A launch for Eutelsat

On its sixth launch of the year, Arianespace will orbit two communications satellites for the European operator Eutelsat: HOT BIRD™ 9 and W2M.

Arianespace and Eutelsat have teamed up very profitably for more than 25 years, with the European launcher lofting more than half of Eutelsat's fleet. HOT BIRD™ 9 and W2M will be the 22nd and 23rd Eutelsat satellites launched by Arianespace.

The choice of Arianespace by one of today's leading satellite communications operators is clear international recognition of the company's top-quality launch services.

Ariane 5 is the only commercial launcher in service today capable of simultaneously launching two payloads, while giving Arianespace's customers unexcelled performance, flexibility and competitiveness.

HOT BIRD™ 9 was built by EADS Astrium as prime contractor, and will weigh about 4,880 kg at launch.

The satellite is fitted with 64 high-power Ku-band transponders, increasing the company's operational redundancy at its flagship orbital position of 13 degrees East. It is designed to transmit television programs to cable and satellite households in Europe, the Middle East and North Africa. HOT BIRD™ 9 is the second in a series of three identical large satellites positioned at 13 degrees East, and the third, HOT BIRD™ 10, will be launched by Arianespace in early 2009.

The W2M satellite was built by a consortium comprising EADS Astrium (prime contractor) and the Indian Space Research Organization (ISRO).

Weighing about 3,460 kg at launch, W2M carries 26 active Ku-band transponders, which can be increased to 32 transponders depending on the operational configuration. It offers a design life of 15 years.

W2M will allow Eutelsat to offer a wide range of services, including TV broadcasting, data network feeds and broadband access. In addition to a fixed beam coverage of Europe, North Africa and the Middle East, the satellite's steerable beam will be oriented to serve islands in the Indian Ocean.

1 - The ARIANESPACE mission
2 - Range operations campaign: ARIANE 5
3 - Launch countdown and flight events
4 - Flight Trajectory
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6 - The HOT BIRD™ 9 satellite
7 - The W2M satellite

Appendix
1. Flight Key personnel
2. Launch environment conditions
3. Synchronized sequence
4. ARIANESPACE, its relations wich ESA and CNES

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

1. Mission profile

The 186th Ariane mission will launch two communications satellites, primarily intended for direct TV broadcast services and data networks: HOT BIRD™ 9 and W2M, both for Eutelsat.

This will be the 42nd Ariane 5 launch

The launcher will be carrying a total payload of 9,220 kg, including 8,340 kg for the two satellites, which will be released separately into their targeted orbits.

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	***4° degrees***

The lift-off is scheduled on the night of december 20, 2008 as soon as possible within the following launch window:

Launch opportunity

	Universal time (GMT)	*Paris time*	*Kourou time*	*Washington time*
Between	*09:51 pm*	*10:51 pm*	*06:51 pm*	*04:51 pm*
and	*10:50 pm*	*11:50 pm*	*07:50 pm*	*05:50 pm*
on	*december 20, 2008*	*december 20, 2008*	*december 20, 2008*	*december 20, 2008*

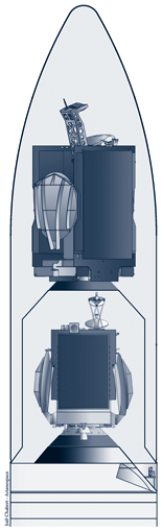
Configuration of Ariane payload

HOT BIRD™ 9 was built by EADS Astrium for Eutelsat.

Orbital position : 13° East

The W2M satellite was built by a consortium comprising EADS Astrium and the Indian Space Research Organization (ISRO).

Orbital position: 16° East.



2. Range operations campaign: ARIANE 5 - HOT BIRD™ 9 & W2M

Satellites and launch vehicle campaign calendar

Ariane activities	*Dates*	*Satellites activities*
	September 16, 2008	*Arrival in Kourou of HOT BIRD™ 9 and beginning of preparation campaign in building S5 C*
Campaign start review	*September 18, 2008*	
EPC Erection	*September 18, 2008*	
EAP transfer and positionning	*September 18-19, 2008*	
Integration EPC/EAP	*September 22, 2008*	
ESC-A and VEB Erection	*September 24, 2008*	
	October 20, 2008	*Arrival in Kourou of W2M and beginning of preparation campaign in building S5 C*
Roll-out from BIL to BAF	*October 24, 2008*	
	November 12-13, 2008	*HOT BIRD™ 9 filling operations in S5 A building*
	November 24 &26, 2008	*W2M operations in S5 B building*
	November 26, 2008	*HOT BIRD™ 9 integration on adaptor (ACU)*

