The largest commercial communications satellite ever launched

For its third launch of the year, Arianespace will orbit the largest communications satellite ever launched, TerreStar-1, on behalf of TerreStar Networks Inc., a new American mobile telecom services operator.

The choice of Arianespace by a pioneer in new space communications technologies is clear recognition of the company's excellence in launch services. The selection of Ariane 5 also confirms that Arianespace's launch Service & Solutions set the standard in guaranteed access to space for all customers, whether commercial telecommunications operators, national or international space agencies, private or government operators.

The TerreStar-1 satellite will supply secure communications services to governments in emergency situations, as well as rural communities. It will also provide voice, data and video transmission services to businesses, using the 2 GHz band, via dual satellite/ground terminals about the size of a mobile phone. Capable of managing some 500 beams, TerreStar-1 will have a design life exceeding 15 years in orbit.

TerreStar-1 was built by Space Systems/Loral in Palo Alto, California on behalf of the satellite operator TerreStar Networks, Inc. based in Reston, Virginia. Weighing nearly 6,910 kg at launch, TerreStar-1 is the largest commercial communications satellite ever launched. It will be positioned at 111 degrees West, offering new-generation mobile communications services across the entire United States and Canada.

Follow the launch live on the internet broadband
at www.arianespace.com
(starting 20 minutes before lift-off)

1. Mission profile

The 189th Ariane mission will orbit the largest communications satellite ever launched, TerreStar-1, on behalf of TerreStar Networks Inc., a new American mobile telecom services operator.

This will be the 45th Ariane 5 launch.

The launcher will be carrying a total payload of 7,055 kg, including 6,910 kg for the satellite, which will be released into its targeted orbit.

The launch will be from Ariane Launch Complex No. 3 (ELA 3) in Kourou, French Guiana.

Injection orbit

Perigee altitude	**250 km**
Apogee altitude	**35 786 km at injection**
Inclination	**6° degrees**

The lift-off is scheduled on July 1st, 2009 as soon as possible within the following launch window:

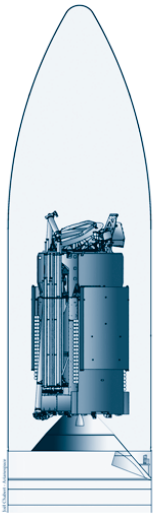
Launch opportunity

	Universal time (GMT)	*Paris time*	*Kourou time*	*Washington time*	*San Francisco time*
Between	*4:13 pm*	*6:13 pm*	*1:13 pm*	*12:13 pm*	*9:13 am*
and	*6:13 pm*	*8:13 pm*	*3:13 pm*	*2:13 pm*	*11:13 am*
on	*july 1st, 2009*	*july 1st, 2009*	*july 1st, 2009*	*july 1st, 2009*	*july 1st, 2009*

Configuration of Ariane payload

TerreStar-1 was built by Space Systems/Loral in Palo Alto, California on behalf of TerreStar Networks, Inc.

Orbital position: 111° West.



2. Range operations campaign: ARIANE 5 - TerreStar-1

Satellite and launch vehicle campaign calendar

Ariane activities	*Dates*	*Satellite activities*
Campaign start review	*March 16, 2009*	
EPC Erection	*March 16, 2009*	
EAP transfer and positionning	*March 16-17, 2009*	
Integration EPC/EAP	*March 18, 2009*	
ESC-A and VEB Erection	*March 20, 2009*	
	May 15, 2009	*Arrival in Kourou of TerreStar-1 and beginning of preparation campaign in building S5 C*
Roll-out from BIL to BAF	*June 3, 2009*	
	June 18-20, 2009	*TerreStar-1 filling operations in S5 A building*
	June 21, 2009	*TerreStar-1 integration on adaptor (ACU)*

Satellite and launch vehicle campaign final calendar

J-8	*Monday, June 22*	*TerreStar-1 transfer to Final Assembly Building (BAF)*
J-7	*Tuesday, June 23*	*TerreStar-1 integration on launcher*
J-6	*Wednesday, June 24*	*Fairing integration*
J-5	*Thursday, June25*	*ESC-A final preparations and payloads control*
J-4	*Friday, June 26*	*Launch rehearsal*
J-3	*Saturday, June 27*	*Arming of launch vehicle*
J-2	*Monday, June 29*	*Arming of launch vehicle* *Launch readiness review (RAL) and final preparation of launcher*
J-1	*Tuesday, June 30*	*Roll-out from BAF to Launch Area (ZL), launch vehicle connections and filling of the EPC liquid Helium sphere*
J-0	*Wednesday, July 1*	*Launch countdown including EPC and ESC-A filling with liquid oxygen and liquid hydrogen*

