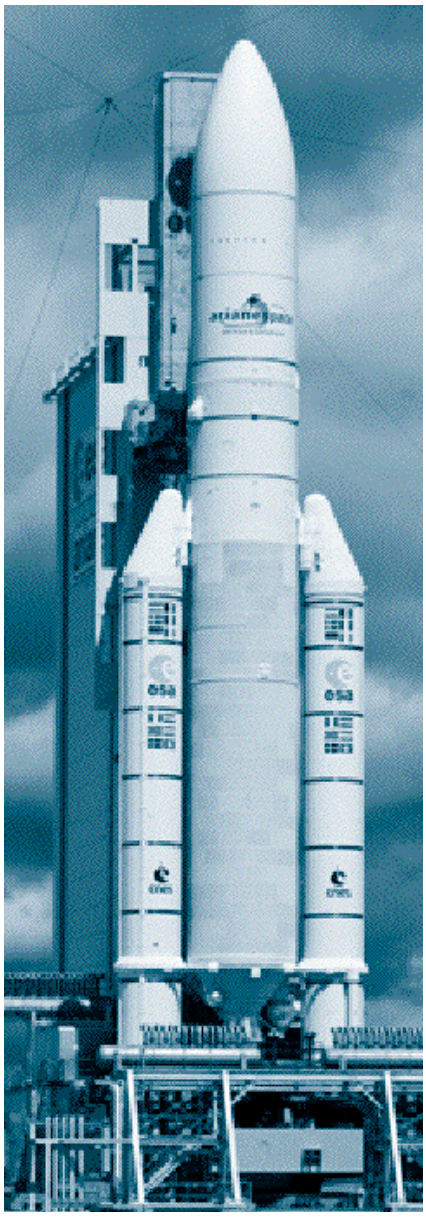
A LAUNCH FOR CIVIL AND MILITARY TELECOM OPERATORS

For its fifth launch of the year, Arianespace will orbit two communications satellites: AMAZONAS-2 for the Spanish operator Hispasat, and COMSATBw-1 for Astrium as part of a contract with the German Ministry of Defense.



The choice of Arianespace by leading space communications operators and manufacturers is clear international recognition of the company's excellence in launch services.
Ariane 5 is the only commercial satellite launcher now on the market capable of simultaneously launching two payloads.

AMAZONAS-2 will be the fifth Spanish satellite launched by Arianespace. The European launcher boosted the Hispasat 1A and 1B satellites in 1992 and 1993; then in 2005 and 2006 Hispasat and subsidiary Hisdesat called on Arianespace to launch their XTAR-Eur and Spainsat satellites.

AMAZONAS-2 was built by Astrium using a Eurostar 3000 platform. Weighing about 5,460 kg at liftoff, this powerful satellite is equipped with 54 active Ku-band transponders and 10 C-band transponders. It will provide a wide range of telecommunications services to Brazil, as well as to North and South America in general.

AMAZONAS-2 has a design life of 15 years and will be positioned in geostationary orbit at 61 degrees West.

Astrium chose Arianespace to launch the two military communications satellites, COMSATBw-1 and COMSATBw-2, as part of a satellite communications system that Astrium is supplying to the German Ministry of Defense.

For the first time, the German Ministry of Defense will be able to count on a secure network for voice, data, fax, video and multimedia transmissions. It chose the company MilSat Services GmbH, created jointly by Astrium Services and ND Satcom as prime contractor. Astrium, is prime contractor for the space segment, comprising the two satellites integrated by Thales Alenia Space, based on the Spacebus platform. The payload is delivered by Astrium subsidiary TESAT. COMSATBw-1, weighing about 2,500 kg at launch and offering a design life of 15 years, will cover an area extending from the Americas to the Far East.

Astrium had already selected Arianespace to launch its Skynet 5A, 5B and 5C military satellites.

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

1. Mission profile

The 191st Ariane mission will place two communications satellites into geostationary transfer orbit: AMAZONAS-2 for the Spanish operator Hispasat, and COMSATBw-1 for Astrium as part of a contract with the German Ministry of Defense.

