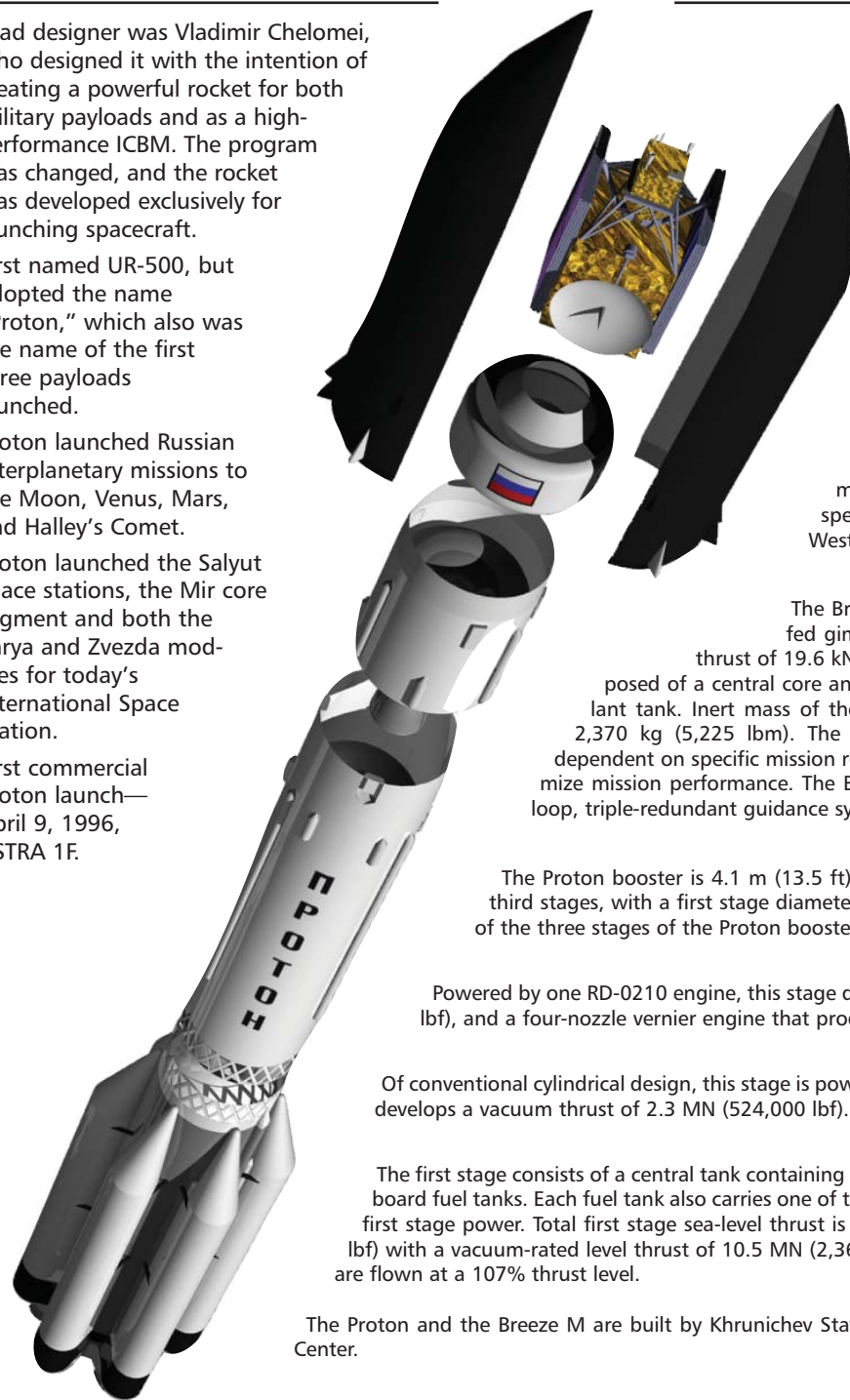


## THE VEHICLE

### PROTON HISTORY

- Lead designer was Vladimir Chelomei, who designed it with the intention of creating a powerful rocket for both military payloads and as 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 and Zvezda modules for today's International Space Station.
- First commercial Proton launch—April 9, 1996, ASTRA 1F.



The Proton and the Breeze M are built by Khrunichev State Research and Production Space Center.

