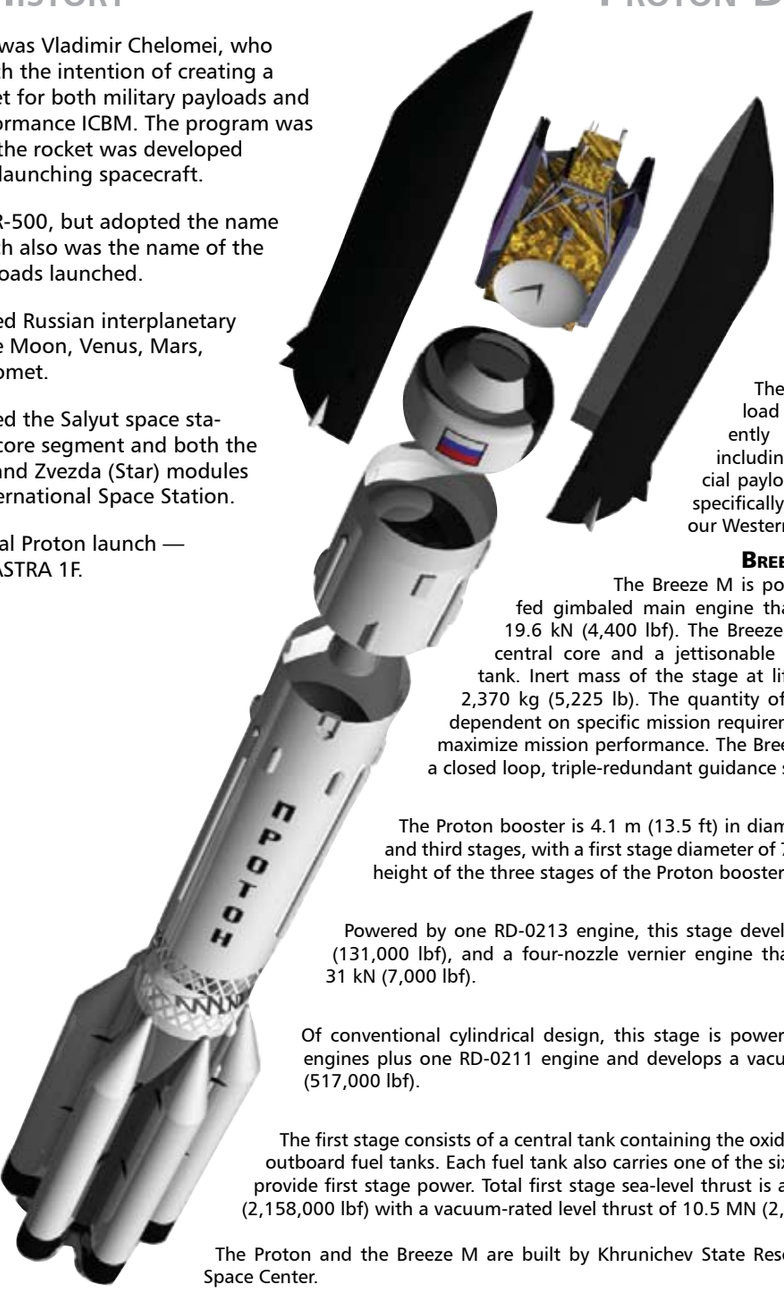
THE VEHICLE

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 (Dawn) and Zvezda (Star) modules for today's International Space Station.
- First commercial Proton launch — 9 April 1996, ASTRA 1F.



Proton Description

Total Height
58.2 m (191 ft)

Gross Liftoff Weight
702,000 kg
(1,547,000 lb)

Propellant
UDMH and N_2O_4

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 Western customers.

Breeze M Upper Stage
The Breeze M is powered by one pump-fed 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 lb). 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 7.3 m (24.0 ft). Overall height of the three stages of the Proton booster is 42.3 m (138.8 ft).

