SATELLITE LAUNCHES FOR THE MIDDLE EAST AND SOUTH KOREA

For its second launch of the year, Arianespace will orbit the Arabsat 5A communications satellite for operator Arabsat, and the COMS multi-mission satellite for the Korea Aerospace Research Institute (KARI).

The choice of Arianespace by leading operators and manufacturers is clear international recognition of the company's excellence in launch services. Based on the proven reliability and availability of its launch services, 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.

Arianespace and Arabsat have developed close ties over the 25 years since the launch of Arabsat 1A in 1985. Arabsat 5A is the seventh Arabsat satellite to be orbited by the European launcher.

Arabsat 5A was built by Astrium and Thales Alenia Space within the scope of a turnkey contract with satcom operator Arabsat, based in Riyadh, Saudi Arabia. Astrium provides the Eurostar 3000 platform and is responsible for satellite integration, while Thales Alenia Space supplies the payload.

The fifth-generation Arabsat 5A will provide telecommunications and TV broadcasting services in the Middle East and North Africa. Positioned at 30.5 degrees East, Arabsat 5A has a design life exceeding 15 years.

The launch of South Korea's COMS satellite carries on a collaboration that started with the launch of the scientific microsats Kitsat A and Kitsat B for SATREC, Satellite Technology Research Center, and continued with the launch of the Koreasat 3 communications satellite for the operator Korea Telecom.

COMS, the Communication, Ocean and Meteorological Satellite, will weigh about 2,460 kg at launch. It is fitted with three payloads to carry out meteorological observation, ocean surveillance and experimental broadband multimedia communications services, based on its orbital position. Program prime contractor Astrium built COMS using a Eurostar 3000 platform, fitted with a meteorological imaging system and an ocean observation payload. The communication payload was supplied by ETRI (Electronics and Telecommunications Research Institute) in Korea.

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

1. Mission profile

The 195th Ariane mission will place two satellites into geostationary transfer orbit: the Arabsat 5A communications satellite for operator Arabsat, and the COMS multi-mission satellite for the Korea Aerospace Research Institute (KARI).

This will be the 51st Ariane 5 launch

The launcher will be carrying a total payload of 8,393 kg, including 7,315 kg for the Arabsat 5A and COMS 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	***2° degrees***

The lift-off is scheduled on the night of 23 to 24 June, 2010 as soon as possible within the following launch window:

Launch opportunity

	Universal time (GMT)	*Paris time*	*Kourou time*	*Riyadh time*	*Seoul time*
Between	*9:41 pm*	*11:41 pm*	*6:41 pm*	*12:41 am*	*6:41 am*
and	*10:45 pm*	*12:45 am*	*7:45 pm*	*13:45 am*	*7:45 am*
on	*June 23, 2010*	*June 23/24, 2010*	*June 23, 2010*	*June 24, 2010*	*June 24, 2010*

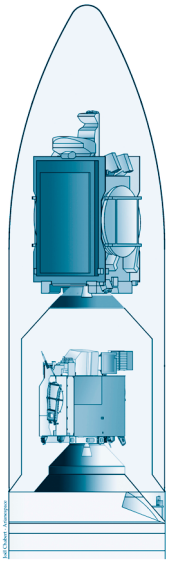
Configuration of Ariane payload

The Arabsat 5A satellite was built by Astrium and Thales Alenia Space, in Toulouse and Cannes, France, for the operator Arabsat.

Orbital position: 30.5° East

COMS was built by Astrium and the Korea Aerospace Research Institute (KARI).

Orbital position : 128,2° East



2. Range operations campaign: ARIANE 5 - ARABSAT 5A & COMS

Satellites and launch vehicle campaign calendar

Ariane activities	*Dates*	*Satellites activities*
Campaign start review	*March 1st, 2010*	
EPC Erection	*March 1st, 2010*	
EAP transfer and positionning	*March 2, 2010*	
Integration EPC/EAP	*March 3, 2010*	
ESC-A and VEB Erection	*March 10, 2010*	
	March 11, 2010	*Arrival in Kourou of ARABSAT 5A and beginning of preparation campaign in building S5 C*
	March 11, 2010	*Arrival in Kourou of COMS and beginning of preparation campaign in building S5 C*
	May 26-31, 2010	*ARABSAT 5A filling operations in S5 A building*
Roll-out from BIL to BAF	*June 2, 2010*	
	June 2, 2010	*ARABSAT 5A integration on adaptor (ACU)*
	June 5-8, 2010	*COMS filling operations in S5 B building*