This will be the 47th Ariane 5 launch.

The launcher will be carrying a total payload of 9,087 kg, including 7,905 kg for the AMAZONAS-2 and COMSATBw-1 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	***250 km***
Apogee altitude	***35 786 km at injection***
Inclination	***3° degrees***

The lift-off is scheduled on the night of September 30, 2009 as soon as possible within the following launch window:

Launch opportunity

	Universal time (GMT)	*Paris time*	*Kourou time*	*Washington time*	*Tokyo time*
Between	*10:00 pm*	*12:00 am*	*7:00 pm*	*6:00 pm*	*7:00 am*
and	*11:10 pm*	*01:10 am*	*8:10 pm*	*7:10 pm*	*8:10 am*
on	*September 30, 2009*	*October 1st, 2009*	*September 30, 2009*	*September 30, 2009*	*October 1st, 2009*

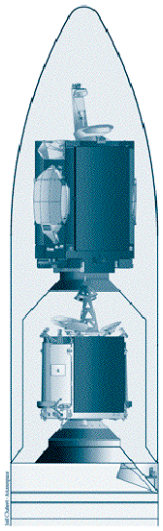
Configuration of Ariane payload

AMAZONAS-2 was built by Astrium in Toulouse, France, for the Spanish operator Hispasat.

Orbital position : 61° West

COMSATBw-1 was integrated by Thales Alenia Space in Cannes, France, for Astrium, as part of a contract with the German Ministry of Defense.

Orbital position : 63° East



2. Range operations campaign: ARIANE 5 - AMAZONAS-2 & COMSATBw-1

Satellites and launch vehicle campaign calendar

Ariane activities	*Dates*	*Satellites activities*
Campaign start review	*July 23, 2009*	
EPC Erection	*July 23, 2009*	
EAP transfer and positionning	*July 24, 2009*	
Integration EPC/EAP	*July 27, 2009*	
ESC-A and VEB Erection	*July 30, 2009*	
Roll-out from BIL to BAF	*August 31, 2009*	
	August 28, 2009	*Arrival in Kourou of AMAZONAS-2 and beginning of preparation campaign in building S5 C*
	August 31, 2009	*Arrival in Kourou of COMSATBw-1 and beginning of preparation campaign in building S5 C*
	September 8-12, 2009	*AMAZONAS-2 filling operations in S5 A building*
	September 14-16, 2009	*COMSATBw-1 filling operations in S5 B building*
	September 16, 2009	*AMAZONAS-2 integration on adaptor (ACU)*

Satellites and launch vehicle campaign final calendar

J-10	*Thursday, September 17*	*AMAZONAS-2 transfer to Final Assembly Building (BAF)*
J-9	*Friday, September 18*	*AMAZONAS-2 integration on Sylda and COMSATBw-1 integration on adaptor*
J-8	*Saturday, September 19*	*Fairing integration on Sylda - COMSATBw-1 transfer to Final Assembly Building (BAF)*
J-7	*Monday, September 21*	*COMSATBw-1 integration on launcher*
J-6	*Tuesday, September 22*	*Upper composite integration with AMAZONAS-2 on launcher*
J-5	*Wednesday, September 23*	*ESC-A final preparations and payloads control*
J-4	*Thursday, September 24*	*Launch rehearsal*
J-3	*Friday, September 25*	*Arming of launch vehicle*
J-2	*Monday, September 28*	*Arming of launch vehicle* *Launch readiness review (RAL) and final preparation of launcher*
J-1	*Tuesday, September 29*	*Roll-out from BAF to Launch Area (ZL), launch vehicle connections and filling of the EPC liquid Helium sphere*
J-0	*Wednesday, September 30*	*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*