Satellites and launch vehicle campaign final calendar

J-10	*Monday, December 8*	*HOT BIRD™ 9 transfer to Final Assembly Building (BAF) and W2M integration on adaptor*
J-9	*Tuesday, December 9*	*HOT BIRD™ 9 integration on Sylda*
J-8	*Wednesday, December 10*	*Fairing integration on Sylda - W2M transfer to Final Assembly Building (BAF)*
J-7	*Thursday, December 11*	*W2M integration on launcher*
J-6	*Friday, December 12*	*Upper composite integration with H OT BIRD™ 9 on launcher*
J-5	*Monday, December 15*	*ESC-A final preparations and payloads control*
J-4	*Tuesday, December 16*	*Launch rehearsal*
J-3	*Wednesday, December 17*	*Arming of launch vehicle*
J-2	*Thursday, December 18*	*Arming of launch vehicle* *Launch readiness review (RAL) and final preparation of launcher*
J-1	*Friday, December 19*	*Roll-out from BAF to Launch Area (ZL), launch vehicle connections* *and filling of the EPC liquid Helium sphere*
J-0	*Saturday, December 20*	*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.

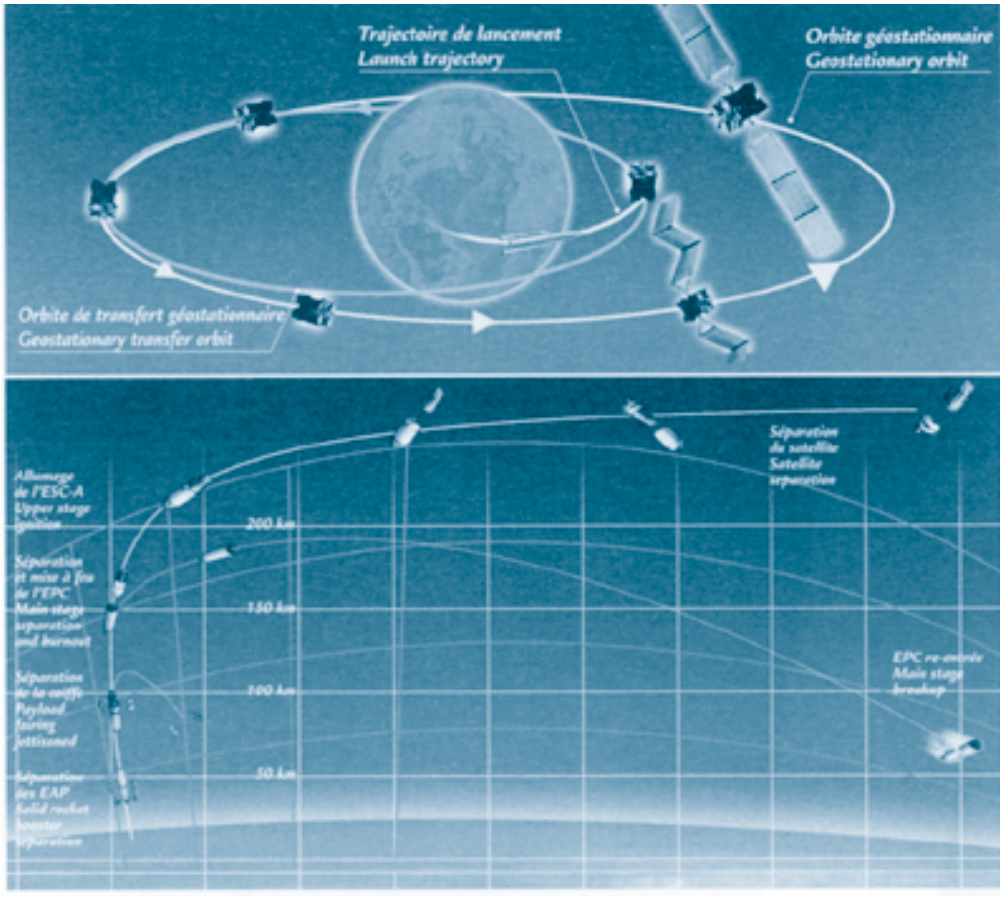
Time		*Events*
– 11 h	*30 mn*	*Start of final countdown*
– 7 h	*30 mn*	*Check of electrical systems*
– 4 h	*50 mn*	*Start of filling of main cryogenic stage with liquid oxygen and hydrogen*
– 3 h	*20 mn*	*Chilldown of Vulcain main stage engine*
– 1 h	*10 mn*	*Check of connections between launcher and 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)*	*0.085*	*36*
	+ 17 s	*Beginning of roll manoeuvre*	*0.335*	*74*
+ 2 mn	*20 s*	*Jettisoning of solid boosters*	*64.6*	*1979*
+ 3 mn	*16 s*	*Jettisoning of fairing*	*105.2*	*2217*
+ 7 mn	*39 s*	*Acquisition by Natal tracking station*	*163*	*5150*
+ 8 mn	*57 s*	*Shut-down of main cryogenic stage*	*160.5*	*6879*
+ 9 mn	*03 s*	*Separation of main cryogenic stage*	*160.7*	*6905*
+ 9 mn	*07 s*	*Ignition of upper cryogenic stage (ESC-A)*	*160.7*	*6907*
+ 13 mn	*39 s*	*Acquisition by Ascension tracking station*	*152.7*	*7582*
+ 18 mn	*10 s*	*Acquisition by Libreville tracking station*	*200*	*8300*
+ 23 mn	*08 s*	*Acquisition by Malindi tracking station*	*502.3*	*9056*
+ 24 mn	*55 s*	*Shut-down of ESC-A / Injection*	*708.4*	*9308*
+ 26 mn	*44 s*	*Separation of HOT BIRD™ 9 satellite*	*987.5*	*9077*
+ 30 mn	*30 s*	*Separation of Sylda 5*	*1705.3*	*8534*
+ 32 mn	*10 s*	*Separation of W2M satellite*	*2068.3*	*8284*
+ 47 mn	*32 s*	*End of Arianespace Flight mission*	*5911.0*	*6283*

