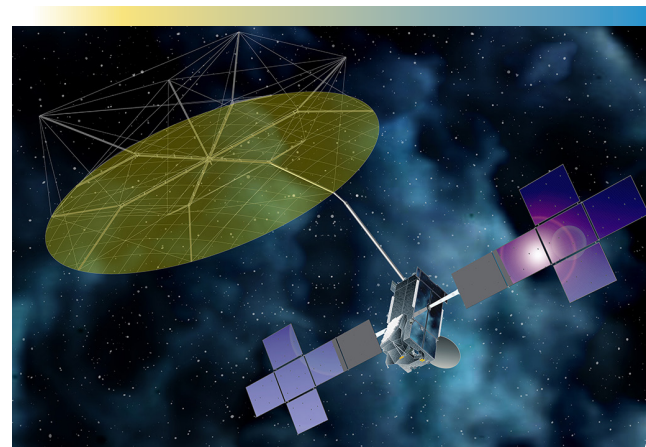
SATELLITE OPERATOR
EchoStar
www.echostar.com

SATELLITE MANUFACTURER
SSL
www.sslmda.com

PLATFORM
SSL 1300

SEPARATED MASS
6871 kg

SATELLITE DESIGN LIFETIME
15 Years



SATELLITE MISSION

EchoStar XXI is a state-of-the-art S-band satellite designed to provide mobile connectivity throughout Europe. The spacecraft, based on SSL's 1300 bus, will be located at the 10.25° East orbital slot. EchoStar subsidiary EchoStar Mobile Limited, an EU-wide licensee for an integrated mobile satellite service network with a complementary ground component, will utilize a portion of the capacity on EchoStar XXI to provision its next-generation, all IP-enabled mobile communications network.