Satellites and launch vehicle campaign final calendar

J-10	*Wednesday, June 9*	*ARABSAT 5A transfer to Final Assembly Building (BAF)*
J-9	*Thursday, June 10*	*ARABSAT 5A integration on Sylda and COMS integration on adaptor*
J-8	*Friday, June 11*	*Fairing integration on Sylda - COMS transfer to Final Assembly Building (BAF)*
J-7	*Monday, June 14*	*COMS integration on launcher*
J-6	*Tuesday, June 15*	*Upper composite integration with ARABSAT 5A on launcher*
J-5	*Wednesday, June 16*	*ESC-A final preparations and payloads control*
J-4	*Thursday, June 17*	*Launch rehearsal*
J-3	*Friday, June 18*	*Arming of launch vehicle*
J-2	*Monday, June 21*	*Arming of launch vehicle* *Launch readiness review (RAL) and final preparation of launcher*
J-1	*Thursday, June 22*	*Roll-out from BAF to Launch Area (ZL), launch vehicle connections and filling of the EPC liquid Helium sphere*
J-0	*Wednesday, June 23*	*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*

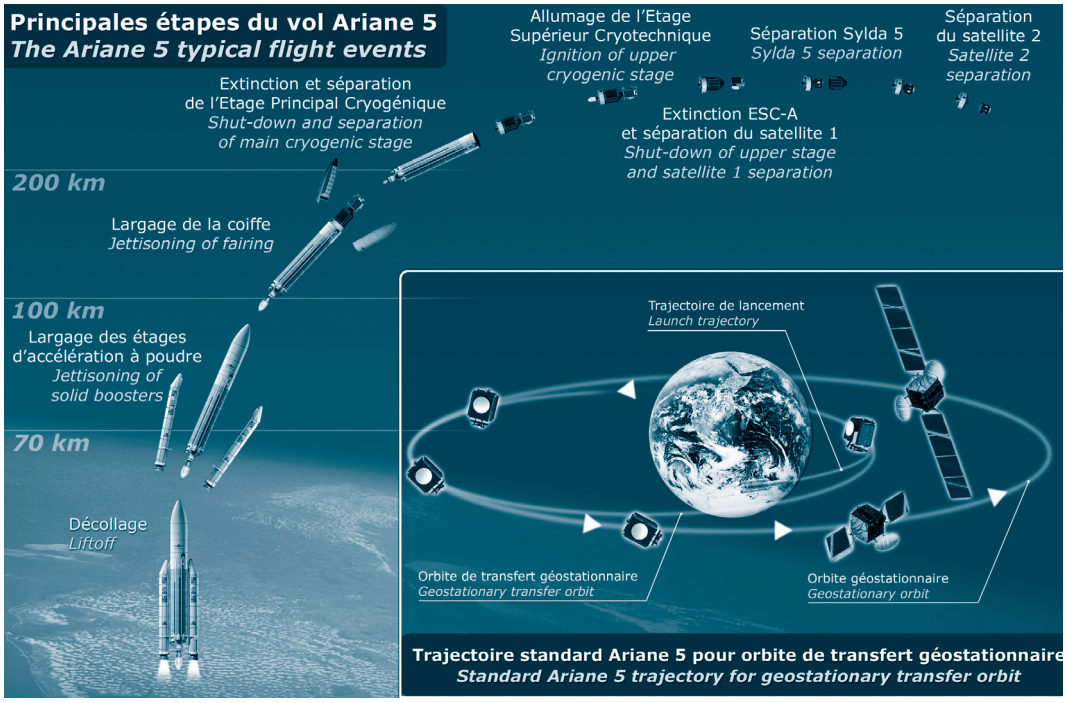
HO	*Ignition of the cryogenic main stage engine (EPC)*		*ALT (km)*	*V. rel. (m/s)*
	+ 7,05 s	*Ignition of solid boosters*	*0*	*0*
	+ 7,3 s	*Liftoff*	*0*	*0*
	+ 12,5 s	*End of vertical climb and beginning of pitch rotation (10 seconds duration)*	*0.090*	*37.5*
	+ 17 s	*Beginning of roll manoeuvre*	*0.345*	*76.6*
+ 2 mn	*20 s*	*Jettisoning of solid boosters*	*67.9*	*1997*
+ 3 mn	*09 s*	*Jettisoning of fairing*	*107.7*	*2184*
+ 7 mn	*31 s*	*Acquisition by Natal tracking station*	*210.0*	*4904*
+ 8 mn	*55 s*	*Shut-down of main cryogenic stage*	*210.7*	*6831*
+ 9 mn	*01 s*	*Separation of main cryogenic stage*	*210.4*	*6858*
+ 9 mn	*05 s*	*Ignition of upper cryogenic stage (ESC-A)*	*210.1*	*6861*
+ 13 mn	*30 s*	*Acquisition by Ascension tracking station*	*180.3*	*7557*
+ 18 mn	*28 s*	*Acquisition by Libreville tracking station*	*199.3*	*8381*
+ 23 mn	*15 s*	*Acquisition by Malindi tracking station*	*434.8*	*9174*
+ 24 mn	*40 s*	*Shut-down of ESC-A / Injection*	*581.8*	*9416*
+ 26 mn	*39 s*	*Separation of ARABSAT 5A satellite*	*852.0*	*9187*
+ 30 mn	*11 s*	*Separation of Sylda 5*	*1485.7*	*8692*
+ 32 mn	*38 s*	*Separation of COMS satellite*	*2006.2*	*8325*
+ 49 mn	*52 s*	*End of Arianespace Flight mission*	*6318.8*	*6118*

