A DUAL LAUNCH FOR TWO DIRECT TV BROADCAST SATELLITES

Arianespace will orbit two satellites dedicated to direct-to-home (DTH) television broadcasting on its fourth launch of the year: ASTRA 1N for the Luxembourg-based operator SES Astra, and BSAT-3c/JCSAT-110R for the American manufacturer Lockheed Martin Commercial Space Systems, as part of a turnkey contract for the Japanese operators B-SAT Corporation and SKY Perfect JSAT Corporation.

The choice of Arianespace by leading space communications operators and manufacturers is clear international recognition of the company's excellence in launch services. Based on its proven reliability and availability, Arianespace continues to confirm its position as the world's benchmark launch system.

Ariane 5 is the only commercial satellite launcher now on the market capable of simultaneously launching two payloads and handling a complete range of missions, from launches of commercial satellites into geostationary orbit, to dedicated launches into special orbits.

Over the last two decades, Arianespace and SES have developed an exceptional relationship. ASTRA 1N will be the 34th satellite from the SES group (Euronext Paris and Luxembourg Bourse: SESG) to use the European launcher. SES operates the leading direct-to-home (DTH) TV broadcast system in Europe, based on its Astra satellites, serving more than 135 million households via DTH and cable networks.

Built by Astrium using a Eurostar E3000 platform, ASTRA 1N will weigh 5,350 kg at launch. Fitted with 52 active Ku-band transponders, ASTRA 1N will be positioned at 19.2 degrees East. It will deliver DTH TV broadcast services across Europe, and offers a design life of about 16 years.

BSAT-3c/JCSAT-110R is the 26th satellite for which Japanese operators have chosen the European launcher, and the 41st Lockheed Martin-built platform to be launched by Arianespace.

BSAT-3c/JCSAT-110R was built by Lockheed Martin Commercial Space Systems at its plant in Newtown, Pennsylvania, using an A2100 A platform. Weighing 2,910 kg at launch, it will be positioned at 110 degrees East longitude in geostationary orbit, and offers a design life exceeding 16 years. BSAT-3c/JCSAT-110R is fitted with 2 sets of twelve 130 Watt Ku-band transponders, and is primarily designed to provide direct TV broadcast links for all of Japan.

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

1. Mission profile

The 203rd Ariane mission will orbit two direct-to-home (DTH) television broadcast satellites : ASTRA 1N for the Luxembourg-based operator SES Astra, and BSAT-3c/JCSAT-110R for the American manufacturer Lockheed Martin Commercial Space Systems, as part of a turnkey contract for the Japanese operators B-SAT Corporation and SKY Perfect JSAT Corporation.

This will be the 59th Ariane 5 launch.

The launcher will be carrying a total payload of 9,095 kg, including 8,240 kg for the ASTRA 1N and BSAT-3c/JCSAT-110R satellites, which will be released into their targeted orbits.

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

Injection orbit

Perigee altitude	***249.6 km***
Apogee altitude	***35,959 km at injection***
Inclination	***2° degrees***

The lift-off is scheduled on the night of July 1st to 2nd, 2011 as soon as possible within the following launch window:

Launch opportunity

	Universal time (GMT)	*Paris time*	*Kourou time*	*Washington time*	*Tokyo time*
Between	*9:43 pm*	*11:43 pm*	*6:43 pm*	*5:43 pm*	*6:43 am*
and	*11:06 pm*	*01:06 am*	*8:06 pm*	*7:06 pm*	*8:06 am*
on	*July 1, 2011*	*July 1-2, 2010*	*July 1, 2011*	*July 1, 2011*	*July 2, 2011*

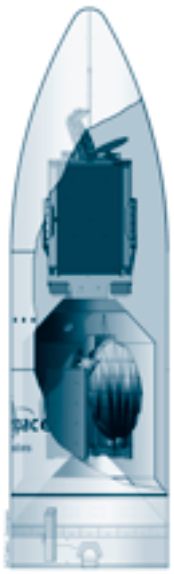
Configuration of Ariane payload

The ASTRA 1N satellite was built by Astrium in Toulouse, France for the Luxembourg-based operator SES Astra.

Orbital position: 19.2° East

The BSAT-3c/JCSAT-110R satellite was built by Lockheed Martin Commercial Space Systems (LMCSS) at its plant in Newtown, Pennsylvania, for the Japanese operators B-SAT Corporation and SKY Perfect JSAT Corporation.

