

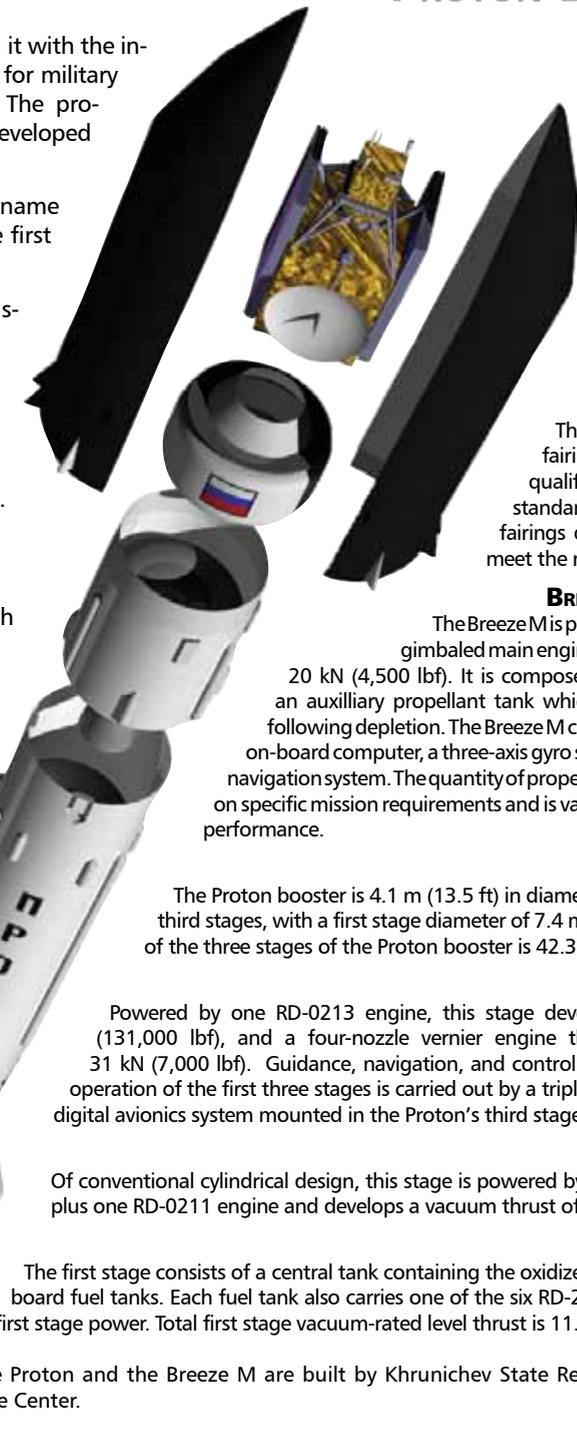
# THE VEHICLE

# THE SATELLITE

## PROTON HISTORY

- Lead designer, Vladimir Chelomei, 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, Astra 1F
- First commercial Proton M Breeze M launch — 30 December 2002, Nimiq-2

## 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.

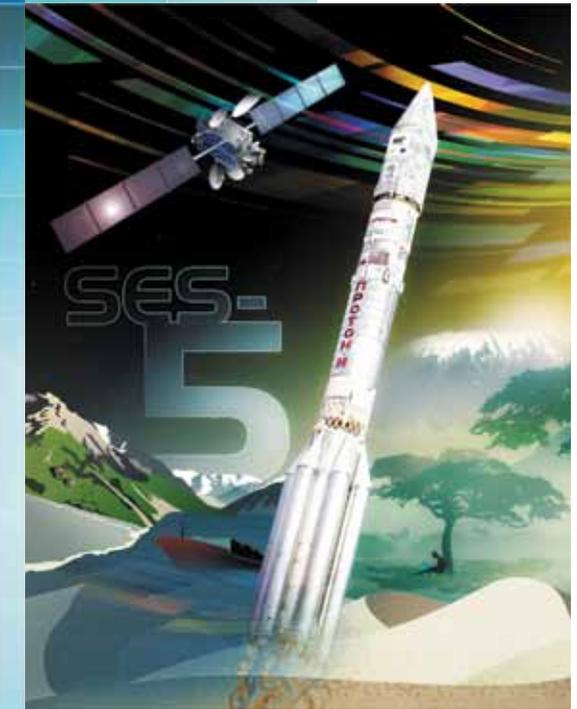
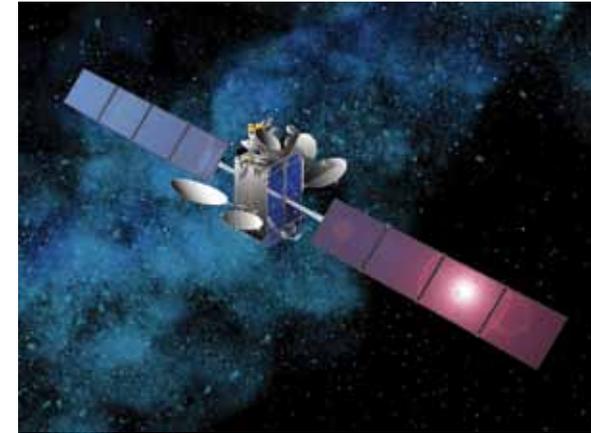
### SECOND STAGE