4. Flight trajectory of ARABSAT 5A & COMS

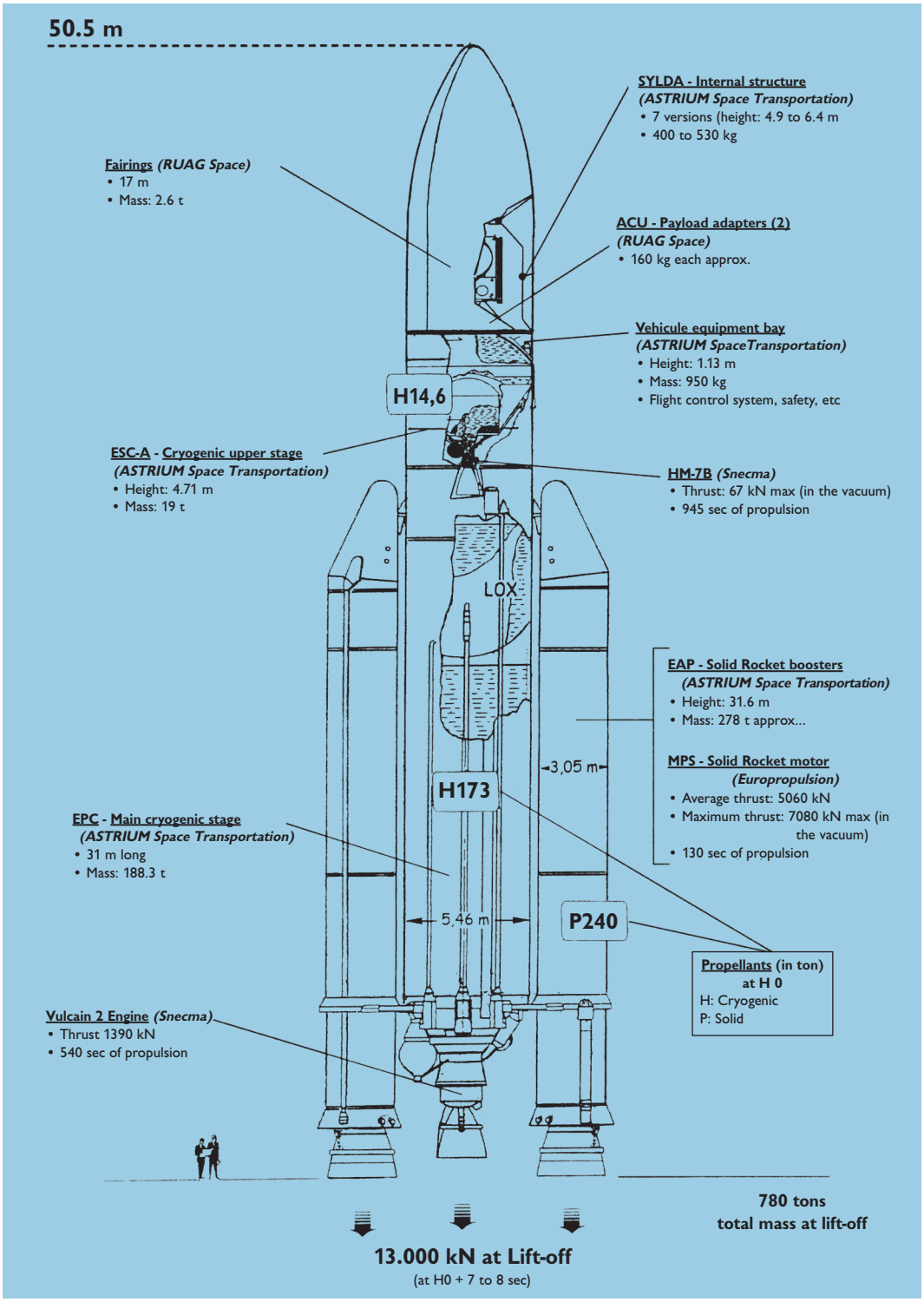
The launcher's attitude and trajectory are totally controlled by the two onboard computers, located in the Ariane 5 vehicle equipment bay (VEB).
7.05 seconds after ignition of the main stage cryogenic engine at T-0, the two solid-propellant boosters are ignited, enabling liftoff. The launcher first climbs 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 9416 meters/second, and will be at an altitude of about 6582 kilometers.
The fairing protecting the ARABSAT 5A et COMS spacecraft is jettisoned shortly after the boosters are jettisoned at about T+189 seconds.

