



SOYUZ TO LAUNCH GLOBALSTAR

Starsem's current mission will launch four satellites for Globalstar, a leading provider of mobile satellite voice and data services. These four satellites, together with four satellites successfully launched by Starsem on May 30, 2007, will be used to augment the company's current first-generation LEO (low earth orbit) satellite constellation.

Between February and November 1999, Starsem successfully launched twenty four Globalstar satellites, one half of the original constellation, using six Soyuz launch vehicles. Globalstar has once again reaffirmed its confidence in Starsem with these two 2007 launches to inject the four 450 kilograms satellites into a circular phasing orbit at an altitude of 920 km and at an orbital inclination of 52 degrees.





MISSION DESCRIPTION

The Globalstar launch will be performed from the Baikonur Cosmodrome, Launch Pad #6.

The launch will occur on Saturday, **October 20, 2007, at 08:12 p.m. UTC:**

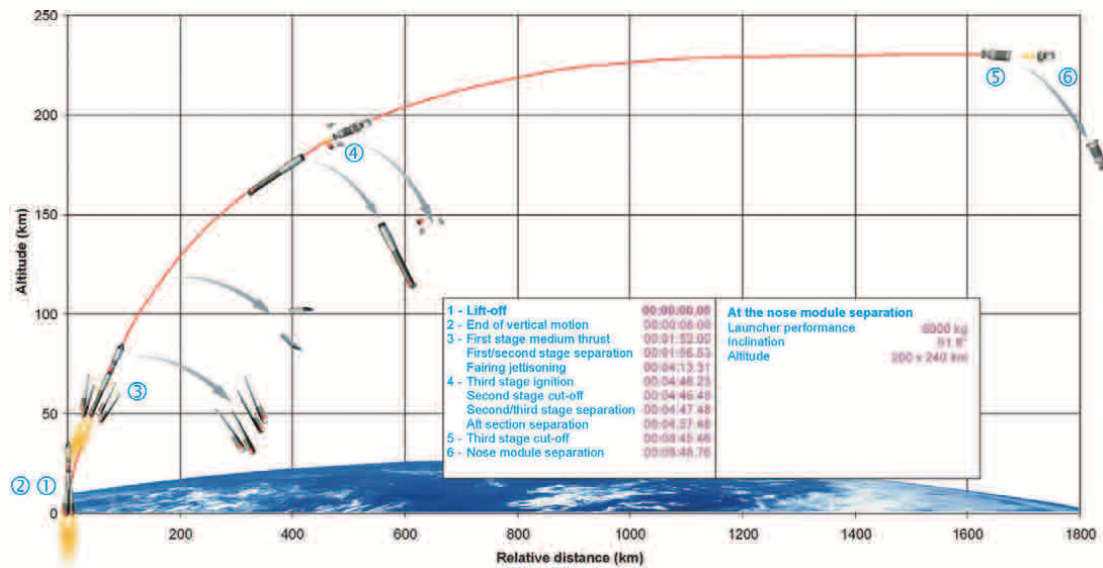
02:12 a.m. Baikonur time (Sunday, October 21)

00:12 a.m. Moscow time (Sunday, October 21)

10:12 p.m. Paris time (Saturday, October 20)

01:12 p.m. Pacific Daylight Time (Saturday, October 20)

The launch window : ± 1 sec



The Launch Vehicle Flight at a Glance

After lift-off from the Baikonur Cosmodrome, the flight of the three lower stages of the Soyuz launch vehicle will last for 8 minutes and 48 seconds. At this time, the Soyuz third stage will separate from the nose module, consisting of the Fregat upper stage, the satellite dispenser and the four Globalstar satellites. The three lower Soyuz stages will fall back to Earth.

The Fregat upper stage will then fire its own engine, taking the nose module into a transfer orbit above the Earth. After this first burn, the Fregat will perform a barbecue maneuver to maintain proper thermal conditions for the Globalstar spacecraft during the following coast phase, which lasts for about 50 minutes.

At the correct point on this orbit, Fregat will fire again, to reach the circular separation orbit. Following stabilization, the four satellites will be released from the dispenser. The separation of the upper-mounted satellite will occur first 2 minutes 30 seconds later, the lower three circumferential-mounted satellites will be separated simultaneously.