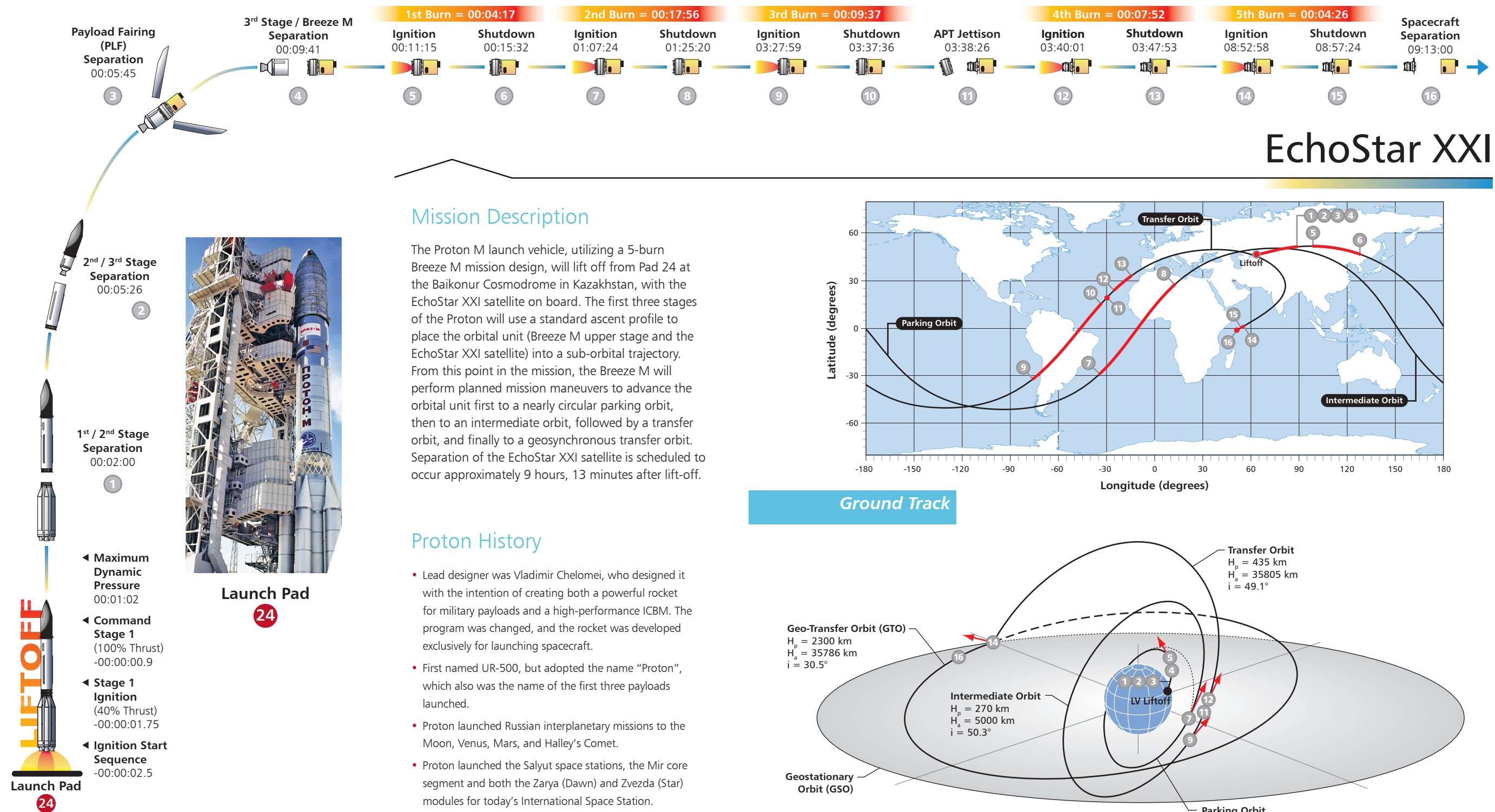
Mission Overview



- 3rd ILS Proton Launch in 2016
- 94th ILS Proton Launch Overall
- 6th EchoStar Satellite Launched on ILS Proton
- 29th SSL Satellite Launched on ILS Proton

EchoStar XXI





EchoStar XXI

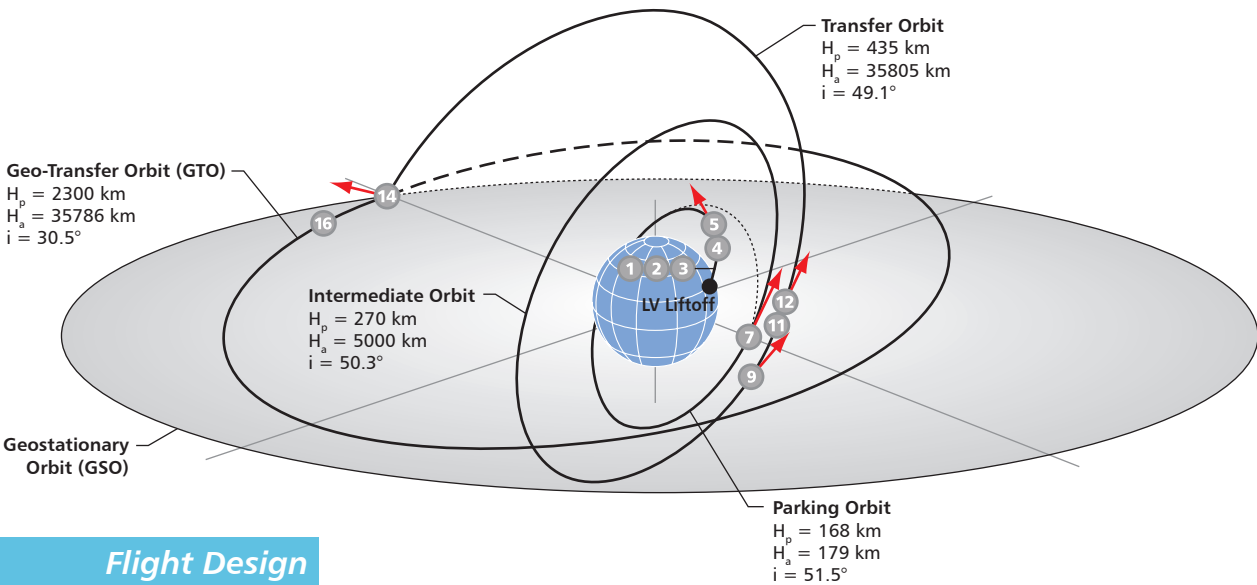
Mission Description

The Proton M launch vehicle, utilizing a 5-burn Breeze M mission design, will lift off from Pad 24 at the Baikonur Cosmodrome in Kazakhstan, with the EchoStar XXI 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 EchoStar XXI 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 nearly circular parking orbit, then to an intermediate orbit, followed by a transfer orbit, and finally to a geosynchronous transfer orbit. Separation of the EchoStar XXI satellite is scheduled to occur approximately 9 hours, 13 minutes after lift-off.

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
- KhSC 100 year anniversary — 30 April 2016

Ground Track



Flight Design