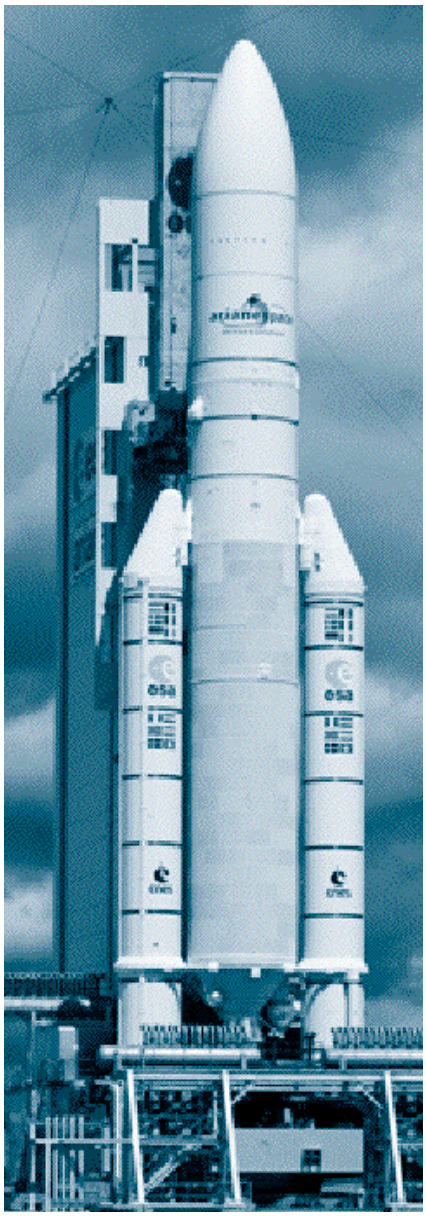
A LAUNCH FOR THE FRENCH DEFENSE MINISTRY

For its seventh launch of the year, Arianespace will place the HELIOS 2B military observation satellite into sun-synchronous polar orbit for the French Ministry of Defense.



Arianespace continues to set the global launch Service & Solutions standard for all operators, whether civil or military. This launch also clearly illustrates the strategic role played by the Ariane launch vehicle, which guarantees independent access to space for all European governments.
HELIOS 2B is the second satellite in the second-generation spaceborne observation system for security and defense applications, conducted by France in conjunction with Belgium, Spain, Italy and Greece.

The program manager is French defense procurement agency DGA (Direction Générale pour l'Armement), part of the French Ministry of Defense, which has assigned contracting authority for the space segment to CNES (Centre National d'Etudes Spatiales), the French space agency.

HELIOS 2B will weigh approximately 4,200 kg at liftoff. It was built by EADS Astrium as prime contractor, leading a number of other European companies, including Thales Alenia Space, responsible for the high-resolution imaging instrument.

HELIOS 2B is the 33rd military payload to be lofted by the European launcher.

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

1. Mission profile

The 193rd Ariane mission will place the HELIOS 2B military observation satellite into sun-synchronous polar orbit for the French Ministry of Defense.

This will be the 49th Ariane 5 launch.

The Ariane 5 GS launcher will be carrying a total payload of 5,954 kg, including 4,200 kg for the HELIOS 2B 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.

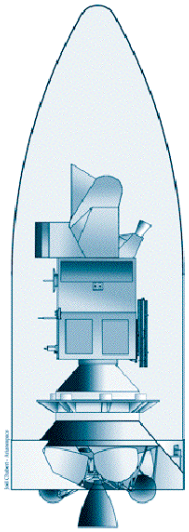
The lift-off is scheduled on the afternoon of December 9, 2009 at exactly :

Launch opportunity

	Universal time (GMT)	*Paris time*	*Kourou time*
	04:26 pm	*05:26 pm*	*01:26 pm*
on	*December 9, 2009*	*December 9, 2009*	*December 9, 2009*

Configuration of Ariane payload

The HELIOS 2B satellite was built by EADS Astrium on behalf of CNES.



