

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 changed, and the rocket was developed exclusively for launching spacecraft.
- First named UR-500, but adopted the name "Proton," from the first three payloads it 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 LIFTOFF 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 Khrunichev State Research and Production Space Center.



SATELLITE OPERATOR
SES
www.ses.com

SATELLITE MANUFACTURER
Space Systems/Loral
www.ssloral.com

PLATFORM
SS/L 1300

SEPARATED MASS
5,514 kg

SATELLITE MISSION LIFETIME
15 Years

SATELLITE MISSION

QuetzSat-1, part of the 45+ satellite fleet of SES, will be located at the 77 degree west orbital location at which the Mexican Government has granted the DTH frequency rights to QuetzSat S. de R.L. de C.V., a Mexican-controlled company comprised of SES and Mexican investors. The spacecraft will provide coverage over Mexico, North America and Central America. The spacecraft is fully contracted to EchoStar Corporation and will be used in part by Dish Mexico, an EchoStar joint venture, for DTH services in Mexico and to a subsidiary of DISH Network for use in connection with its U.S. DTH business.



Mission Overview



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

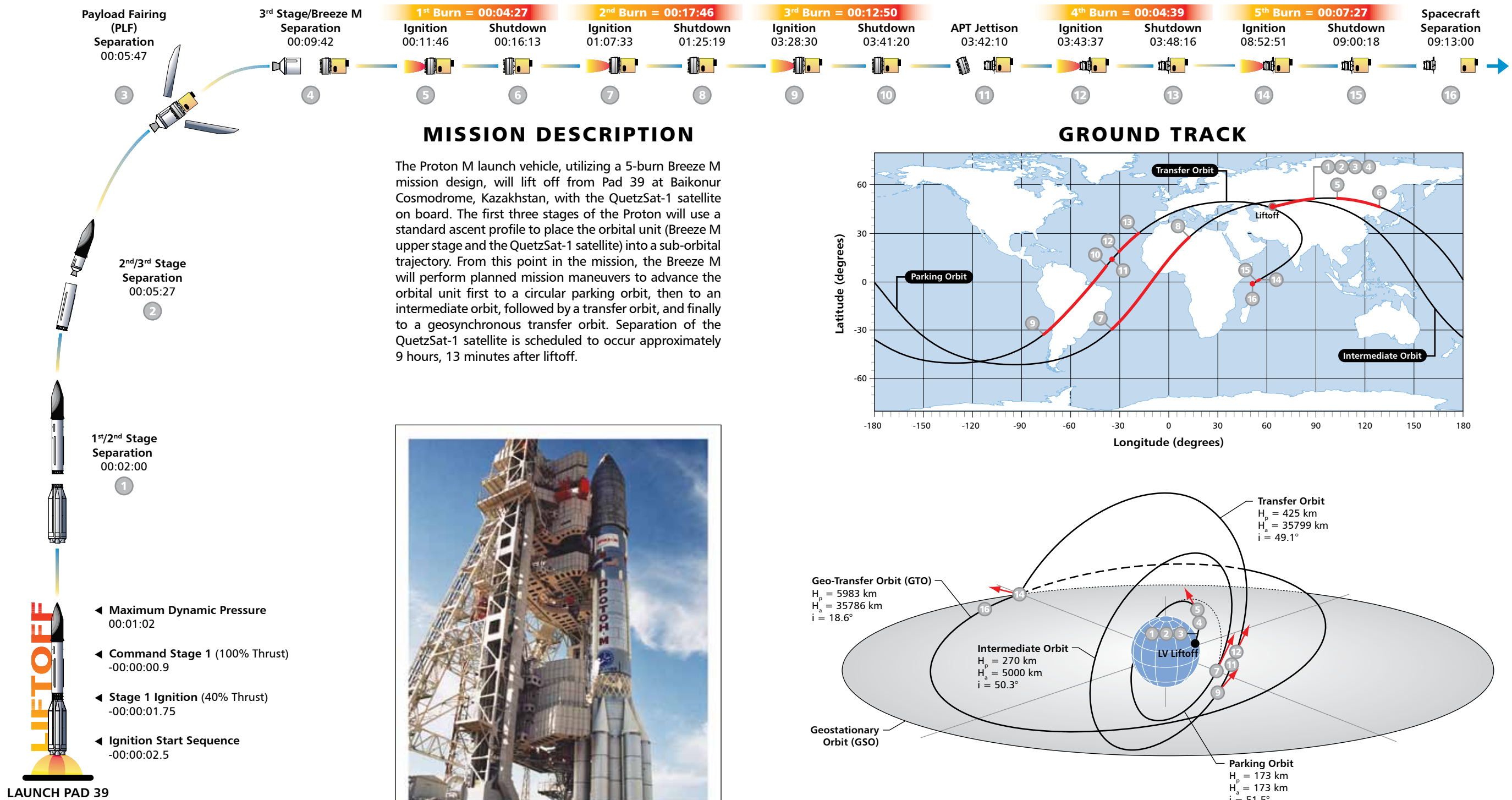


www.ilslaunch.com

QuetzSat-1

- **19th** SES Satellite Launch on ILS Proton
- **18th** Space Systems/Loral Satellite Launch on ILS Proton
- **3rd** ILS Proton Launch in 2011
- **67th** ILS Proton Launch Overall

THE MISSION



ASCENT PROFILE

PROTON ON PAD 39

FLIGHT DESIGN