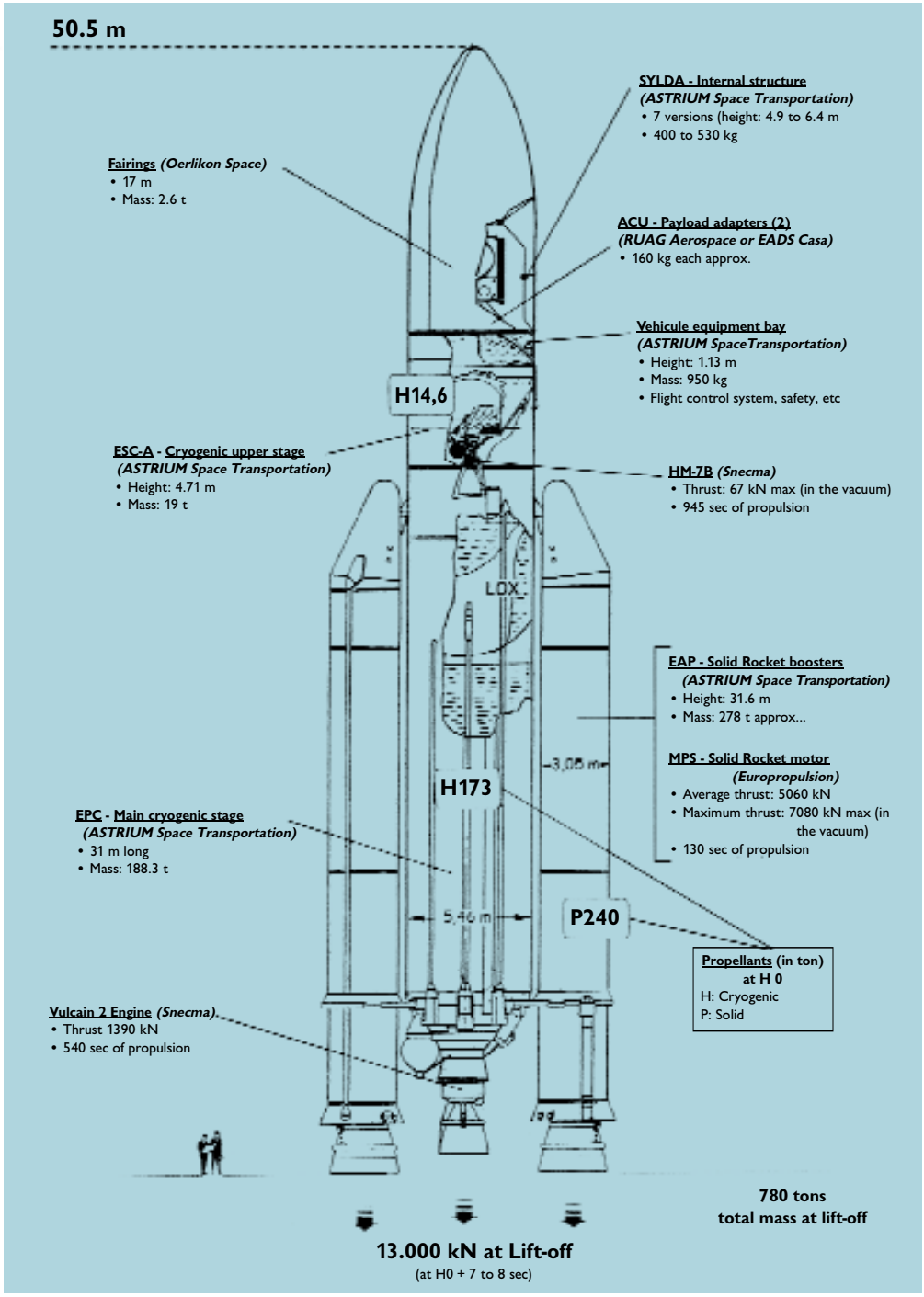
4. Flight trajectory of HOT BIRD™ 9& W2M