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 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 OPERATOR

SES  
www.ses.com

### SATELLITE MANUFACTURER

Space Systems/Loral  
www.ssloral.com

### PLATFORM

SS/L 1300

### SEPARATED MASS

6,008 kg

### SATELLITE MISSION LIFETIME

15 Years

### SATELLITE MISSION

SES' high-powered Ku-band beams will bring incremental capacity over Africa, and the Nordic and Baltic countries to support DTH services. Its comprehensive C-band beams cover Africa, the Middle East and Europe to enable services such as GSM backhaul, VSAT applications, maritime communications and video distribution. SES-5 will also carry the first hosted L-band payload for the European Commission's European Geostationary Navigation Overlay Service (EGNOS).

## Mission Overview



Experience ILS: Achieve Your Mission

QUALITY | PERFORMANCE | EXPERIENCE | DEDICATION

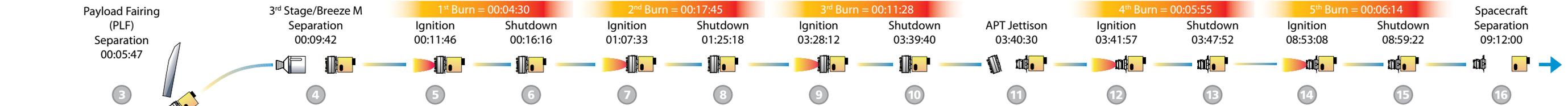


www.ilslaunch.com

## SES-5

- 5th ILS Proton Launch in 2012
- 74th ILS Proton Launch Overall
- 21st SES Satellite Launch on ILS Proton
- 23rd Space Systems/Loral Satellite Launched on ILS Proton

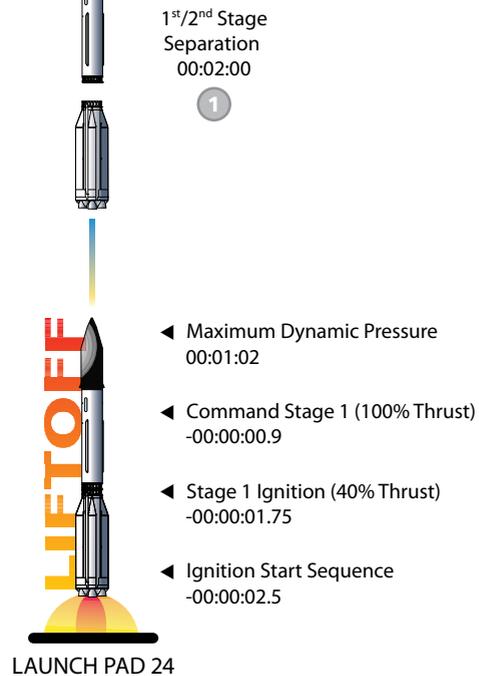
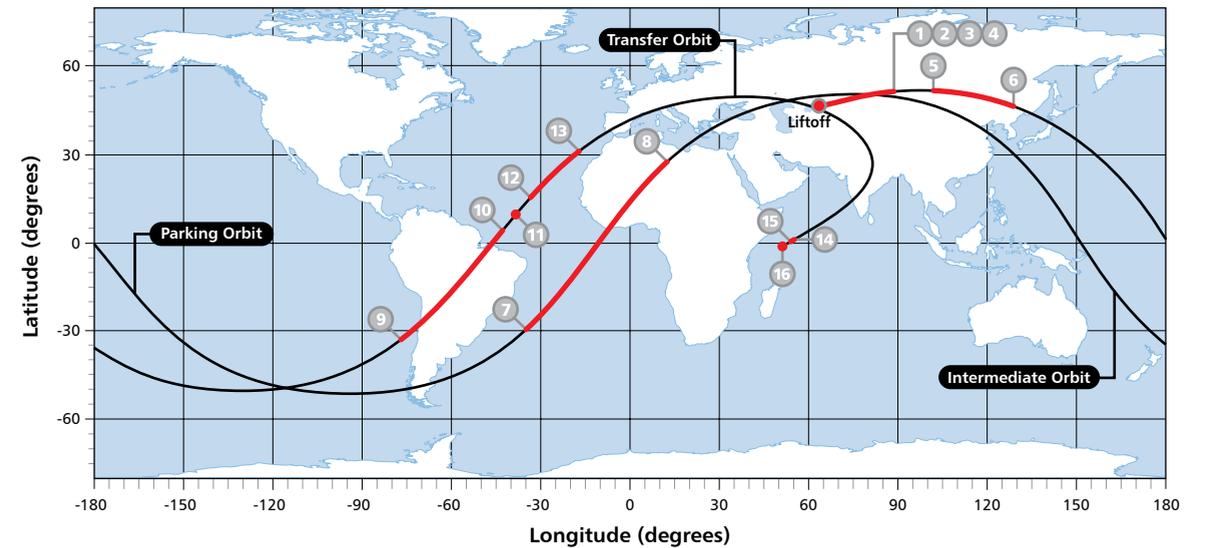
# THE MISSION