3. Launch countdown and flight events

The countdown comprises all final preparation steps for the launcher, the satellites and the launch site. If it proceeds as planned, the countdown leads to the ignition of the main stage engine, then the two boosters, for a liftoff at the targeted time, as early as possible in the satellites launch window.
The countdown culminates in a synchronized sequence (see appendix 3), which is managed by the control station and onboard computers starting at T-7 minutes.
If an interruption in the countdown means that T-0 falls outside the launch window, then the launch will be delayed by one, two or more days, depending on the problem involved, and the solution developed.

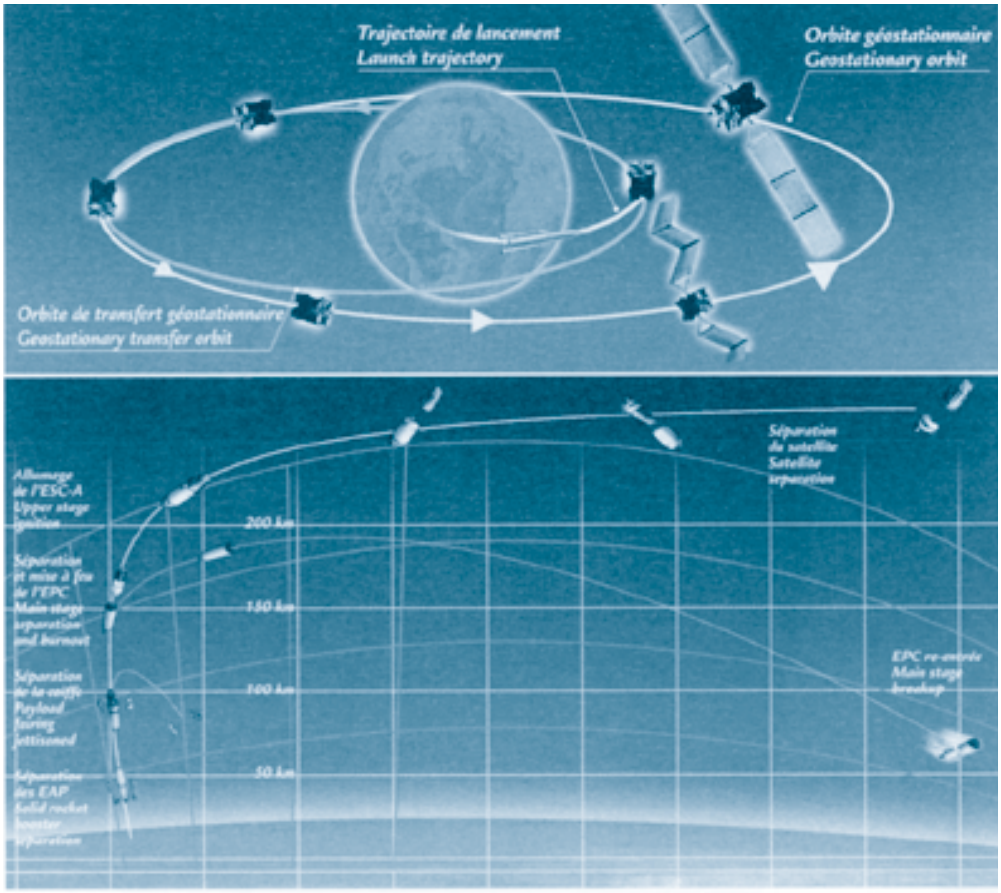
Time		*Events*
– 11 h	*30 mn*	*Start of final countdown*
– 7 h	*30 mn*	*Check of electrical systems*
– 4 h	*50 mn*	*Start of filling of main cryogenic stage with liquid oxygen and hydrogen*
– 3 h	*20 mn*	*Chilldown of Vulcain main stage engine*
– 1 h	*10 mn*	*Check of connections between launcher and telemetry, tracking and command systems*
	– 7 mn 00 s	*"All systems go" report, allowing start of synchronized sequence*
	– 4 mn 00 s	*Tanks pressurized for flight*
	– 1 mn 00 s	*Switch to onboard power mode*
	- 05,5 s	*Command issued for opening of cryogenic arms*
	– 04 s	*Onboard systems take over*
	– 03 s	*Unlocking of guidance systems to flight mode*