The target orbital parameters at separation are:

Semi Major Axis: 7298.1 km

Orbit inclination: 52.00 °

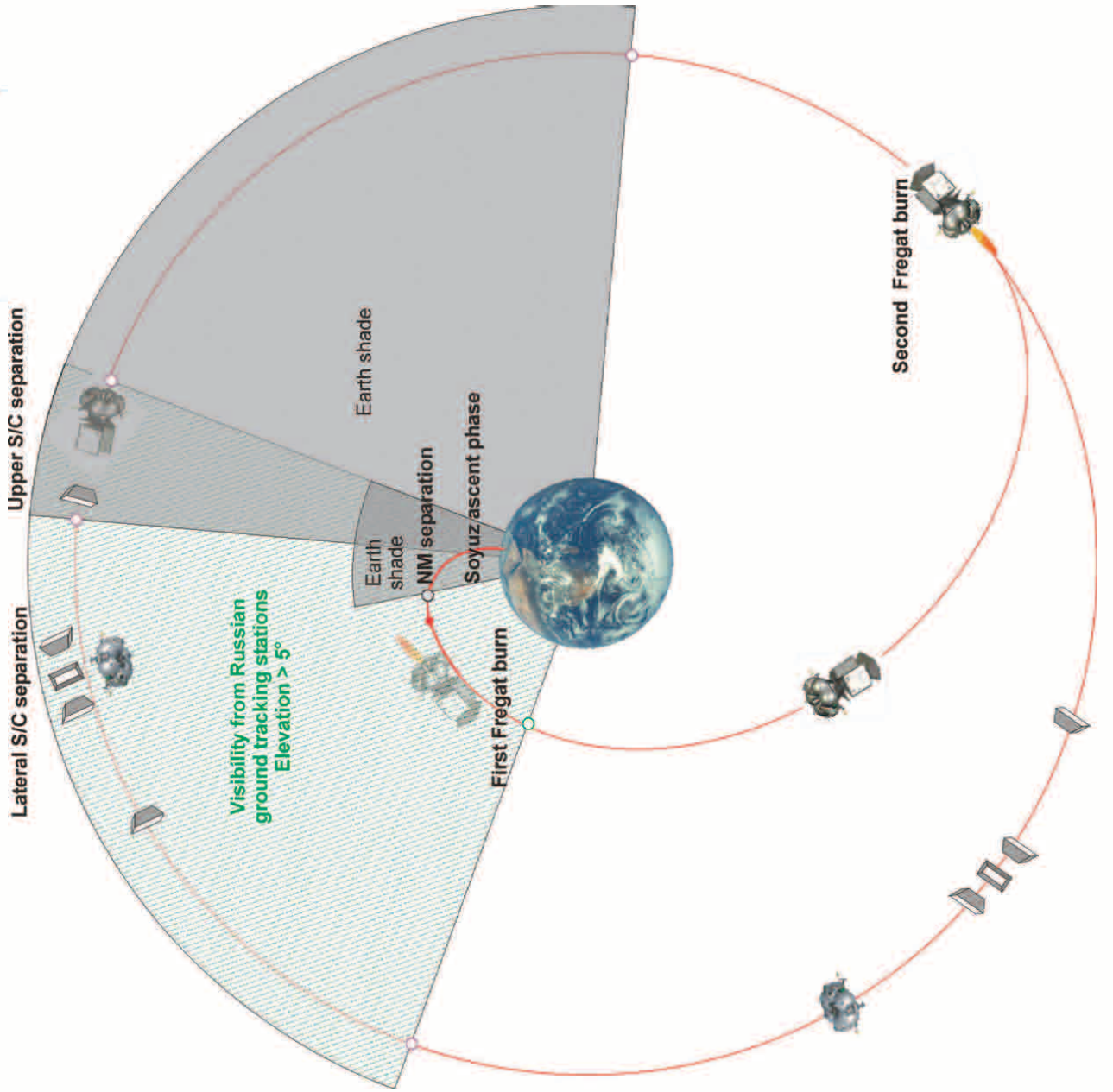
Eccentricity: 0.000

Mission Duration:

The nominal mission duration (from lift-off to spacecraft separation) is 1 hour, 42 minutes, 3 seconds.



