# THE **VEHICLE**

MP

0

0

## 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 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.





# **GROSS LIFTOFF WEIGHT**705,000 kg (1,554,000 lb)

**PROPELLANT**UDMH and N<sub>2</sub>O<sub>4</sub>

#### 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 auxilliary 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

SIRIUS XM Radio www.sirius.com

#### SATELLITE MANUFACTURER

Space Systems/Loral www.ssloral.com

#### **PLATFORM**

LS-1300

#### SEPARATED MASS

5820 kg

#### SATELLITE DESIGN LIFE

15 Years

#### SATELLITE MISSION

SIRIUS XM Radio is America's satellite radio company delivering commercial-free music channels, premier sports, news, talk, entertainment, traffic and weather to millions of subscribers. The SIRIUS XM FM-5 satellite will supplement the existing fleet of SIRIUS satellites with a high-power geostationary satellite that enhances the listening experience. It will ensure SIRIUS XM's array of audio and data services are received robustly by cars and mobile devices, improve the signal delivery to homes, and bolster the continuity of our service for years to come. SIRIUS XM is installed in vehicles of every major automaker and available for sale at retail locations nationwide. SIRIUS XM offers SIRIUS Backseat TV, the first live in-vehicle rear seat entertainment, featuring Nickelodeon, Disney Channel and Cartoon Network, as well as XM NavTraffic® service for GPS navigation systems, delivering real-time traffic information to markets across North America.



## **SIRIUS FM-5**

## MISSION OVERVIEW

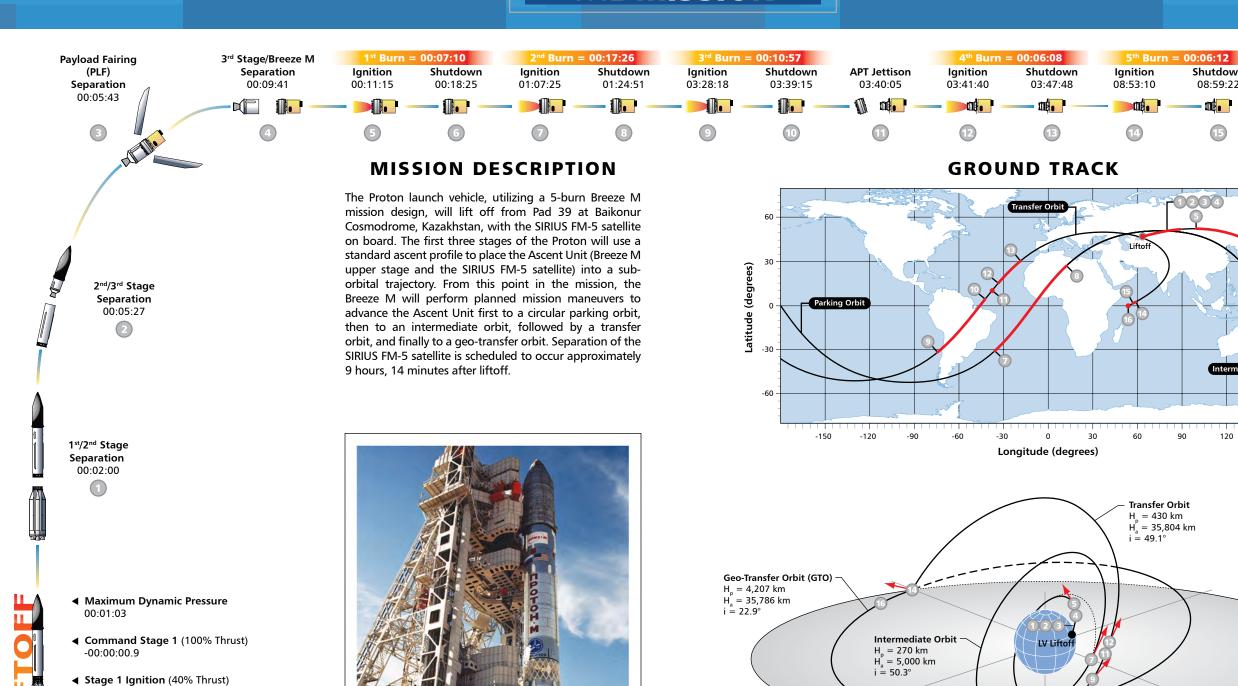
- 5th Proton Launch of 2009 / 3rd ILS Proton
- 52nd Proton Launch for ILS
- 4th SIRIUS XM Satellite Launched on a Proton
- **11th** Space Systems/Loral Satellite Launched on a Proton



# THE **MISSION**

Geostationary

Orbit (GSO)



**ASCENT PROFILE** 

**◄** Ignition Start Sequence

-00:00:01.75

-00:00:02.5

**LAUNCH PAD 39** 

**PROTON ON PAD 39** 

### **ORBIT INSERTION**

Parking Orbit  $H_{cir} = 179 \text{ km}$ 

i = 51.5°

Spacecraft

Separation

09:14:00

Shutdown

08:59:22

Intermediate Orb

150

120