HO	*Ignition of the cryogenic main stage engine (EPC)*		*ALT (km)*	*V. rel. (m/s)*
	+ 7,0 s	*Ignition of solid boosters*	*0*	*0*
	+ 7,3 s	*Liftoff*	*0*	*0*
	+ 12,5 s	*End of vertical climb and beginning of pitch rotation (10 seconds duration)*	*0.089*	*37.5*
	+ 17 s	*Beginning of roll manoeuvre*	*0.334*	*76.6*
+ 2 mn	*19 s*	*Jettisoning of solid boosters*	*66.6*	*1983*
+ 3 mn	*10 s*	*Jettisoning of fairing*	*107.6*	*2619*
+ 7 mn	*30 s*	*Acquisition by Natal tracking station*	*174.1*	*4971*
+ 8 mn	*51 s*	*Shut-down of main cryogenic stage*	*173.3*	*6851*
+ 8 mn	*57 s*	*Separation of main cryogenic stage*	*173.7*	*6878*
+ 9 mn	*01 s*	*Ignition of upper cryogenic stage (ESC-A)*	*174*	*6881*
+ 13 mn	*56 s*	*Acquisition by Ascension tracking station*	*174*	*7457*
+ 18 mn	*38 s*	*Acquisition by Libreville tracking station*	*181*	*8440*
+ 23 mn	*48 s*	*Acquisition by Malindi tracking station*	*353*	*9400*
+ 24 mn	*35 s*	*Shut-down of ESC-A / Injection*	*417.6*	*9563*
+ 26 mn	*14 s*	*Separation of TerreStar-1 satellite*	*589*	*9411*
+ 39 mn	*46 s*	*End of Arianespace Flight mission*	*332.5*	*7516*