PROFILE OF THE GLOBALSTAR INJECTION MISSION



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SOYUZ LAUNCH VEHICLE

The Soyuz launch vehicle family has provided reliable and efficient launch services since the birth of the space program. Vehicles in this family, which launched both the first satellite and first man into space, have been credited with more than 1725 launches to this date. Today, this vehicle is used for manned and unmanned flights to the International Space Station and commercial launches managed by Starsem.

The Soyuz configuration introduced in 1966 has been the workhorse of the Soviet/Russian space program. As the only manned launch vehicle in Russia and in the former Soviet Union, the Soyuz benefits from very high standards in both reliability and robustness.

In 1999, Soyuz allowed Starsem to launch 24 satellites of the Globalstar constellation in 6 launches. Following this success, Starsem introduced the flexible, restartable Fregat upper stage, thus opening up a full range of missions (LEO, SSO, MEO, GTO, GEO and escape).

The inaugural flight of the Soyuz 2-1a launch vehicle performed on November 8, 2004 from the Plessetsk Cosmodrome represents a major step in the launch vehicle evolution program. This modernized version of Soyuz, which was also used to successfully launch MetOp-A on October 19, 2006, implements a digital control system providing additional mission flexibility and will enable control of the launch vehicle with the 4.1 m ST fairing. It represents a necessary milestone towards the next generation evolved Soyuz 2-1b launcher as the latest step in a cooperative European/Russian evolution program. In addition to the 2-1a version's features, it utilizes the more powerful third stage engine, significantly increasing the overall launch vehicle performance.

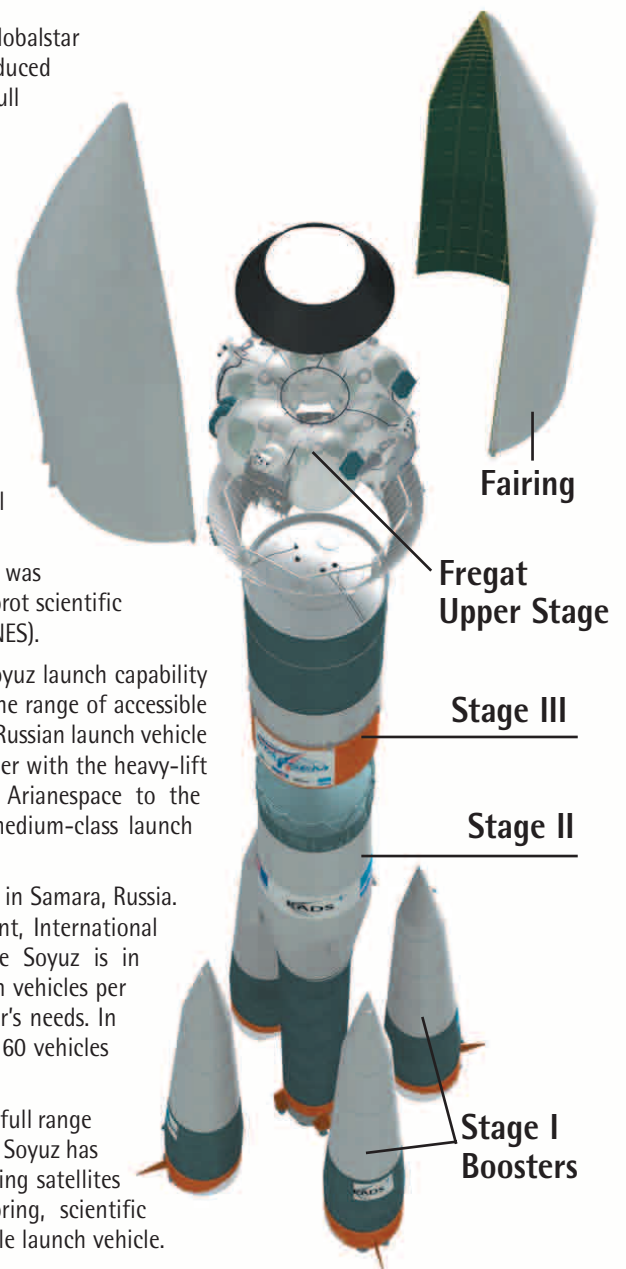
The inaugural flight of the upgraded Soyuz 2-1b launch vehicle was successfully performed on December 27, 2006, launching the Corot scientific spacecraft for the French Centre National d'Etudes Spatiales (CNES).