Orbital position: 110° *East*



2. Range operations campaign: ARIANE 5 - ASTRA 1N & BSAT-3c/JCSAT-110R

Satellites and launch vehicle campaign calendar

Ariane activities	*Dates*	*Satellites activities*
Campaign start review	*May 9, 2011*	
EPC Erection	*May 9, 2011*	
EAP transfer and positioning	*May 10, 2011*	
Integration EPC/EAP	*May 11, 2011*	
ESC-A and VEB Erection	*May 13, 2011*	
	May 19, 2011	*Arrival in Kourou of ASTRA 1N and beginning of preparation campaign in building S5 C*
	May 30, 2011	*Arrival in Kourou of BSAT-3c/JCSAT-110R and beginning of preparation campaign in building S5 C*
	June 3-9, 2011	*ASTRA 1N filling operations*
Roll-out from BIL to BAF	*June 14, 2011*	
	June 14-17, 2011	*BSAT-3c/JCSAT-110R filling operations*

Satellites and launch vehicle campaign final calendar

J-11	*Saturday, June 18*	*ASTRA 1N integration on adaptor (ACU)*
J-10	*Monday, June 20*	*ASTRA 1N transfer to Final Assembly Building (BAF) - BSAT-3c/JCSAT-110R integration on adaptor*
J-9	*Tuesday, June 21*	*Arming of BSAT-3c/JCSAT-110R - ASTRA 1N integration on Sylda*
J-8	*Wednesday, June 22*	*Fairing integration on Sylda - BSAT-3c/JCSAT-110R transfer to Final Assembly Building (BAF)*
J-7	*Thursday, June 23*	*BSAT-3c/JCSAT-110R integration on launcher*
J-6	*Friday, June 24*	*ESC-A final preparations and payloads control* *Upper composite integration with ASTRA 1N on launcher*
J-5	*Saturday, June 25*	*Satellite functional tests on launcher*
J-4	*Monday, June 27*	*Launch rehearsal*
J-3	*Tuesday, June 28*	*Arming of launch vehicle*
J-2	*Wednesday, June 29*	*Launch readiness review (RAL) and final preparation of launcher*
J-1	*Thursday, June 30*	*Roll-out from BAF to Launch Area (ZL), launch vehicle connections and filling of the EPC liquid helium sphere*
J-0	*Friday, July 1st*	*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*