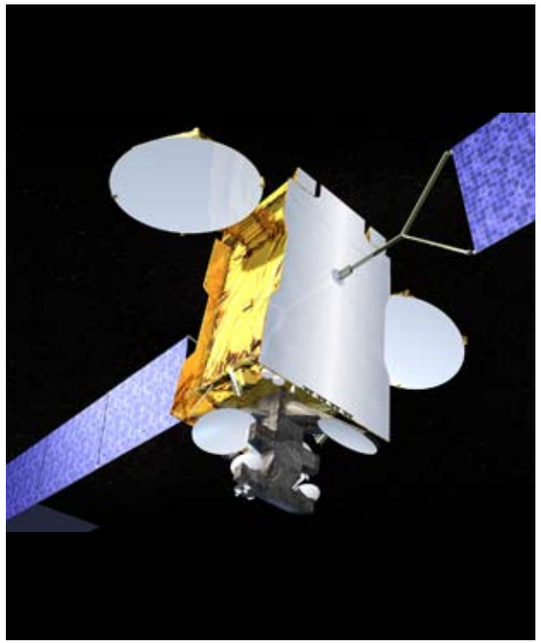
Third Stage
Powered by one RD-0213 engine, this stage develops thrust of 583 kN (131,000 lbf), and a four-nozzle vernier engine that produces thrust of 31 kN (7,000 lbf).

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 2.3 MN (517,000 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 9.6 MN (2,158,000 lbf) with a vacuum-rated level thrust of 10.5 MN (2,360,000 lbf).

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

THE SATELLITE



Satellite Operator
Telesat
www.telesat.com

Satellite Manufacturer
EADS Astrium
www.astrium.eads.net

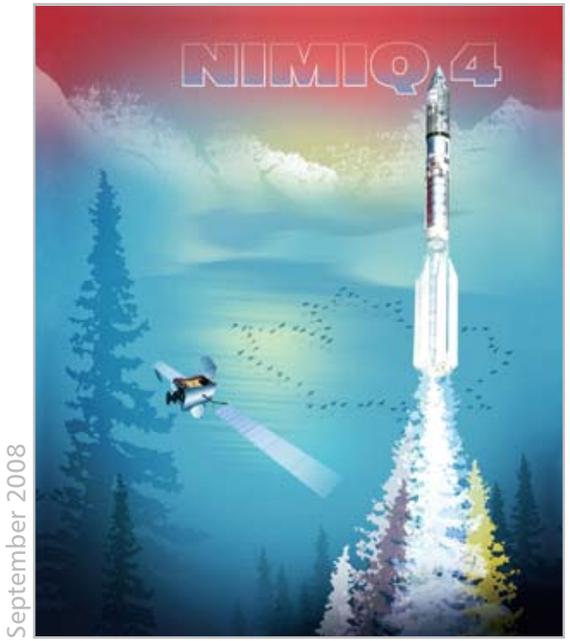
Platform
Eurostar E3000

Separated Mass
4,850 kg

Satellite Design Life
15+ Years

Mission
Nimiq 4 is a commercial communications satellite built by EADS Astrium. The satellite has two payloads for Canadian broadcast services. The main payload has 32 Ku-band channels providing specialty television and foreign language programming. The second, smaller payload has 8 Ka-band channels spread over six beams covering Canada for advanced services such as high-definition television. The satellite will be located at 82° West longitude. Nimiq satellites are dedicated to the provision of direct-to-home services for Bell TV.

ILS
www.ilslaunch.com



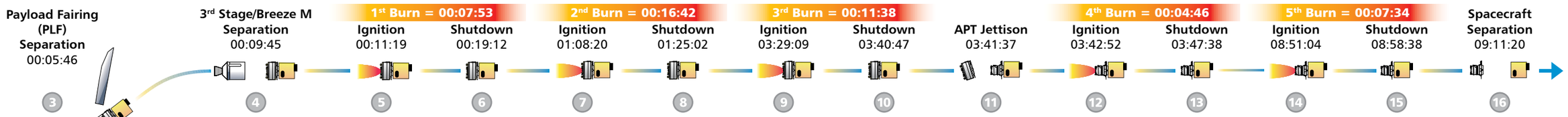
September 2008

Nimiq 4

Mission Overview

- **4th** ILS launch of 2008
- **47th** Proton launch for ILS
- **10th** Eurostar satellite launched on Proton
- **5th** Telesat satellite launched with ILS Proton