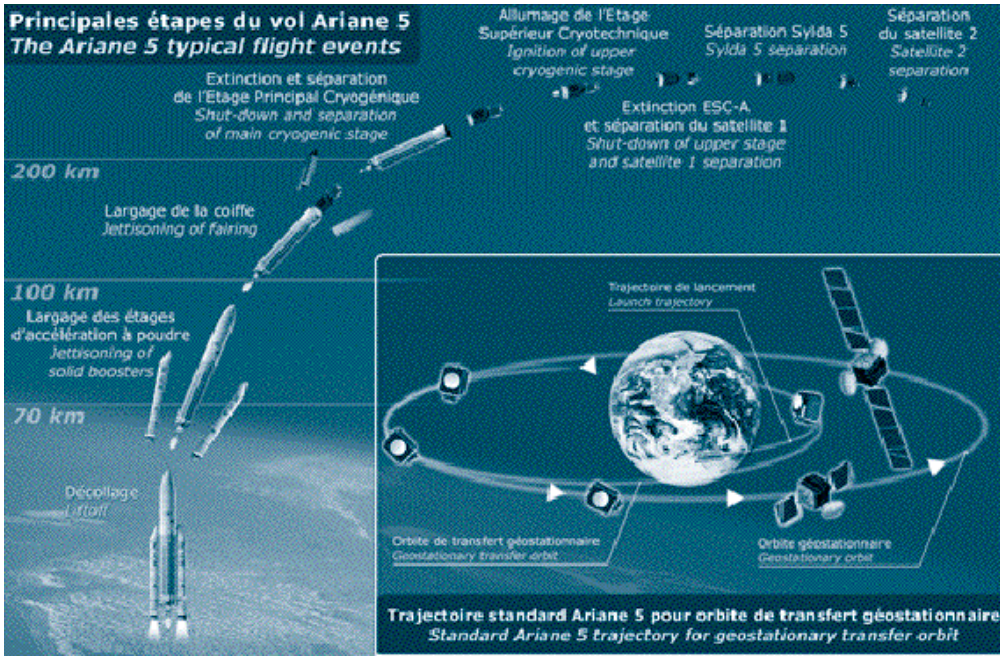
HO	*Ignition of the cryogenic main stage engine (EPC)*		*ALT (km)*	*V. rel. (m/s)*
	+ 7,0 s	*Ignition of solid boosters*	*0*	*0*
	+ 7,3 s	*Liftoff*	*0*	*0*
	+ 12,5 s	*End of vertical climb and beginning of pitch rotation (10 seconds duration)*	*0.087*	*36*
	+ 17 s	*Beginning of roll manoeuvre*	*0.335*	*75*
+ 2 mn	*20 s*	*Jettisoning of solid boosters*	*67.0*	*1989*
+ 3 mn	*09 s*	*Jettisoning of fairing*	*106.7*	*2196*
+ 7 mn	*17 s*	*Acquisition by Natal tracking station*	*176.0*	*5000*
+ 8 mn	*55 s*	*Shut-down of main cryogenic stage*	*174.2*	*6923*
+ 9 mn	*01 s*	*Separation of main cryogenic stage*	*174.0*	*6950*
+ 9 mn	*05 s*	*Ignition of upper cryogenic stage (ESC-A)*	*173.9*	*6952*
+ 13 mn	*31 s*	*Acquisition by Ascension tracking station*	*153.0*	*7600*
+ 18 mn	*12 s*	*Acquisition by Libreville tracking station*	*182.0*	*8400*
+ 23 mn	*10 s*	*Acquisition by Malindi tracking station*	*450.0*	*9080*
+ 24 mn	*41 s*	*Shut-down of ESC-A / Injection*	*632.1*	*9373*
+ 27 mn	*06 s*	*Separation of AMAZONAS-2 satellite*	*984.0*	*9080*
+ 31 mn	*05 s*	*Separation of Sylda 5*	*1747.8*	*8503*
+ 33 mn	*01 s*	*Separation of COMSATBw-1 satellite*	*2174.6*	*8213*
+ 49 mn	*29 s*	*End of Arianespace Flight mission*	*6316.1*	*6120*