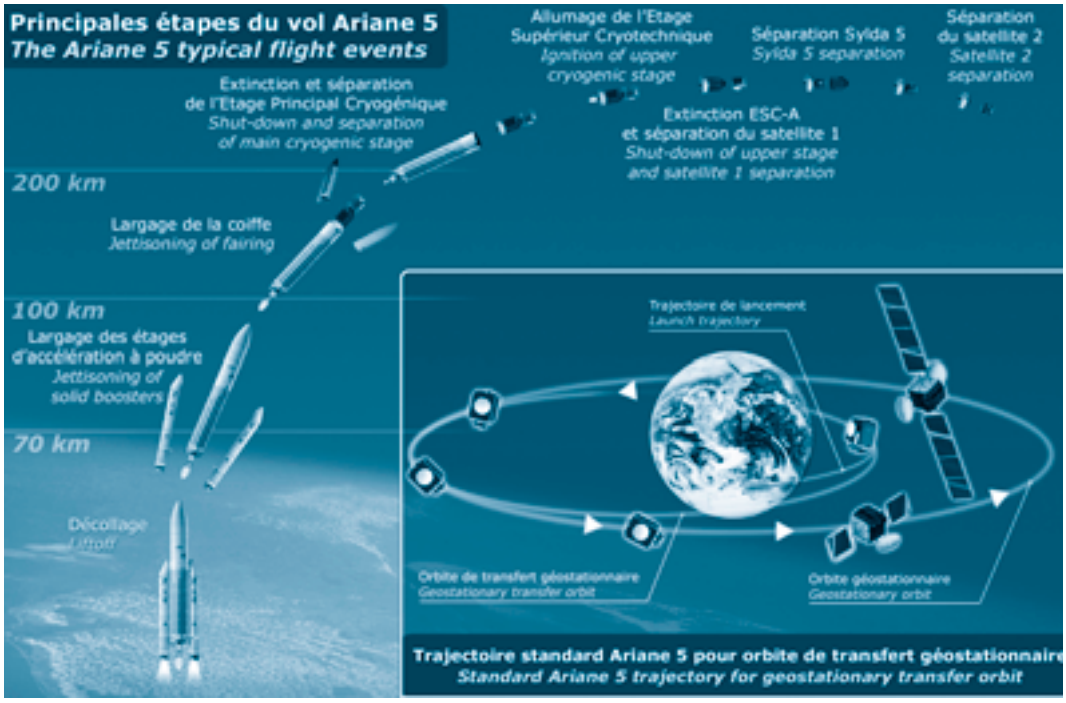
HO	*Ignition of the cryogenic main stage engine (EPC)*		*ALT (km)*	*V. rel. (m/s)*
	+ 7,05 s	*Ignition of solid boosters*	*0*	*0*
	+ 7,3 s	*Liftoff*	*0*	*0*
	+ 12,5 s	*End of vertical climb and beginning of pitch rotation (10 seconds duration)*	*0.086*	*36.2*
	+ 17,1 s	*Beginning of roll manoeuvre*	*0.300*	*75.4*
+ 2 mn	*21 s*	*Jettisoning of solid boosters*	*69.4*	*2003*
+ 3 mn	*12 s*	*Jettisoning of fairing*	*109.8*	*2221*
+ 7 mn	*34 s*	*Acquisition by Natal tracking station*	*189.7*	*5018*
+ 8 mn	*52 s*	*Shut-down of main cryogenic stage*	*187.6*	*6882*
+ 8 mn	*58 s*	*Separation of main cryogenic stage*	*187.4*	*6908*
+ 9 mn	*02 s*	*Ignition of upper cryogenic stage (ESC-A)*	*187.3*	*6911*
+ 13 mn	*27 s*	*Acquisition by Ascension tracking station*	*166.0*	*7549*
+ 18 mn	*25 s*	*Acquisition by Libreville tracking station*	*199.2*	*8329*
+ 23 mn	*10 s*	*Acquisition by Malindi tracking station*	*452.7*	*9058*
+ 25 mn	*00 s*	*Injection*	*660.6*	*9848*
+ 27 mn	*12 s*	*Separation of ASTRA 1N satellite*	*988.9*	*9589*
+ 36 mn	*45 s*	*Separation of Sylda 5*	*3047*	*7673*
+ 38 mn	*11 s*	*Separation of BSAT-3c/JCSAT-110R satellite*	*3403*	*7472*
+ 49 mn	*41 s*	*End of Arianespace Flight mission*	*6348*	*6107*