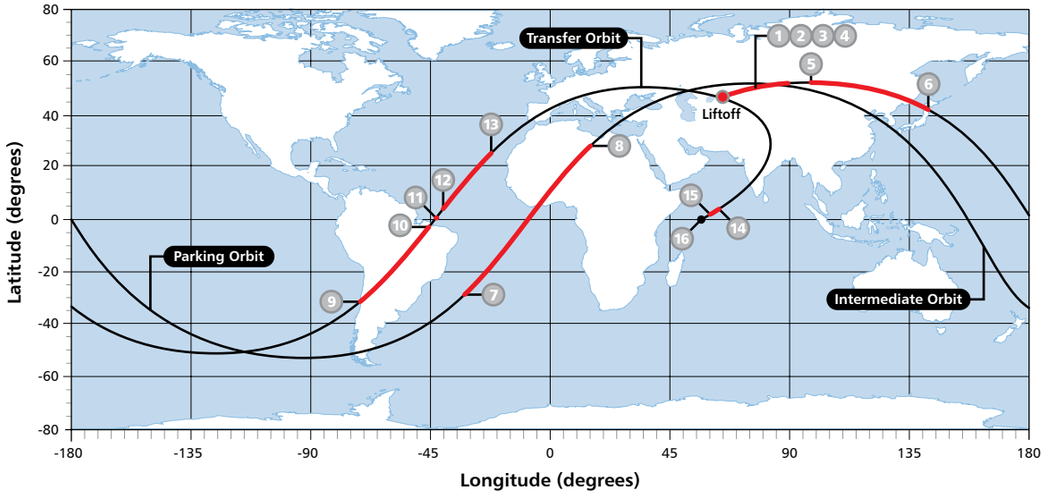
THE **MISSION**

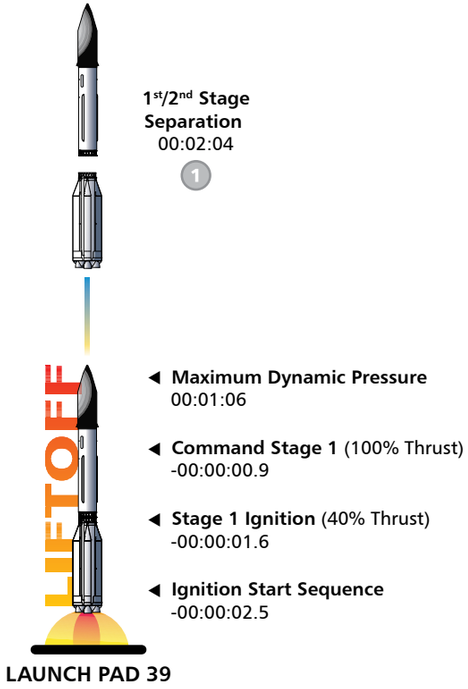


MISSION DESCRIPTION

The Proton Breeze M launch vehicle, utilizing a standard 5-burn mission profile, will lift off from Launch Pad 39 (within Launch Complex 200) at the Baikonur Cosmodrome, Kazakhstan, with the Nimiq 4 satellite on board. The first three stages of the Proton will use a standard ascent profile to place the Ascent Unit (Breeze M upper stage and the Nimiq 4 satellite) into a sub-orbital trajectory. From this point in the mission, the Breeze M will perform planned mission maneuvers to advance the Ascent Unit first to a circular parking orbit, then to an intermediate orbit, followed by a transfer orbit, and finally to geo-transfer orbit. Separation of the Nimiq 4 satellite is scheduled to occur approximately 9 hours, 11 minutes after liftoff.

GROUND TRACK

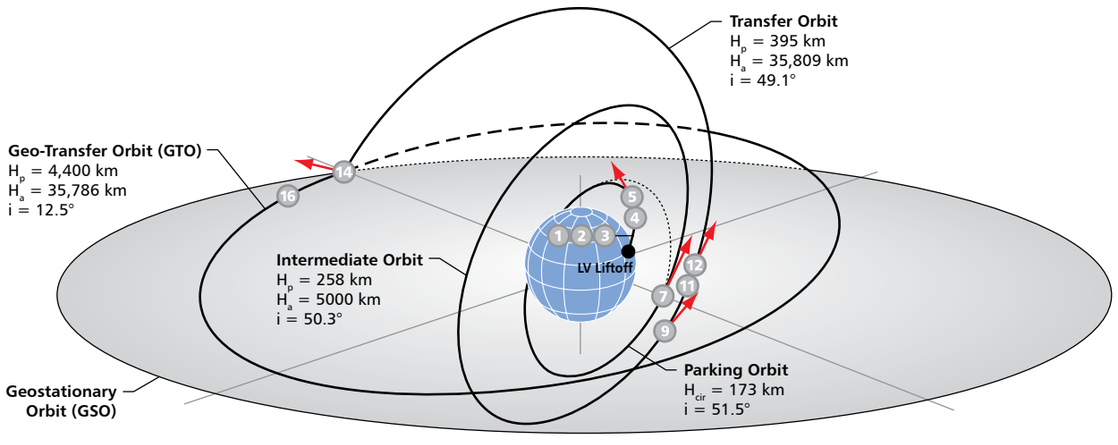




ASCENT PROFILE



PROTON M ON PAD 39



ORBIT INSERTION