### PROTON DESCRIPTION

**TOTAL HEIGHT**  
56.2 m (184 ft)

**GROSS LIFTOFF WEIGHT**  
691,272 kg  
(1,523,565 lbm)

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

**INITIAL LAUNCH**  
July 16, 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 Western customers.

#### BREEZE M UPPER STAGE

The Breeze M is powered by one pumped gimbaled main engine that develops thrust of 19.6 kN (4,400 lbf). The Breeze M is composed of a central core and a jettisonable additional propellant tank. Inert mass of the stage at liftoff is approximately 2,370 kg (5,225 lbm). The quantity of propellant carried is dependent on specific mission requirements and is varied to maximize mission performance. The Breeze M is controlled by a closed loop, triple-redundant guidance system.

#### 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-0210 engine, this stage develops thrust of 583 kN (131,000 lbf), and a four-nozzle vernier engine that produces thrust of 31 kN (6,900 lbf).

#### Second Stage

Of conventional cylindrical design, this stage is powered by four RD-0210 engines and develops a vacuum thrust of 2.3 MN (524,000 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-275 engines that provide first stage power. Total first stage sea-level thrust is approximately 9.5 MN (2,140,000 lbf) with a vacuum-rated level thrust of 10.5 MN (2,360,000 lbf). The first stage engines are flown at a 107% thrust level.

## THE SATELLITE



#### SATELLITE OPERATOR

JSAT Corporation  
[www.jsat.net/en](http://www.jsat.net/en)

#### SATELLITE MANUFACTURER

Lockheed Martin Commercial Space Systems  
[www.lmcommercialspace.com](http://www.lmcommercialspace.com)

#### PLATFORM

A2100AX

#### SEPARATED MASS

Approx. 4.0 ton

#### DESIGN LIFE

15 years

#### MISSION

JCSAT-11 is a high-power hybrid satellite consisting of 30 active Ku-band transponders and 12 active C-band transponders that will provide coverage to Japan, Oceania, the Asia-Pacific region and Hawaii. JCSAT-11, designed for a minimum service life of 15 years, will serve as an in-orbit backup satellite for other JSAT satellites.



[www.ilslaunch.com](http://www.ilslaunch.com)



## JCSAT-11

### MISSION OVERVIEW

- 3rd ILS Proton launch in 2007
- 1st Proton launch for Japanese customer
- 327th Proton launch
- 9th launch of A2100 model

# THE MISSION

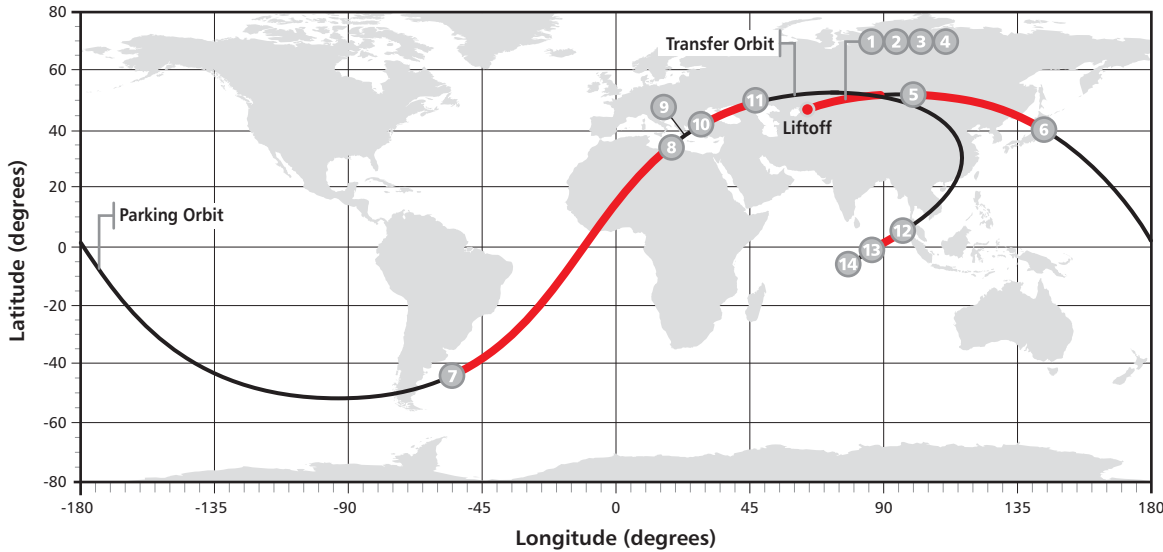
The Proton Breeze M launch vehicle, utilizing a 4-burn Breeze M mission design, will lift off from Pad 39 at the Baikonur Cosmodrome, Kazakhstan, with the **JCSAT-11** satellite on board. The first three stages of the Proton will use a standard ascent trajectory to place the Breeze M fourth stage and the **JCSAT-11** satellite into a suborbital trajectory, from which the Breeze M will place itself and the spacecraft into a circular parking orbit. Once **JCSAT-11** is in the parking orbit, it will be propelled into its transfer orbit by a series of additional burns of the Breeze M. Separation occurs approximately 6 hours, 55 minutes and 50 seconds after liftoff.