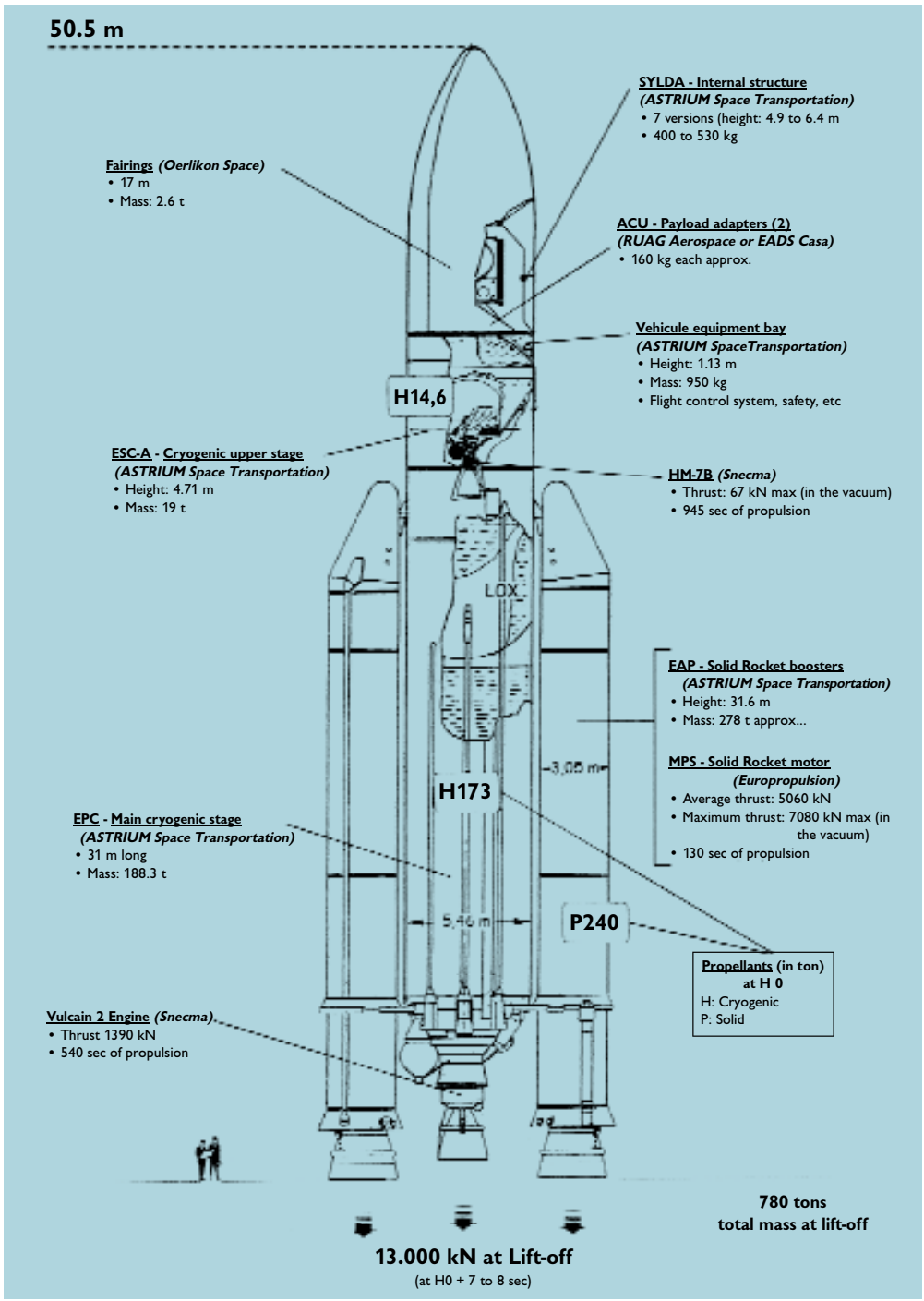
4. Flight trajectory of TerreStar-1

The launcher's attitude and trajectory are totally controlled by the two onboard computers, located in the Ariane 5 vehicle equipment bay (VEB).
7.05 seconds after ignition of the main stage cryogenic engine at T-0, the two solid-propellant boosters are ignited, enabling liftoff. The launcher first climbs vertically for 6 seconds, then rotates towards the East. It maintains an attitude that ensures the axis of the launcher remains parallel to its velocity vector, in order to minimize aerodynamic loads throughout the entire atmospheric phase, until the solid boosters are jettisoned.
Once this first part of the flight is completed, the onboard computers optimize the trajectory in real time, minimizing propellant consumption to bring the launcher first to the intermediate orbit targeted at the end of the main stage propulsion phase, and then the final orbit at the end of the flight of the cryogenic upper stage. The main stage falls back off the coast of Africa in the Atlantic Ocean (in the Gulf of Guinea).
On orbital injection, the launcher will have attained a velocity of approximately 9563 meters/second, and will be at an altitude of about 417 kilometers.
The fairing protecting the TerreStar-1 spacecraft is jettisoned shortly after the boosters are jettisoned at about T+190 seconds.

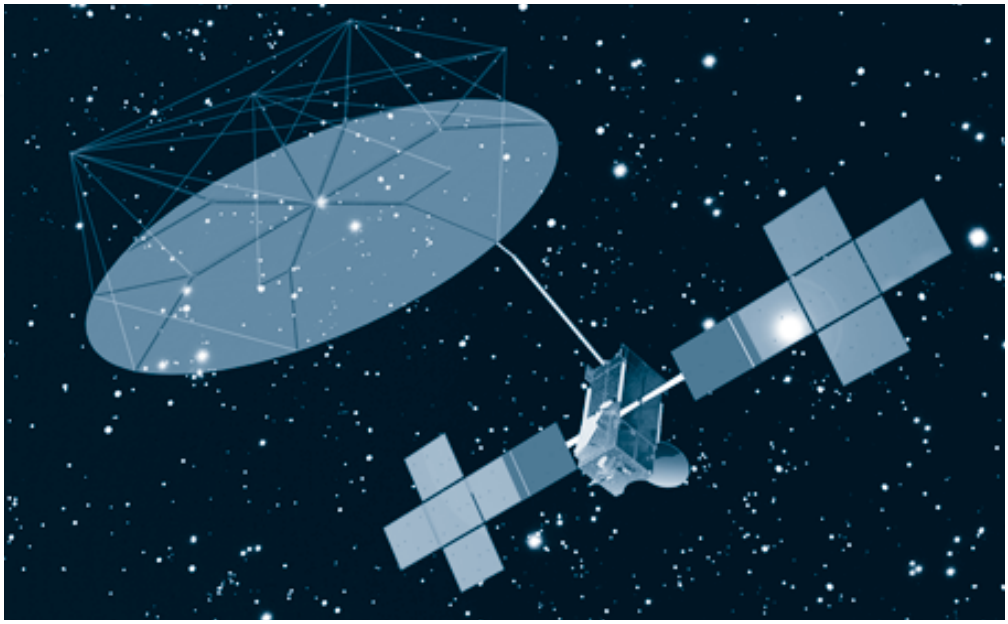
Standard Ariane 5 trajectory for geostationary transfer orbit