4. Flight trajectory of AMAZONAS-2 & COMSATBw-1

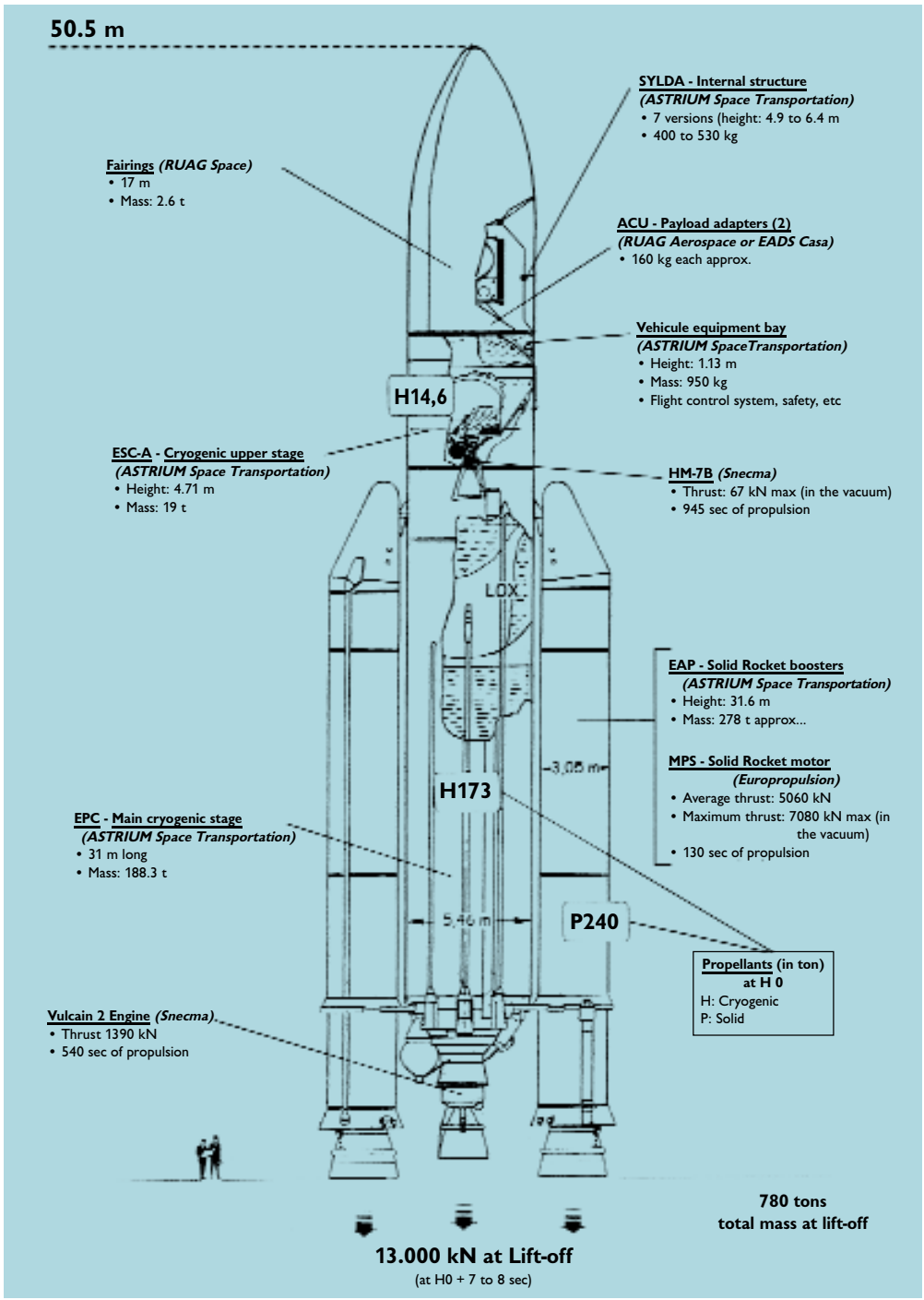
The launcher's attitude and trajectory are totally controlled by the two onboard computers, located in the Ariane 5 vehicle equipment bay (VEB).
7.05 seconds after ignition of the main stage cryogenic engine at T-0, the two solid-propellant boosters are ignited, enabling liftoff. The launcher first climbs 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 9373 meters/second, and will be at an altitude of about 632 kilometers.
The fairing protecting the AMAZONAS-2 & COMSATBw-1 spacecraft is jettisoned shortly after the boosters are jettisoned at about T+189 seconds.