The decision of the European Space Agency to introduce the Soyuz launch capability at the Guiana Space Center (CSG) is a major step in widening the range of accessible missions. With the introduction of the Soyuz at CSG, this famed Russian launch vehicle becomes an integral part of the European launcher fleet, together with the heavy-lift Ariane 5 and the light Vega. To be offered exclusively by Arianespace to the commercial market, the Soyuz at CSG is Europe's reference medium-class launch vehicle for governmental and commercial missions.

The Samara Space Center continues to mass-produce the Soyuz in Samara, Russia. As a result of continued demand from the Russian government, International Space Station activity, and Starsem's commercial orders, the Soyuz is in uninterrupted production at an average rate of 10 to 15 launch vehicles per year with a capability to rapidly scale up to accommodate user's needs. In fact, peak production of the Soyuz in the early 1980's reached 60 vehicles per year.

The Soyuz is a reliable, efficient, and cost effective solution for a full range of missions from LEO to Mars. In its unequalled flight history, the Soyuz has already performed almost every mission profile, including orbiting satellites for telecommunications, Earth observation, weather monitoring, scientific missions and manned flights. It is a highly responsive and flexible launch vehicle.

The Soyuz currently offered by Starsem is a four-stage launch vehicle. The vehicle consists of four boosters (first stage), a central core (second stage), a third stage, and the restartable Fregat upper stage (fourth stage). Each vehicle also includes a payload adapter/dispenser and fairing.





THE BOOSTERS (FIRST STAGE)

The four boosters are assembled around the central core and are tapered cylinders with the oxidizer tank in the tapered portion and the kerosene tank in the cylindrical portion. The booster's RD-107A engines are powered by liquid oxygen and kerosene, the same propellants which are used on each of the lower three stages. Each engine has four combustion chambers and nozzles. Three-axis flight control is carried out by aerofins (one per booster) and movable vernier thrusters (two per booster). Following lift-off, the boosters burn for 118 seconds and are then discarded. The separation time is determined by comparing the velocity with a predefined value. Thrust is transferred through a ball joint located at the top of the cone-shaped structure of the booster, which is attached to the central core by two rear struts.



CENTRAL CORE (SECOND STAGE)

The central core is similar in construction to the four boosters, with a hammer-head shape to accommodate the boosters. A stiffening ring is located at the interface between the boosters and the core. This stage has a RD-108A engine with four combustion chambers and nozzles and four vernier thrusters. The verniers are used for three-axis flight control once the boosters have separated. The core stage nominally burns for 286 seconds. Ignition of the central core and boosters occurs at an intermediate level of thrust on the launch pad 20 seconds before lift-off in order to monitor engine health parameters before the engines are throttled up and the vehicle leaves the pad.



THIRD STAGE

The third stage is linked to the central core by a lattice-work structure. Ignition of the third stage's main engine occurs approximately 2 seconds before shutdown of the central core. The third stage engine's thrust directly separates the stage from the central core. In between the oxidizer and fuel tanks is an intermediate bay where avionics systems are located. This stage uses a RD-0110 engine with four combustion chambers and nozzles. Four vernier nozzles provide three-axis flight control. The third stage engine nominally burns for 240 seconds. After engine cut-off and separation of the fourth stage, the third stage performs an avoidance maneuver by opening an outgassing valve in the liquid oxygen tank.



FREGAT UPPER STAGE (FOURTH STAGE)