## COUNTDOWN AND FLIGHT EVENTS SUMMARY

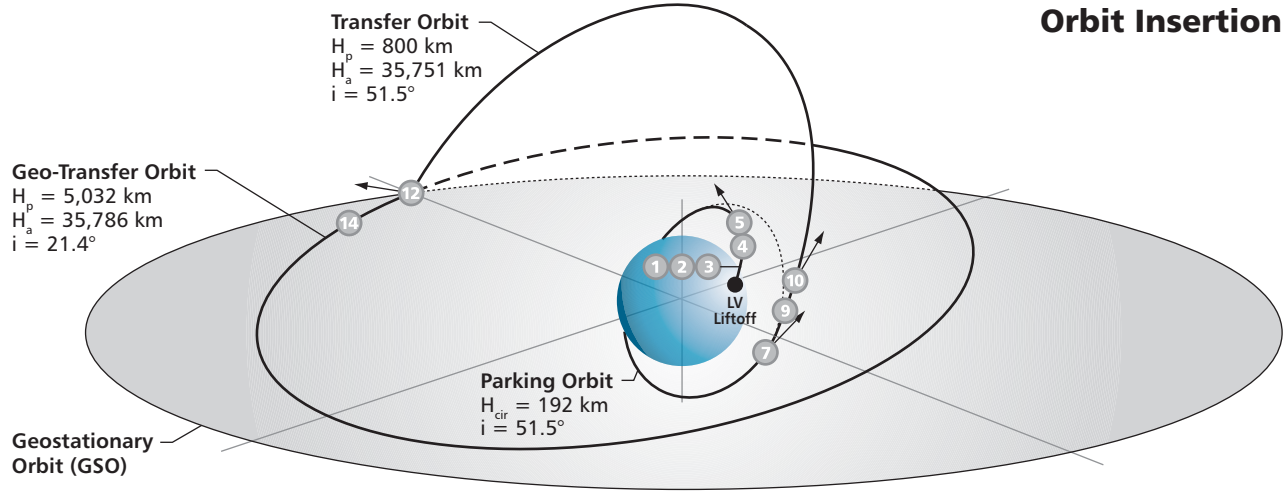
EVENT	HR:MIN:SEC
Ignition Sequence Start	...00:00:02.5
Stage One Ignition, 40 Percent Thrust	...00:00:01.6
Command Stage One Thrust to 100 Percent	...00:00:00.9
<b>Liftoff</b>	<b>...00:00:00.0</b>
Maximum Dynamic Pressure	...00:01:06
1 Stage One/Two Separation	...00:02:08
2 Stage Two/Three Separation	...00:05:40
3 Payload Fairing Jettison	...00:05:54
4 Stage Three Separation from Breeze M Upper Stage	...00:09:53
5 Breeze M First Burn Ignition	...00:11:28
6 Breeze M First Burn Shutdown	...00:20:05
7 Breeze M Second Burn Ignition	...01:02:22
8 Breeze M Second Burn Shutdown	...01:29:48
9 Additional Propellant Tank (APT) Jettison	...01:30:38
10 Breeze M Third Burn Ignition	...01:32:03
11 Breeze M Third Burn Shutdown	...01:37:41
12 Breeze M Fourth Burn Ignition	...06:36:50
13 Breeze M Fourth Burn Shutdown	...06:42:44
14 Breeze M/Spacecraft Separation	...06:55:50



Ascent Ground Track



Orbit Insertion



Note: All orbit altitudes are given relative to Earth radius of R<sub>E</sub> = 6,378 km.

Ascent Profile