5. The Ariane 5-ECA (Industrial prime contractor: ASTRIUM SpaceTransportation)



6. The TerreStar-1 satellite



Customer	**TerreStar Networks**
Prime contractor	*Space Systems / Loral*
Mission	*New generation telecommunication mobile services*
Mass	*Total mass at lift-off 6,910 kg*
Stabilization	*3 axis stabilized*
Dimensions	*7.6 x 3.6 x 2.8 m*
Span in orbit	*32.44 m*
Platform	*FS 1300 OMEGA BUS*
Payload	*S-band transponders - 500 spot beams*
On-board power	*14.2 kW (end of life)*
Life time	*More Than 15 years*
Orbital position	*111° West*
Coverage area	*USA, Alaska, Hawaï, Canada*

Press Contact:
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Director Marketing & Communications
TerreStar Networks
12010 Sunset Hills Road, Suite 600 / Reston, VA 20190
Ph 703.483.7966 / fax 703.476.7143 / cell 703.930.6449

Appendix 1. Arianespace TerreStar-1 launch key personnel

In charge of the launch campaign			
Mission Director	*(CM)*	*Ignazio GORI*	*ARIANESPACE*
In charge of the launch service contract			
Ariane Payload Manager	*(RCUA)*	*Michael CALLARI*	*ARIANESPACE*
Ariane Deputy Mission Manager	*(RCUA/A)*	*Jérôme RIVES*	*ARIANESPACE*
In charge of TerreStrar-1 satellite			
Satellite Mission Director	*(DMS)*	*Tann PINNEY*	*TERRESTAR*
Satellite Program Executive Director	*(DPS)*	*Mahableshwar BHAT*	*SS/LORAL*
Satellite Launch Mission Manager	*(CPS)*	*Eric ELLER*	*SS/LORAL*
Satellite Preparation Manager	*(RPS)*	*Jeffrey LAKIN*	*SS/LORAL*
In charge of the launch vehicle			
Launch Site Operations Manager	*(COEL)*	*Pierre-François BENAITEAU*	*ARIANESPACE*
Ariane Production Project Manager	*(CPAP)*	*Denis SCHMITT*	*ARIANESPACE*
In charge of the Guiana Space Center (CSG)			
Range Operations Manager	*(DDO)*	*Emmanuel SANCHEZ*	*CNES/CSG*
Range Operations Deputy	*(DDO/A)*	*Damien SIMON*	*CNES/CSG*

Appendix 2. Launch environment conditions

Acceptable wind speed limits at lift-off range from between 7.5 m/s to 9.5 m/s according to the wind direction. The most critical is a northerly wind. For safety reasons, the wind's speed on the ground (Kourou), and at a high altitude (between 10,000 and 20,000 m) is also taken into account.

Appendix 3. The synchronized sequence

The synchronized sequence starts 7 mn beforre ignition (T-0), it is primarily designed to perform the final operations on the launcher prior to launch, along with the ultimate checks needed following switchover to flight configuration. As its name indicates, it is fully automatic, and is performed concurrently by the onboard computer and by two reduntant computers at the ELA 3 launch complex until T-4 seconds.

The computers command the final electrical operations (startup of the flight program, servocontrols, switching from ground power supply to onboard batteries, etc.) and associated checks. They also place the propellant and fluid systems in flight configuration and perform associated checks. In addition, it handles the final ground system configurations, namely:

- Startup of water injection in the flame trenches and jet guide (T-30 sec).
- Hydrogen aspiration for chilldown of the Vulcain engine in the jet guide (T-18 sec).
- Burnoff of hydrogen used for chilldown (T-5.5 sec).

At T-4 seconds, the onboard computer takes over control of final engine startup and lift-off operations:

- It starts the ignition sequence for the Vulcain main stage engine (T-0).
- It checks engine operation (from T+4.5 to T+7.3 sec).
- It commands ignition of the solid boosters for immediate lift-off at T+7.3 seconds.

Any shutdown of the synchronized sequence after T-7 mn automatically places the launcher back in its T-7 min configuration.