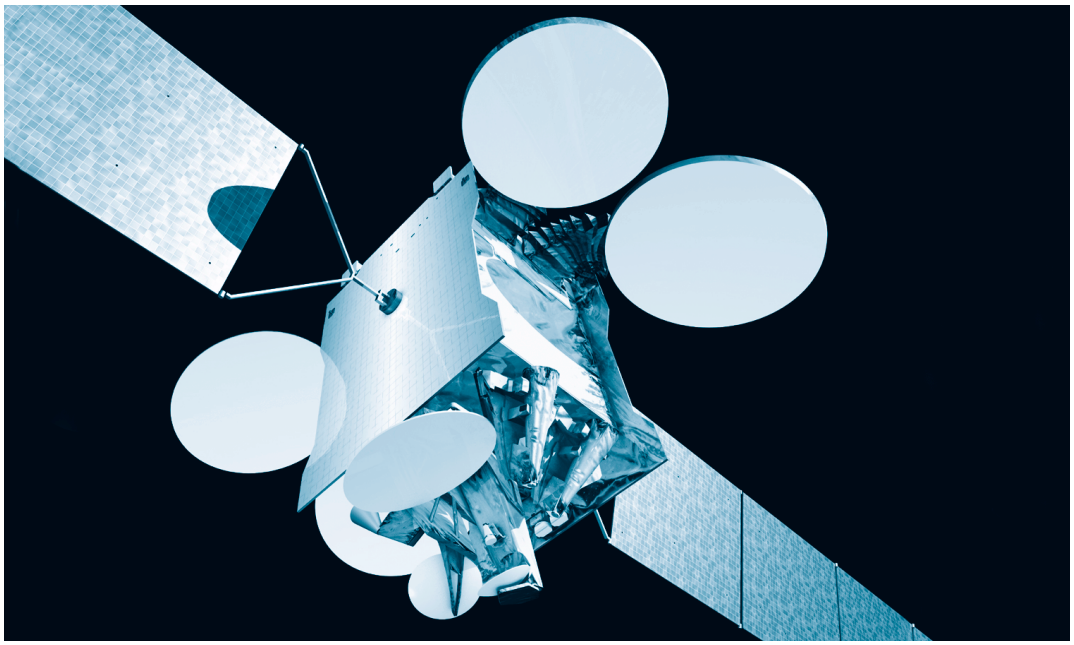
Standard Ariane 5 trajectory for geostationary transfer orbit



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



6. The ARABSAT 5A satellite



Customer	THALES ALENIA SPACE FOR ARABSAT
Prime contractor	*Astrium and Thales Alenia Space*
Mission	*Communications satellite*
Mass	*Total mass at lift-off 4 939 kg*
Stabilization	*3 axis stabilized*
Dimensions	*2.1 x 2.35 x 4.5 m*
Span in orbit	*39.4 m*
Platform	*EUROSTAR E3000*
Payload	*24 Ku-band transponders and 28 C-band transponders*
On-board power	*12 kW (end of life)*
Life time	*15 years*
Orbital position	*30.5° East*
Coverage area	*The Middle East and Africa*