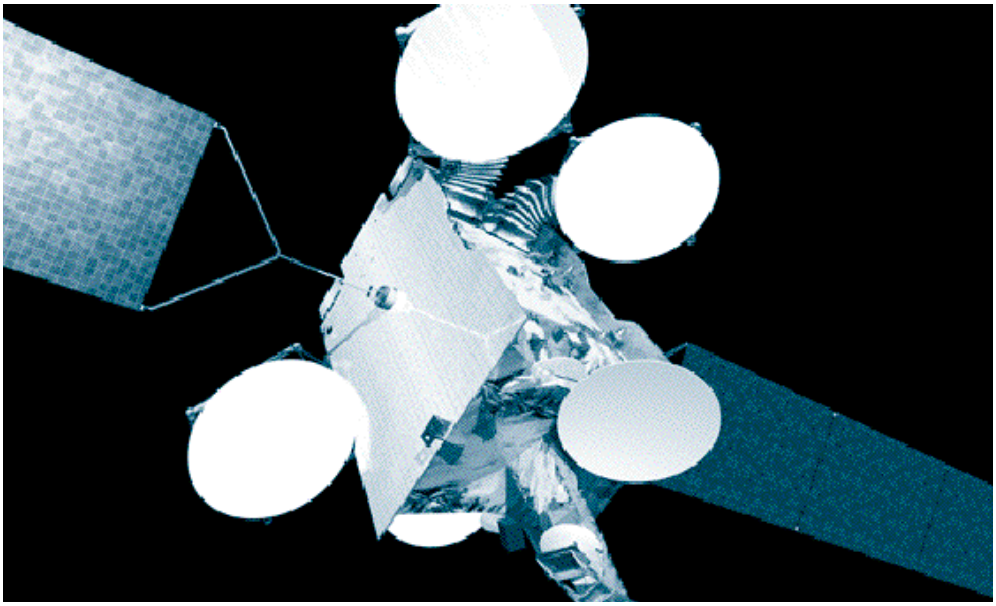
Standard Ariane 5 trajectory for geostationary transfer orbit



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



6. The AMAZONAS-2 satellite



Customer	**HISPASAT**
Prime contractor	*Astrium*
Mission	*Communications satellite*
Mass	*Total mass at lift-off 5 465 kg*
Stabilization	*3 axis stabilized*
Dimensions	*6.7 x 2.9 x 3.5 m*
Span in orbit	*28 m*
Platform	*EUROSTAR 3000*
Payload	*54 Ku-band transponders and 10 C-band transponders*
On-board power	*15.3 kW (end of life)*
Life time	*15 years*
Orbital position	*61° West*
Coverage area	*Brazil, North America, Latin and South America*