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 9308 meters/second, and will be at an altitude of about 708 kilometers.
The fairing protecting the HOT BIRD™ 9 & W2M spacecraft is jettisoned shortly after the boosters are jettisoned at about T+196 seconds.

Standard Ariane 5 trajectory for geostationary transfer orbit



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



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6. The HOT BIRD™ 9 satellite

Customer	**EUTELSAT**	
Prime contractor	*EADS Astrium*	
Mission	*TV and Radio to Satellite and cable homes*	
Mass	*Total mass at lift-off*	*4,880 kg*
	Dry mass	*2,238 kg*
Stabilization	*3 axis stabilized*	
Dimensions	*2.7 x 3.4 x 6.3 m*	
Span in orbit	*38 m*	
Platform	*EUROSTAR 3000*	
Payload	64 Ku-band transponders	
On-board power	*14.5 kW (end of life)*	
Life time	*More Than 15 years*	
Orbital position	*13° East*	
Coverage area	*Europe, North Africa, Middle East*	

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7. The W2M satellite

Customer	**EUTELSAT**	
Prime contractor	*EADS ASTRIUM & ISRO*	
Mission	*TV and radio broadcasting to satellite and cable homes, data networks*	
Mass	*Total mass at lift-off*	*3,460 kg*
	Dry mass	*1,555 kg*
Stabilization	*3 axis stabilized*	
Dimensions	*1.8 x 2.0 x 5.0 m*	
Span in orbit	*15.7 m*	
Platform	*ISRO 1-3K*	
Payload	*up to 32 Ku-band transponders*	
On-board power	*7 kW (end of life)*	
Life time	*More Than15 years*	
Orbital position	*16° East*	
Coverage area	*Europe, North Africa, Middle East, Indian Ocean islands*	

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Appendix 1. Arianespace HOT BIRD™ 9 & W2M launch key personnel

In charge of the launch campaign			
Mission Director	*(CM)*	*Thierry WILMART*	*ARIANESPACE*
In charge of the launch service contract			
Ariane Payload Manager	*(RCUA)*	*Luca CHIECHIO*	*ARIANESPACE*
Ariane Deputy Mission Manager	*(RCUA/A)*	*Christophe BARDOU*	*ARIANESPACE*
In charge of HOT BIRD™ 9 satellite			
Satellite Mission Director	*(DMS)*	*Manuel CALVO SERRANO*	*Eutelsat*
Deputy Satellite Mission Director	*(DMS/A)*	*Raphael MUSSALIAN*	*Eutelsat*
Satellite Program Manager	*(CPS)*	*Daniel CABAU*	*Astrium*
Satellite Preparation Manager	*(RPS)*	*Nicolas BOUGE*	*Astrium*
In charge of W2M satellite			
Satellite Mission Director	*(DMS)*	*Manuel CALVO SERRANO*	*Eutelsat*
Deputy Satellite Mission Director	*(DMS/A)*	*Stephen GLYNN*	*Eutelsat*
Astrium Program Manager	*(CPS)*	*Stéphane VESVAL*	*Astrium*
ISRO Project Director	*(CPS/A)*	*Narayanaswamy NEELAKANTAN*	*ISRO*
Satellite Preparation Manager	*(RPS)*	*P.K. GUPTA*	*ISRO*
In charge of the launch vehicle			
Launch Site Operations Manager	*(COEL)*	*Christian LARDOT*	*ARIANESPACE*
Ariane Production Project Manager	*(CPAP)*	*Roland LAGIER*	*ARIANESPACE*
In charge of the Guiana Space Center (CSG)			
Range Operations Manager	*(DDO)*	*Bruno GILLES*	*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.

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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 263 satellites. More than two-thirds of the commercial satellites now in service worldwide were launched by Arianespace.
The company posted sales of more than 900 million euros in 2007, and stayed in the black for the fifth year in a row.
At January 1, 2008, Arianespace had 301 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 in 2009.
- The Vega light launcher, to be launched from the Guiana Space Center starting in 2009.

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.