## MISSION DESCRIPTION

The Proton M launch vehicle, utilizing a 5-burn Breeze M mission design, will lift off from Pad 24 at Baikonur Cosmodrome, Kazakhstan, with the SES-5 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 SES-5 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 SES-5 satellite is scheduled to occur approximately 9 hours, 12 minutes after lift-off.

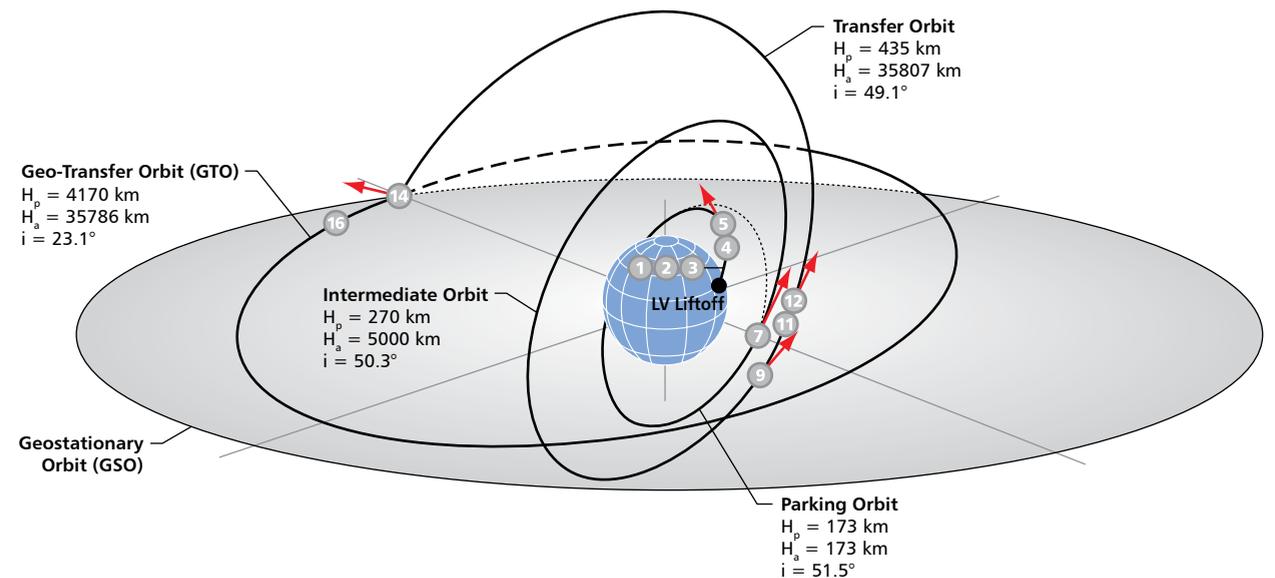
## GROUND TRACK



ASCENT PROFILE



PROTON ON PAD 24



FLIGHT DESIGN