2. Range operations campaign: ARIANE 5 - HELIOS 2B

Satellite and launch vehicle campaign calendar

Ariane activities	*Dates*	*Satellite activities*
Campaign start review	*October 14, 2009*	
EPC Erection	*October 14, 2009*	
	October 14, 2009	*Arrival in Kourou of HELIOS 2B and beginning of preparation campaign in building S1 B*
EAP transfer and positionning	*October 15, 2009*	
Integration EPC/EAP	*October 16, 2009*	
EPS Erection	*October 21, 2009*	
VEB Erection	*October 21, 2009*	
Roll-out from BIL to BAF	*November 12, 2009*	
	November 17-20, 2009	*HELIOS 2B filling operations in S5 A building*
	November 25, 2009	*HELIOS 2B integration on adaptor (ACU)*

Satellite and launch vehicle campaign final calendar

J-10	*Wednesday, November 25*	*HELIOS 2B transfer to Final Assembly Building (BAF)*
J-9	*Thursday, November 26*	*HELIOS 2B integration on launcher*
J-8	*Friday, November 27*	*Fairing integration*
J-7	*Monday, November 30*	*RF Operations*
J-6	*Tuesday, December 1*	*Filling of SCA (attitude control system) with N2H4*
J-5	*Wednesday, December 2*	*Filling of EPS with MMH*
J-4	*Thursday, December 3*	*Launch rehearsal - Filling of EPS with N2O4*
J-3	*Friday, December 4*	*Arming of launch vehicle*
J-2	*Monday, December 7*	*Arming of launch vehicle* *Launch readiness review (RAL) and final preparation of launcher*
J-1	*Tuesday, December 8*	*Roll-out from BAF to Launch Area (ZL), launch vehicle connections and filling of the EPC liquid Helium sphere*
J-0	*Wednesday, December 9*	*Launch countdown including EPC 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. The nominal countdown leads to the ignition of the main stage engine, then the two solid boosters, for a lift-off at the targeted time.
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 results in T-0 falling outside the launch instant, 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*
	– 04 s	*Onboard systems take over*
	– 03 s	*Unlocking of guidance systems to flight mode*

HO	*Ignition of the cryogenic main stage engine (EPC)*	
	+ 7,0 s	*Ignition of solid boosters*
	+ 7,3 s	*Liftoff*
	+ 17,0 s	*End of vertical climb and beginning of pitch rotation (10 seconds duration)*
	+17,1 s	*Beginning of roll manoeuvre*
+ 2 mn	*20 s*	*Jettisoning of solid boosters*
+ 3 mn	*10 s*	*Jettisoning of fairing*
+ 9 mn	*36 s*	*Extinction of main cryogenic stage*
+ 9 mn	*42 s*	*Separation of main cryogenic stage*
+ 9 mn	*49 s*	*Ignition of the storable propellant stage (EPS)*
+ 12 mn	*07 s*	*Acquisition by St Hubert (Canada) tracking station*
+ 24 mn	*51 s*	*Acquisition by Svalbard (Polar Circle) tracking station*
+ 26 mn	*18 s*	*Extinction of EPS*
+ 26 mn	*20 s*	*Beginning of SCA phase*
+ 57 mn	*08 s*	*Acquisition by Perth (Australia) tracking station*
+ 59 mn	*23 s*	*Separation of HELIOS 2B satellite*
1h + 15 mn	*29 s*	*End of Arianespace Flight 193 mission*

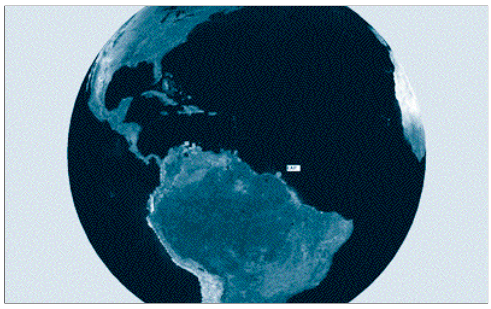
4. Flight trajectory of HELIOS 2B

The launcher's attitude and trajectory are totally controlled by the two onboard computers, located in the Ariane 5 vehicle equipment bay (VEB).
7.0 seconds after ignition of the main stage cryogenic engine at T-0, the two solid-propellant boosters are ignited, enabling lift-off. The launcher first climbs vertically for 10 seconds, then rotates towards the North. 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.

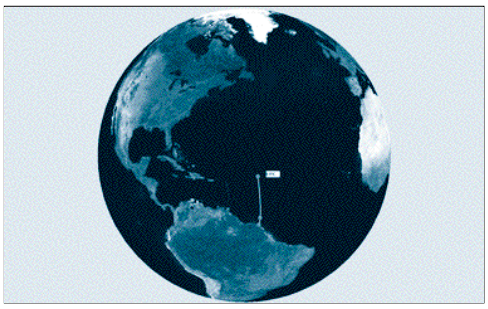
Once this first part of the flight is completed, the onboard computer optimizes the trajectory in real time, minimizing propellant consumption to bring the launcher first to the intermediate orbit targeted at the end of the main stage propulsion phase, and then the final orbit at the end of the flight of the upper stage.

The main stage falls back in the Arctic Ocean. On orbital injection, the launcher will have attained a relative velocity of approximately 7,500 meters/second, and will be at an altitude of about 680 kilometers.
The fairing protecting the HELIOS 2B spacecraft is jettisoned shortly after the boosters are jettisoned at about T+190 seconds.