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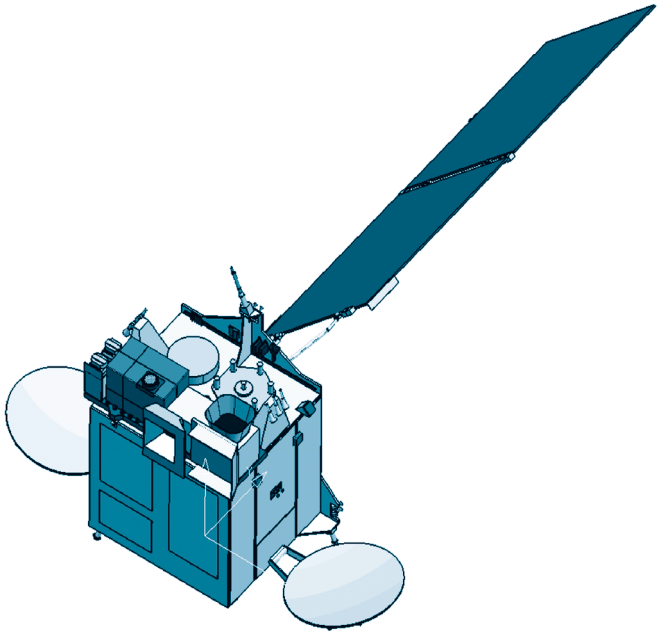
7. The COMS satellite



Customer	KARI (KOREA AEROSPACE RESEARCH INSTITUTE)
Prime contractor	*Astrium*
Mission	*Geostationary multi-missions observation*
Mass	*Total mass at lift-off 2,460 kg*
Stabilization	*3 axis*
Dimensions	*2,8 x 1,8 x 2,9 m*
Span in orbit	*17.2 m*
Platform	*EUROSTAR E3000*
Payload	*3 Payloads: telecommunications, meteorological observations, surveillance of the oceans*
On-board power	*2.5 kW (end of life)*
Life time	*10 years*
Orbital position	*128.2° East*

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Appendix 1. Arianespace ARABSAT 5A & COMS launch key personnel

In charge of the launch campaign			
Mission Director	*(CM)*	*Ignacio GORI*	*ARIANESPACE*
In charge of the launch service contract			
Program Director ARABSAT 5A	*(CP1)*	*Michael CALLARI*	*ARIANESPACE*
Program Director COMS	*(CP2)*	*Luca CHIECCHIO*	*ARIANESPACE*
In charge of ARABSAT 5A satellite			
Satellite Mission Director	*(DMS)*	*Ahmad AL-SHRAIDEH*	*ARABSAT*
Deputy Satellite Mission Director	*(DMS/A)*	*Guy MACE*	*ASTRIUM*
Satellite Program Manager	*(CPS)*	*Philippe LE BOUAR*	*ASTRIUM*
Satellite Preparation Manager	*(RPS)*	*François GLASSER*	*ASTRIUM*
In charge of COMS satellite			
Satellite Mission Director	*(DMS)*	*Dr. Seong-Bong CHOI*	*KARI*
Satellite Program Manager	*(CPS)*	*Hervé LAMBERT*	*ASTRIUM*
Satellite Preparation Manager	*(RPS)*	*Jean-Luc LORMEAU*	*ASTRIUM*
In charge of the launch vehicle			
Launch Site Operations Manager	*(COEL)*	*Pierre-François BENAITEAU*	*ARIANESPACE*
Ariane Production Project Manager	*(CPAP)*	*Pierre-Yves TISSIER*	*ARIANESPACE*
In charge of the Guiana Space Center (CSG)			
Range Operations Manager	*(DDO)*	*Thierry VALLEE*	*CNES/CSG*
Range Operations Deputy	*(DDO/A)*	*Tony GUILLAUME*	*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 24 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 279 satellites. More than two-thirds of the commercial satellites now in service worldwide were launched by Arianespace.
The company posted sales of 1046 million euros in 2009.
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 in 2010.
- The Vega light launcher, to be launched from the Guiana Space Center starting in 2011.

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 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 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.