Appendix 4. Arianespace and the Guiana Space Center

Arianespace was founded in 1980 as the world's first launch Service & Solutions company. Today, Arianespace has 23 shareholders from ten European countries (including French space agency CNES with 34%, EADS with 30%, and all European companies participating in the construction of Ariane launchers).
Since the outset, Arianespace has signed more than 300 launch contracts and launched 269 satellites. More than two-thirds of the commercial satellites now in service worldwide were launched by Arianespace.
The company posted sales of 955,7 million euros in 2008, and stayed in the black for the sixth year in a row.
At January 1, 2009, Arianespace had 309 employees, working at the company's headquarters in Evry (near Paris), the Guiana Space Center in French Guiana, where the Ariane, Soyuz and Vega launch pads are located, and offices in Washington, D.C., Tokyo and Singapore.
Arianespace offers launch Service & Solutions to satellite operators from around the world, including private companies and government agencies. These Service & Solutions call on three launch vehicles:

- The Ariane 5 heavy launcher, operated from the Guiana Space Center in Kourou, French Guiana.
- The Soyuz medium launcher. Currently in operation at the Baikonur Cosmodrome in Kazakhstan under the responsibility of Starsem, a Euro-Russian subsidiary of Arianespace, it will be launched from the Guiana Space Center starting at the end of 2009.
- The Vega light launcher, to be launched from the Guiana Space Center starting in 2010.

Arianespace has also signed a mutual backup agreement with Boeing Launch Services and Mitsubishi Heavy Industries, through an entity called the Launch Services Alliance. This arrangement guarantees that customers' payloads will be launched in case the chosen launcher is unavailable for technical reasons.
With its family of launchers and this backup agreement, Arianespace won over half of the commercial launch contracts up for bid worldwide in the last two years. Arianespace now has a backlog of more than 40 satellites to be launched.

The Guiana Space Center: Europe's Spaceport
For over 30 years, the Guiana Space Center (CSG), Europe's Spaceport in French Guiana, has offered a complete array of facilities for rocket launches.
It mainly comprises the following:

- CNES/CSG technical center, including various resources and facilities that are critical to launch bas operation, such as radars, telecom network, weather station, receiving sites for launcher telemetry, etc.
- Payload processing facilities (ECPU), in particular the S5 facility.
- Ariane launch complexes (ELA), comprising the launch zone and launcher integration buildings.
- Various industrial facilities, including those operated by Regulus, Europropulsion, Air Liquide Spacial Guyane and EADS, which contribute to the production of Ariane 5 elements. A total of 40 European manufacturers and local companies are involved in operations.

The Guiana Space Center is preparing to welcome two new launch vehicles, Soyuz and Vega. The Soyuz launch complex (ELS) and the Vega launch complex (SLV) are now under construction.
Europe's commitment to independent access to space is based on actions by three key players: the European Space Agency (ESA), French space agency CNES and Arianespace.
ESA has helped change the role of the Guiana Space Center, in particular by funding the construction of the launch complexes, payload processing buildings and associated facilities. Initially used for the French space program, the Guiana Space Center has gradually become Europe's own spaceport, according to the terms of an agreement between ESA and the french government.
To ensure that the Spaceport is available for its programs, ESA takes charge of the lion's share of CNES/CSG fixed expenses, and also helps finance the fixed costs for the ELA launch complexes.
French space agency CNES plays several roles at the Space Center.

- It designs all infrastructures and, on behalf of the French government, is responsible for safety and security.
- It provides the resources needed to prepare the satellites and launcher for missions.

Whether during tests or actual launches, CNES is also responsible for overall coordination of operations. It collects and processes all data transmitted from the launcher via a network of receiving stations, to track Ariane rockets throughout their trajectory.
In French Guiana, Arianespace is the contracting authority in charge of operating the family of three launchers, Ariane, Soyuz and Vega.
Arianespace supervises the integration and functional checks of the Ariane launcher, built by EADS Astrium as production prime contractor, in the Launcher Integration Building (BIL). It then carries out acceptance tests of the launcher at the same time as satellite preparations in the Payload Preparation Complex (EPCU), operated by the Guiana Space Center (CSG). Arianespace next oversees final assembly of the launcher and integration of satellites in the Final Assembly Building (BAF), followed by transfer of the launcher to Launch Zone No. 3 (ZL3), and then final countdown and liftoff from Launch Complex No. 3 (CDL3).
Arianespace has created a top-flight team and array of technical resources to get launchers and satellites ready for their missions. Building on this unrivalled expertise and outstanding local facilities, Arianespace is now the undisputed benchmark in the global launch services market.