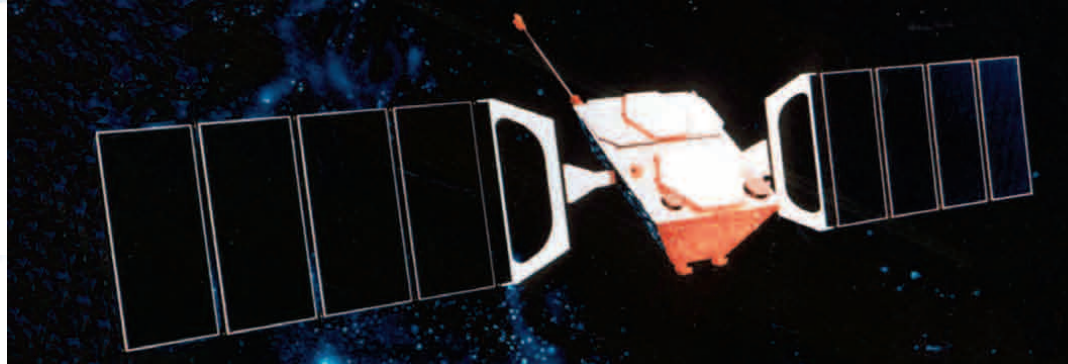
Flight qualified in 2000, the Fregat upper stage is an autonomous and flexible upper stage that is designed to operate as an orbital vehicle. It extends the capability of the lower three stages of the Soyuz vehicle to provide access to a full range of orbits (LEO, SSO, MEO, GTO, GEO and escape). In order to provide the Fregat with high initial reliability, several flight-proven subsystems and components from previous spacecraft and rockets are incorporated into the upper stage. The upper stage consists of 6 spherical tanks (4 for propellants, 2 for avionics) arrayed in a circle, with trusses passing through the tanks to provide structural support. The stage is independent from the lower three stages, having its own guidance, navigation, control, tracking, and telemetry systems. The stage uses storable propellants (UDMH/NTO) and can be restarted up to 20 times in flight, thus enabling it to carry out complex mission profiles. It can provide the customer with 3-axis stabilization or spin-up of their spacecraft.

PAYLOAD ACCOMMODATION

The current Soyuz flies the S-type fairing, with external diameter of 3.7 m and a length of 7.7 m. The Fregat upper stage is encapsulated in the fairing with the payload and a payload adapter/dispenser. Starsem has already developed a series of adapters and dispensers, which may be used directly by the customer.



THE GLOBALSTAR SPACECRAFT



Each first-generation Globalstar satellite, designed by Space Systems/Loral, is a three-axis stabilized spacecraft consisting of a trapezoidal main body, two solar arrays, and a boom-mounted magnetometer. Mass of the satellite is approximately 450 kilograms.

These four satellites, together with four additional satellites successfully launched by Starsem on May 30, 2007, will be used to augment the company's current first-generation LEO (low earth orbit) satellite constellation. The Globalstar constellation experience indicates these first generation spacecraft will operate beyond their 7.5-year engineered design life. Therefore the satellites can also be used to initially integrate into the Globalstar second-generation satellite constellation, which is scheduled for delivery beginning in the summer of 2009.

The satellite's trapezoidal body is fabricated from rigid aluminum honeycomb. The trapezoidal shape was selected to conserve volume and to allow the mounting of multiple satellites under the launch vehicle's payload fairing.

The satellite operates in a body-stabilized, three-axis attitude control mode and uses sun sensors, Earth sensors, and a magnetic sensor to help maintain attitude. The satellite contains momentum wheels and magnetic torquers to minimize propellant consumption for attitude control, and utilizes five thrusters for orbit-raising, station-keeping maneuvers and attitude control. The spacecraft's mono-propellant hydrazine thrusters are fueled from a single on-board propellant tank, sufficient to keep the satellite in its proper orbit for the full lifetime.

Solar arrays provide the primary source of power for the Globalstar spacecraft, while batteries are used during eclipses and peak traffic periods. The solar panels provide the satellite with 1,100 watts of power, and they automatically track the sun as the satellite orbits the Earth, providing the maximum possible exposure to the sun's energy.

The heart of a Globalstar satellite is its communications systems. These systems are mounted on the Earth deck, which is the larger of the two rectangular faces on the satellite's body. There are C-band antennas for communications with Globalstar gateways, and L- and S-band antennas for communications with user terminals. These antennas are of a phased array design that projects a pattern of 16 spot beams on the Earth's surface, covering a service area, or "footprint", of several thousand kilometers in diameter.

About Globalstar, Inc.

With over 250,000 activated satellite voice and data units, Globalstar offers satellite services to commercial and recreational users in more than 120 countries around the world. The Company's voice and data products include mobile and fixed satellite telephones, simplex and duplex satellite data modems and flexible service packages. Many land based and maritime industries benefit from Globalstar with increased productivity from remote areas beyond cellular and landline service. Global customer segments include: oil and gas, government, mining, forestry, commercial fishing, utilities, military, transportation, heavy construction, emergency preparedness, and business continuity as well as individual recreational users. Globalstar data solutions are ideal for various asset tracking, data monitoring and SCADA applications.