4. Flight trajectory of ASTRA 1N & BSAT-3c/JCSAT-110R

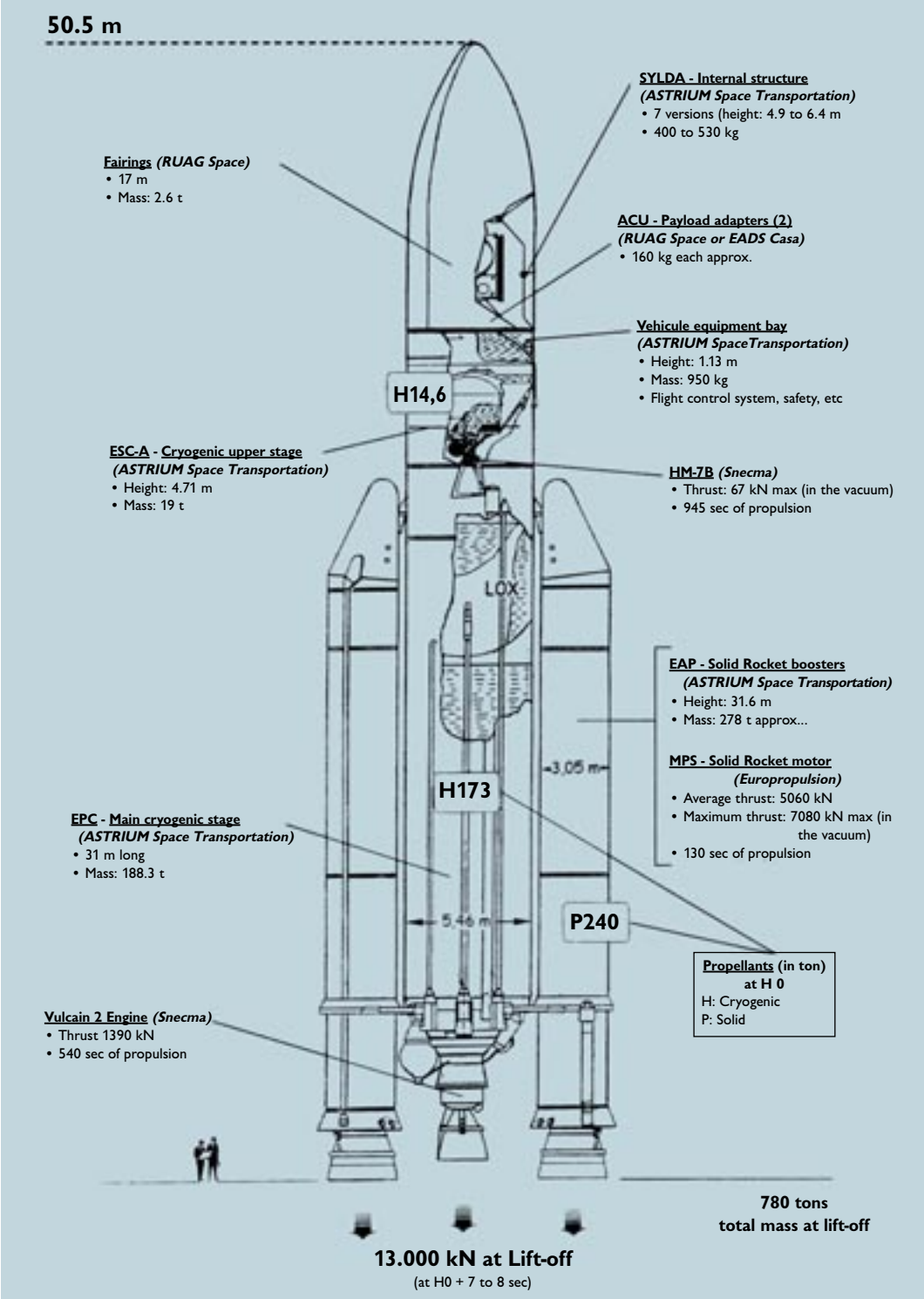
The launcher's attitude and trajectory are totally controlled by the two onboard computers, located in the Ariane 5 vehicle equipment bay (VEB).
7.05 seconds after ignition of the main stage cryogenic engine at T-0, the two solid-propellant boosters are ignited, enabling liftoff. The launcher first climbs 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 9848 meters/second, and will be at an altitude of about 660 kilometers.
The fairing protecting the ASTRA 1N and BSAT-3c/JCSAT-110R spacecraft is jettisoned shortly after the boosters are jettisoned at about T+192 seconds.

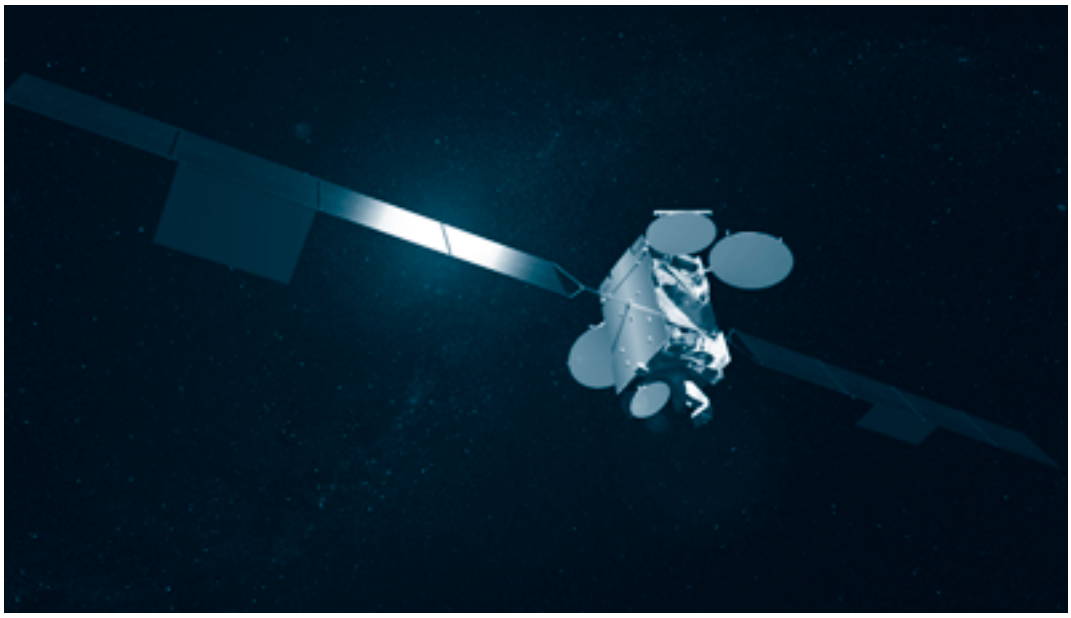
Standard Ariane 5 trajectory for geostationary transfer orbit