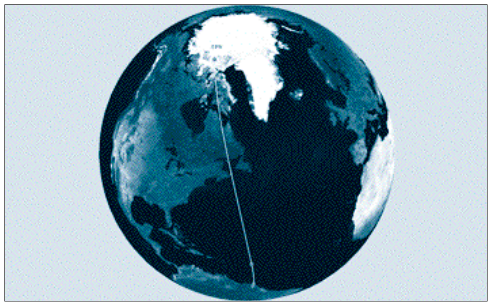
trajectory



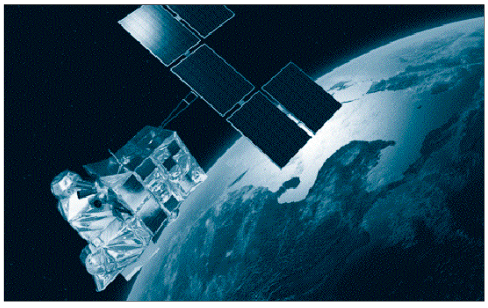
EAP jettison
ALT = 79,7 km
T = 140 s



EPC jettison
ALT = 399,2 km
T = 582 s

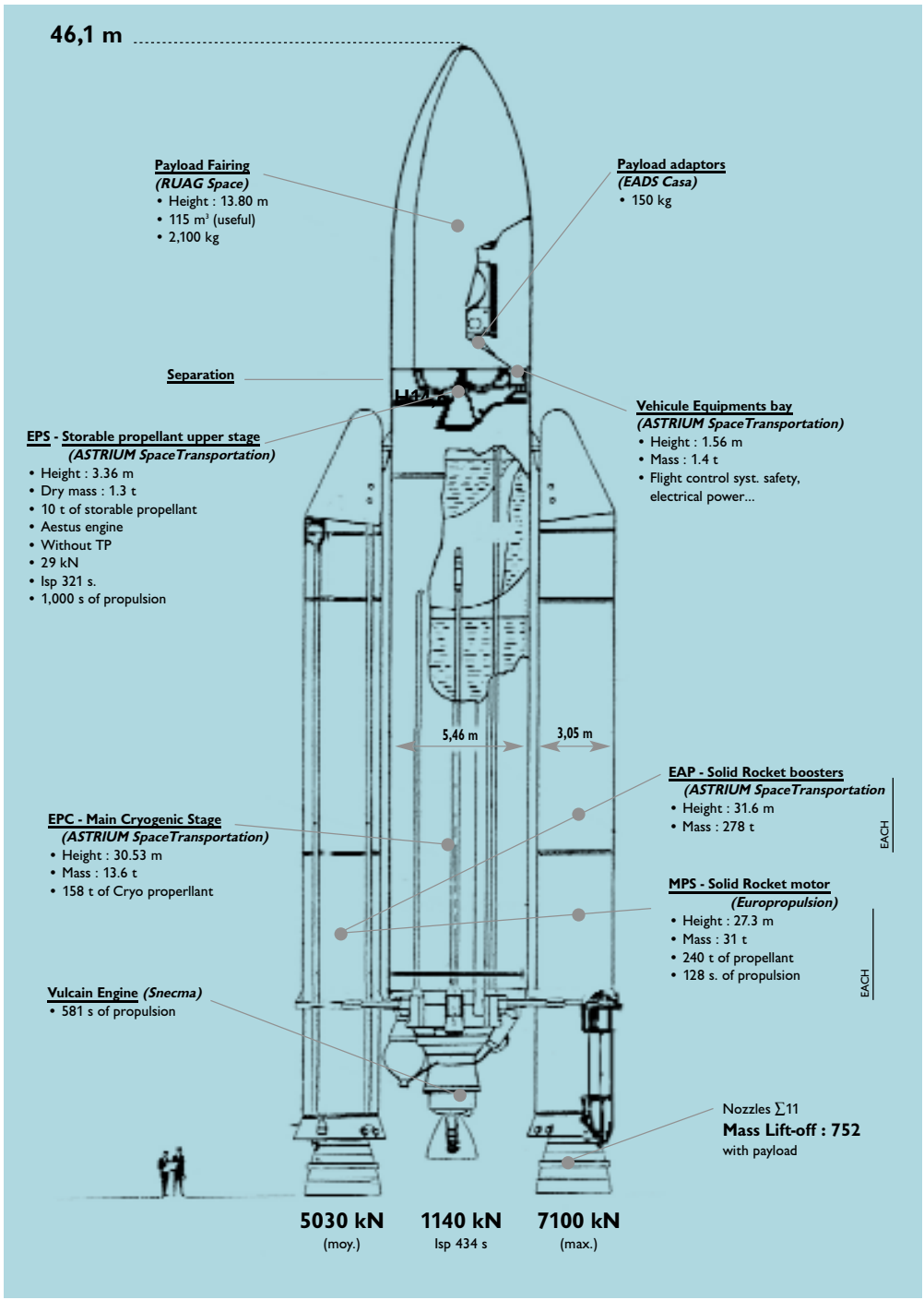


Injection EPS
ALT = 676,5 km
T = 1580 s

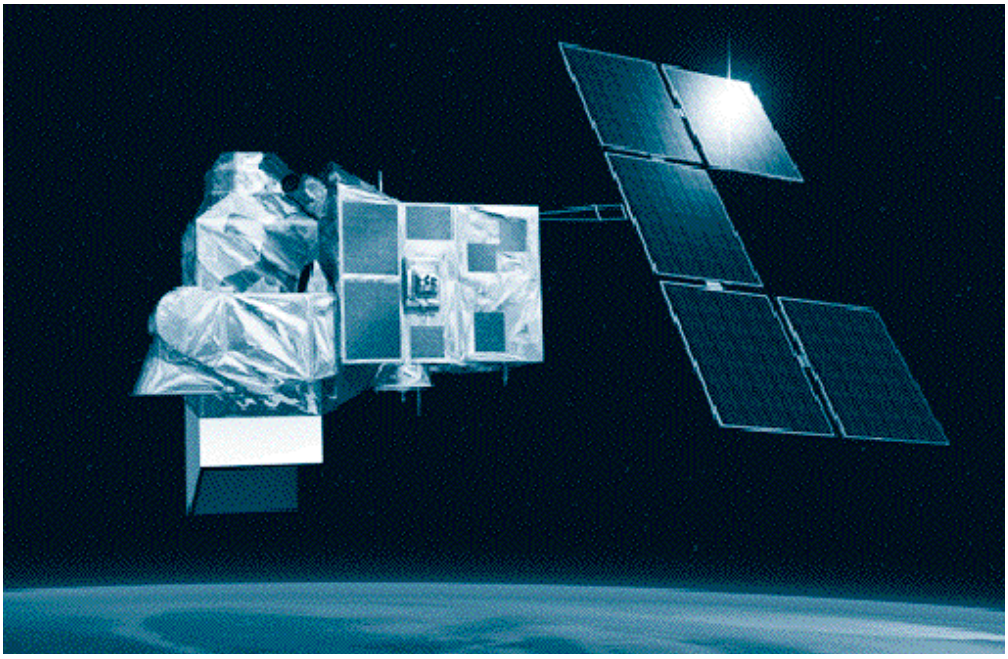


Separation HELIOS 2B

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



6. The HELIOS 2B satellite



Customer	**CNES for French Defense Ministry**
Prime contractor	*EADS - Astrium*
Mission	*Observation satellite*
Mass	*Total mass at lift-off 4 200 kg*
Stabilization	*3 axis stabilized*
Dimensions	*6 x 3.6 x 3.4 m*
Orbital position	*Sunsynchronous polar orbit*
Coverage area	*Global*

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Appendix 1. Arianespace HELIOS 2B launch key personnel

In charge of the launch campaign			
Mission Director	*(CM)*	*Dan MURE*	*ARIANESPACE*
In charge of the launch service contract			
Ariane Payload Manager	*(RCUA)*	*Caroline ARNOUX*	*ARIANESPACE*
Ariane Payload Deputy Manager	*(RCUA/A)*	*Alexandre MADEMBA-SY*	*ARIANESPACE*
In charge of HELIOS 2B satellite			
Satellite Mission Director	*(DMS)*	*Joël FERAUD*	*CNES*
Satellite Mission Deputy Director	*(DMS/A)*	*Jean-François GORY*	*CNES*
Satellite Program Manager	*(CPS)*	*Phillipe ROY*	*CNES*
Satellite Preparation Manager	*(RPS)*	*André MICHEL*	*ASTRIUM*
HELIOS Program Director	*(DP)*	*Pascal FINTZ*	*DGA*
In charge of the launch vehicle			
Launch Site Operations Manager	*(COEL)*	*André SICARD*	*ARIANESPACE*
Ariane Production Project Manager	*(CPAP)*	*Marc ROY*	*ARIANESPACE*
In charge of the Guiana Space Center (CSG)			
Range Operations Manager	*(DDO)*	*Jacques SCHRIVE*	*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 will result in a postponement of at least one day.

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 276 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 in 2010.
- 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.