For more information regarding Globalstar, please visit Globalstar's web site at www.globalstar.com

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LAUNCH CAMPAIGN

After the completion of AIT testing at Thales Alenia Space in Rome, the Globalstar replacement satellites arrived at the Baikonur airport and the launch campaign began. Activities in Baikonur during the first several weeks of the launch campaign included preparation of the satellites in the PPF followed by filling and mounting to the dispenser in the HPF. The four satellites, on the dispenser, were then mated to the Fregat upper stage and together encapsulated under the fairing, comprising the Upper Composite.

The key events of the Globalstar Launch Campaign in the final days and moments prior to launch proceed as follows (L = lift-off):



L-8 days:

Upper composite (satellites + dispenser + Fregat + fairing) is transferred to assembly facility near the launch pad where it is mated to the third stage of the launch vehicle

L-4 days:

The Transfer Readiness Review ensures the Soyuz and its payload are ready for final launch pad activity and launch

L-3 days:

The fully assembled launch vehicle is transferred to the pad and erected in the vertical position. Check out and countdown rehearsal for the lower 3 stages of the vehicle takes place

L-2 days:

Countdown rehearsal for the customer's spacecraft and the Fregat upper stage

L-10 hours:

Final countdown begins. Systems checks on Soyuz begin

L-5 hours:

Systems checks begin on Fregat upper stage

L-4 h20m:

Launch vehicle fueling authorization review

L-4 hours:

Launch vehicle fueling begins

L-30 minutes:

Removal of service platform

L-2m35s:

Pressurization of propellant tanks

L-45 seconds:

Transfer to on-board power supply

L-20 seconds:

Ignition of booster and core engines at intermediate thrust level

L:

Lift-off !

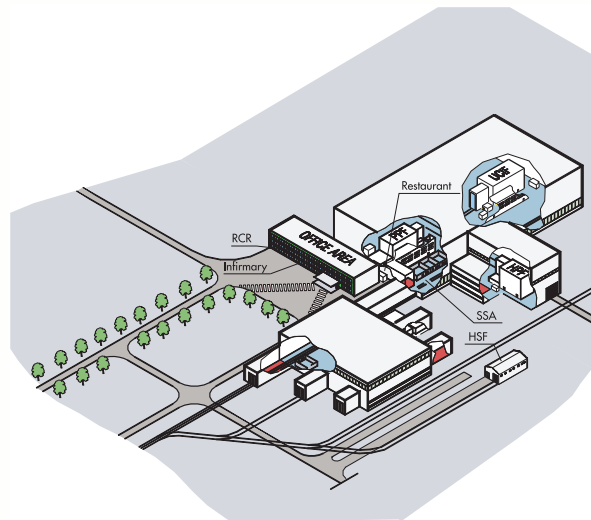


STARSEM BAIKONUR FACILITIES

Starsem has adapted, modified, developed, and built dedicated facilities at the Baikonur Cosmodrome which allow its customers to access to state-of-the-art facilities for their launch campaign. Central to these facilities are the three class 100,000 clean rooms used for the complete integration checkout, test, and fueling of customer's spacecraft.

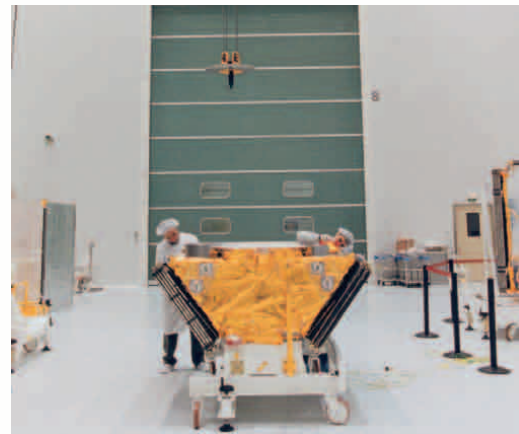
SITE 112

Starsem's facilities are located primarily in two areas of the Cosmodrome: Site 112 and Site 31. Site 112 is the location of the assembly and integration facility for the former Energia launch vehicle. This facility (MIK 112) houses Starsem's dedicated clean rooms and is the location where customer's spacecraft are prepared, fueled, and eventually mated to the Fregat upper stage and encapsulated in the fairing. Customer's offices are also located in this facility. Built in 1998, Starsem's 1158-m² of Class 100 000 clean rooms ensure customers with international standard facilities for the preparation of their spacecraft. This allows customers to have their spacecraft in a controlled environment from spacecraft unpacking through encapsulation. Portable and fixed ventilation systems ensure the thermal conditions of the spacecraft until launch. Failsafe backup power supplies are available in all clean rooms to protect sensitive hardware during processing activities. Dedicated networks allow voice and data exchange between the clean rooms and other facilities. An independent, redundant satellite communications system provides high data rate connections between customers and their home base.