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



6. The ASTRA 1N satellite



Customer	**SES ASTRA**
Prime contractor	*ASTRIUM*
Mission	*Direct to Home television (DTH)*
Mass	*Total mass at lift-off 5 350 kg*
Stabilization	*3 axis stabilized*
Dimensions	*6.5 x 2.8 x 3.2 m*
Span in orbit	*39.8 m*
Platform	*EUROSTAR E3000*
Payload	*52 Ku-band transponders*
On-board power	*13 kW (end of life)*
Life time	*15 years*
Orbital position	*19.2° East*
Coverage area	*Europe*

Press Contact

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7. The BSAT-3c/JCSAT-110R satellite

Customer	***LOCKHEED MARTIN COMMERCIAL SPACE SYSTEMS (USA) for B-SAT Corporation and SKY Perfect JSAT Corporation (JAPAN)***
Prime contractor	*Lockheed Martin Commercial Space Systems*
Mission	*Direct to Home television (DTH) and Telecommunications*
Mass	*Total mass at lift-off 2 910 kg*
Stabilization	*3 axis stabilized*
Dimensions	*5.3 x 2.0 x 1.9 m*
Span in orbit	*18.9 m*
Platform	*A2100 A*
Payload	*2 sets of 12 Ku-band transponders (24 total active)*
On-board power	*7.5 KW (end of life)*
Life time	*16 + years*
Orbital position	*110° East*
Coverage area	*Japan*

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Appendix 1. Arianespace ASTRA 1N & BSAT-3c/JCSAT-110R launch key personnel

In charge of the launch campaign			
Mission Director	*(CM)*	*Jean-Marc DURAND*	*ARIANESPACE*
In charge of the launch service contract			
Program Director ASTRA 1N	*(CP)*	*Véronique LOISEL*	*ARIANESPACE*
Program Director BSAT-3c/JCSAT-110R	*(CP)*	*Luca CHIECCHIO*	*ARIANESPACE*
In charge of ASTRA 1N satellite			
Satellite Mission Director	*(DMS)*	*Richard STARKOVS*	*SES*
Satellite Program Manager	*(CPS)*	*Christian FOURNIER*	*ASTRIUM*
Satellite Preparation Manager	*(RPS)*	*Cédric PEZ*	*ASTRIUM*
In charge of BSAT-3c/JCSAT-110R satellite			
Satellite Mission Director	*(DMS)*	*Luis TERRAZAS*	*LMCSS*
Satellite Program Manager	*(CPS)*	*Howard FLOYD*	*LMCSS*
Satellite Preparation Manager	*(RPS)*	*Roy WELLER*	*LMCSS*
In charge of the launch vehicle			
Launch Site Operations Manager	*(COEL)*	*André SICARD*	*ARIANESPACE*
Ariane Production Project Manager	*(CPAP)*	*Arnaud SOVICHE*	*ARIANESPACE*
Launcher Production Quality Manager	*(RQLP)*	*Sebastien GASPARINI*	*ARIANESPACE*
Launch Campaign Quality Manager	*(CQCL)*	*Jean-Claude NOMBLOT*	*ARIANESPACE*
In charge of the Guiana Space Center (CSG)			
Range Operations Manager	*(DDO)*	*Bruno GILLES*	*CNES/CSG*
Range Operations Deputy	*(DDO/A)*	*Aimée CIPPE*	*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 before 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 redundant 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, they handle 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 21 shareholders from ten European countries (including French space agency CNES with 34%, Astrium 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 294 satellites. More than two-thirds of the commercial satellites now in service worldwide were launched by Arianespace.
The company posted sales exceeding 900 million euros in 2010.
As of January 1, 2011, Arianespace had 331 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 2011.
- The Vega light launcher, to be launched from the Guiana Space Center starting in 2011.

With its family of launchers 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 base operations, 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 Astrium, 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 construction of the Soyuz launch complex (ELS) and of the Vega launch complex (SLV) have now been completed.
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 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.