

TOTAL HEIGHT 58.2 m (191 ft)

GROSS LIFT-OFF WEIGHT 705,000 kg (1,554,000 lb)

0

0

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 fournozzle 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 TURKSAT www.turksat.com.tr

SATELLITE MANUFACTURER MELCO www.mitsubishielectric.com

PLATFORM DS2000

SEPARATED MASS 4924 kg

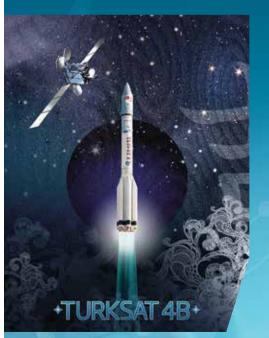
SATELLITE DESIGN LIFETIME 15 Years



SATELLITE MISSION

TURKSAT-4B is a commercial communication satellite built by MELCO. The satellite will provide telecommunication and direct TV broadcasting services over a wide geographic region between west of China and east of England spanning Turkey, as well as Europe, Central Asia, the Middle East and Africa. TURKSAT-4B consists of several band transponders with expected on-orbit Maneuver Life of 30 years. TURKSAT-4B satellite will expand the space capacity of Turkey and provide enhanced performance to its coverage areas. The satellite will provide high flexibility of switchability and connectivity among different service areas to its customers.

Mission Overview

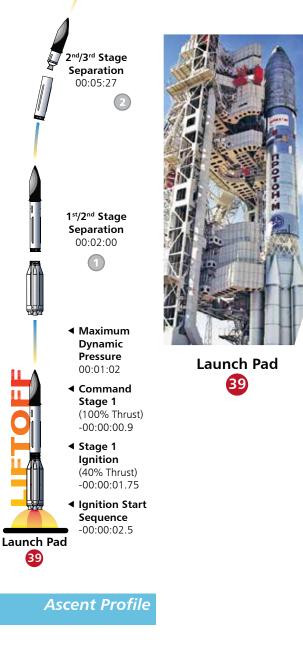


- 4th ILS Proton Launch in 2015
- 91st ILS Proton Launch Overall
- 2nd TURKSAT Satellite Launched on ILS Proton
- 2nd MELCO Satellite Launched on ILS Proton

TURKSAT-4B





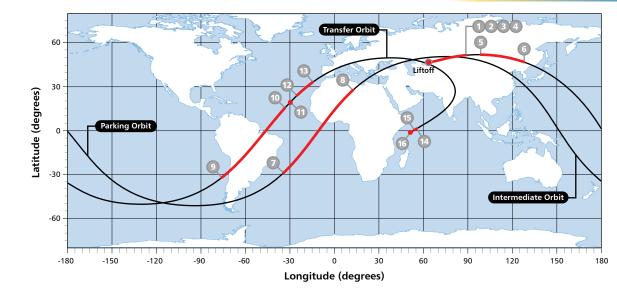


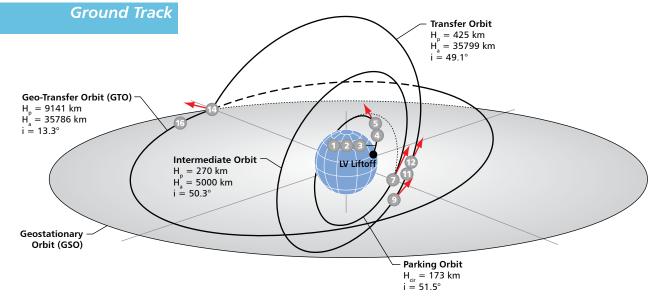
Mission Description

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 TURKSAT-4B 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 TURKSAT-4B 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 TURKSAT-4B satellite is scheduled to occur approximately 9 hours, 13 minutes after liftoff.

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