THE PAYLOAD PROCESSING FACILITY (PPF)

The PPF features a 286 m² high bay for the processing of customer's spacecraft. This facility has two independent 70 m² control rooms to permit parallel operations and personnel and equipment airlocks to ensure the integrity of conditions in the processing area.



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THE HAZARDOUS PROCESSING FACILITY (HPF)

The HPF high bay covers a surface of 285 m², and is designed for spacecraft filling activities and pressurization of tanks. The HPF is designed to accommodate bipropellant spacecraft (e.g. MMH/N2O4). The facility has airlocks and an on-site control room. A remote control room in the customer office area with a dedicated data transmission system, intercoms, and video monitors ensures maximum safety for customer's launch teams. Spacecraft propellants are stored in the controlled and monitored Hazardous Storage Facility, located next to MIK 112.



THE UPPER COMPOSITE INTEGRATION FACILITY (UCIF)

Spacecraft mating with the Fregat upper stage is performed in this 587 m² high bay, along with fairing encapsulation. The facility has equipment and personnel airlocks and a on-site control room. The remote control room in the customer office area can also be used to monitor activities in the UCIF. The data network allows the customer to carry out spacecraft testing via direct links with EGSE installed in the PPF control room.

SITE 31

Site 31 includes the launch pad, assembly and integration facility for the launch vehicle (MIK 40), and administrative buildings. After encapsulation, customer's spacecraft is transported to MIK 40 under a controlled environment to be mated to the rest of the launch vehicle in MIK 40. Following integration, the vehicle is rolled out to the launch pad.





STARSEM'S FOUNDING COMPANIES

As the Soyuz Company, Starsem brings together four of the world's leading space organizations

ASTRIUM

ASTRIUM, a wholly owned subsidiary of EADS is dedicated to providing civil and defense space systems. In 2006, ASTRIUM had a turnover of € 3.2 billion and 11,000 employees in France, Germany, the United Kingdom and Spain. Its activities are based on three main subsidiaries: ASTRIUM SAS - Space Transportation, for launchers and orbital infrastructure, ASTRIUM SAS for satellites and ground segment and ASTRIUM SAS - Services to develop and deliver satellite services. EADS is a global leader in aerospace, defense and related services. In 2006, EADS generated revenues of € 39.4 billion and employed a workforce of more than 113,000.

ARIANESPACE

Arianespace is the international leader in commercial launch services, and today holds 50 percent of the world market. From its creation in 1980 as the first commercial space transportation company, Arianespace has successfully performed over 178 launches and signed contracts for more than 290 payloads with some 66 customers. Arianespace is in charge of the marketing and sales, production and operation of Ariane 5, Soyuz from the Guiana Space Centre and Vega. Based in Evry, France, Arianespace has 23 European corporate shareholders.

RUSSIAN FEDERAL SPACE AGENCY - ROSCOSMOS

The Russian Federal Space Agency - Roscosmos is the central body of the federal executive authority defining the Russian Federation's national policy in the field of space research and exploration. The agency also performs interdisciplinary coordination of national scientific and application space programs. It was created in February 1992 by a decree issued by the President of the Russian Federation. Agency's responsibilities include: development and implementation of Russian national space policy; acting in the capacity of government customer in the development of scientific and application space systems, facilities and equipment; establishing international cooperation and collaboration in space research, and organization/coordination of commercial space programs. Operations under Agency responsibility include several hundred space companies and organizations.

SAMARA SPACE CENTER

The Samara Space Center "TsSKB-Progress" was created by a Russian Presidential decree in 1996 by combining the TsSKB Central Samara Design Bureau and the Progress production plant. The Samara Space Center is one of the world leaders in the design of launchers, spacecraft and related systems. Its history goes back to the start of the space program in 1959 when a branch of the Moscow OKB-1 design bureau was established in the city of Kuibyshev (now known as Samara).