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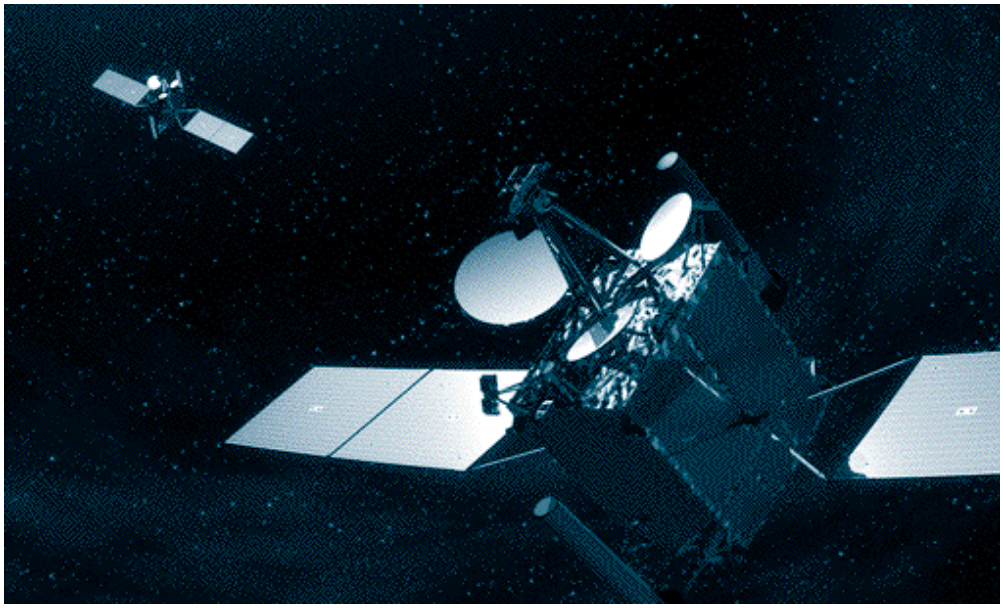
7. The COMSATBw-1 satellite



Customer	**German Ministry of Defense represented by IT-Amt**
Prime contractor	*Astrium*
Integrator	*Thales Alenia Space*
Mission	*Secure military telecommunications*
Mass	*Total mass at lift-off 2,440 kg*
Stabilization	*3 axis*
Dimensions	*2,8 x 1,8 x 2,9 m*
Span in orbit	*17.2 m*
Platform	*Spacebus 3000 B2*
Payload	*4 SHF-band transponders and 5 UHF-band transponders*
On-board power	*3 205 W (end of life)*
Life time	*15 years*
Orbital position	*63° East*

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Appendix 1. Arianespace AMAZONAS-2 & COMSATBw-1 launch key personnel

In charge of the launch campaign			
Mission Director	*(CM)*	*Jean-Marc DURAND*	*ARIANESPACE*
In charge of the launch service contract			
Ariane Payload Manager	*(RCUA)*	*Jérôme RIVES*	*ARIANESPACE*
Ariane Deputy Mission Manager	*(RCUA/A)*	*Patrick LOIRE*	*ARIANESPACE*
In charge of AMAZONAS-2 satellite			
Satellite Mission Director	*(DMS)*	*Antonio ABAD*	*HISPASAT*
Satellite Mission Deputy Director	*(DMS/A)*	*Manuel SANSEGUNDO*	*HISPASAT*
Satellite Program Manager	*(CPS)*	*Jean-Michel FLEURANT*	*ASTRIUM*
Satellite Preparation Manager	*(RPS)*	*François GLASSER*	*ASTRIUM*
In charge of COMSATBw-1 satellite			
Satellite Mission Director	*(DMS)*	*Lionel IMBERT*	*ASTRIUM*
Satellite Mission Deputy Director	*(DMS/A)*	*Anton LIBOSSEK*	*ASTRIUM*
Satellite Program Manager	*(CPS)*	*René NEYER*	*THALES*
Satellite Preparation Manager	*(RPS)*	*Bernard ARTERO*	*THALES*
In charge of the launch vehicle			
Launch Site Operations Manager	*(COEL)*	*Patrick LUCET*	*ARIANESPACE*
Ariane Production Project Manager	*(CPAP)*	*Pierre-Yves TISSIER*	*ARIANESPACE*
In charge of the Guiana Space Center (CSG)			
Range Operations Manager	*(DDO)*	*Damien SIMON*	*CNES/CSG*
Range Operations Deputy	*(DDO/A)*	*Jacques SCHRIVE*	*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 272 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 beginning of 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.