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A dual launch for Intelsat and Optus

For its fourth launch of the year Arianespace will boost two communications satellites into orbit: Intelsat 11 for the international operator Intelsat, and Optus D2 for the Australian operator Optus. Both satellites were built by Orbital Sciences Corporation.

Arianespace's selection by leading satcom manufacturers and operators is clear international recognition of the company's high-quality launch services. Ariane 5 is the only commercial launcher in service today capable of simultaneously launching two payloads.

Arianespace is particularly proud of its partnership with Intelsat. Since 1983, Arianespace has launched 46 satellites for the international operator. Most recently, Arianespace successfully launched Intelsat's Galaxy 17 satellite on May 2, 2007.

Weighing about 2,500 kg at launch, the Intelsat 11 satellite was built by Orbital Sciences Corporation at its plant in Dulles, Virginia, using a Star 2 platform. The satellite is fitted with a hybrid payload comprising 34 high-power transponders, including 16 C-band and 18 Ku-band transponders. It offers 3.5 kW of electrical power. Positioned at 43 degrees West, Intelsat will host Latin America's premier video programmers and the region's largest DTH platform.

Optus D2 will be the fourth satellite launched by Arianespace for the Australian operator. It launched Optus D1 in October 2006, following Optus & Defence C1 in June 2003 and Aussat K3 in 1987. SingTel, the parent company of Optus, had already chosen Arianespace to launch its ST-1 satellite in 1998.

Orbital Sciences Corporation also integrated the Optus D2 satellite in Dulles, using a Star 2 platform. Weighing about 2,350 kg at launch, Optus D2 will be positioned at 152 degrees East and has a design life of 15 years. Optus D2 will provide direct TV broadcast, Internet, telephone and data transmission services for Australia and New Zealand.

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

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UPDATE

Arianespace Flight Intelsat 11 / Optus D2

During the night of Friday, October 5, to Saturday, October 6, Arianespace will place two telecommunications satellites into geostationary transfer orbit: Intelsat 11 for International operator Intelsat and Optus D2 for Australian operator Optus. The two satellites are built by Orbital Sciences Corporation.

Following the completion of additional checks, lift-off of the Ariane 5 GS launcher is now scheduled from the Spaceport in Kourou, French Guiana on **the night of October 5 to 6,** as early as possible in the following launch window:

Launch Opportunity	Kourou Time	Washington Time	Paris Time	Sydney Time
Between 9:28 pm and 10 :13 pm On October 5, 2007	Between 6 :28pm and 7 :13 pm On October 5, 2007	Between 5 :28 pm and 6 :13 pm On October 5, 2007	Between 11:28 pm and 00:13 am On October 5-6, 2007	Between 7:28 am and 8:13 am On October 6, 2007

The final days of the launch campaign:

October 3, 07	Launch Readiness Review (RAL) and final preparation of launcher, payloads control.
October 4, 07	Roll-out from BAF to Launch Area, launch vehicle connections and filling of the EPC liquid Helium Sphere
October 5, 07	Launch countdown including EPC filling with liquid oxygen and liquid hydrogen

1. Mission profile

The 178th Ariane launch will boost two communications satellites into orbit: Intelsat 11 for the international operator Intelsat, and Optus D2 for the Australian operator Optus. Both satellites were built by Orbital Sciences Corporation.

This will be the 34th Ariane 5 launch.

The launcher will be carrying a total payload of 5,857 kg, including 4,832 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	***585 km***
Apogee altitude	***35 786 km at injection***
Inclination	***4° degrees***

The lift-off is scheduled on the night of 2 to 3 October, 2007 as soon as possible within the following launch window:

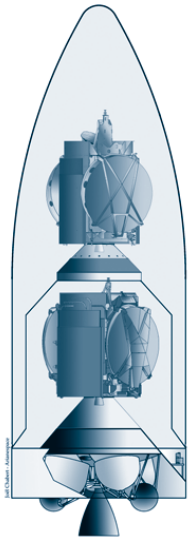
Launch opportunity

	Universal time (GMT)	*Paris time*	*Washington time*	*Kourou time*	*Sydney time*
Between	*9:29 pm*	*11:29 pm*	*5:29 pm*	*6:29 pm*	*7:29 am*
and	*10:14 pm*	*00:14 am*	*6:14 pm*	*7:14 pm*	*8:14 am*
on	*October 2, 2007*	*October 2-3, 2007*	*October 2, 2007*	*October 2, 2007*	*October 3, 2007*

Configuration of Ariane payload

The Intelsat 11 satellite was built by Orbital Sciences Corporation in Dulles, Virginia for international operator Intelsat
Orbital position: 43° West.

The Optus D2 satellite was built by Orbital Sciences Corporation in Dulles, Virginia for Australian operator Optus.
Orbital position: 152° East



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2. Range operations campaign: ARIANE 5 - INTELSAT 11 & OPTUS D2

Satellites and launch vehicle campaign calendar

Ariane activities	*Dates*	*Satellites activities*
Campaign start review	*May 21, 2007*	
EPC Erection	*May 21, 2007*	
EAP transfer and positionning	*May 22, 2007*	
Integration EPC/EAP	*May 23, 2007*	
EPS Erection	*May 28, 2007*	
Integration equipement bay	*May 28, 2007*	
	August 25, 2007	*Arrival in Kourou and begining of INTELSAT 11 preparation campaign in building S1 A*
	August 25, 2007	*Arrival in Kourou and begining of OPTUS D2 preparation campaign in building S1 B*
Roll-out from BIL to BAF	*September 3, 2007*	
	September 6-8, 2007	*INTELSAT 11 filling operations in S5A building*
	September 11-13, 2007	*OPTUS D2 filling operations in S5B building*

Satellites and launch vehicle campaign final calendar

Wednesday, September 12		*INTELSAT 11 integration on adaptor (ACU)*
Thursday, September 13		*INTELSAT 11 transfer to Final Assembly Building (BAF)*
Friday, September 14		*INTELSAT 11 integration on Sylda*
Monday, September 17		*OPTUS D2 integration on adaptor*
Tuesday, September 18		*Fairing integration on Sylda - OPTUS D2 transfer to Final Assembly Building (BAF)*
Wednesday, September 19		*OPTUS D2 integration on launcher*
Thursday, September 20		*Upper composite integration with INTELSAT 11 on launcher*
Friday, September 21		*Preparations EPS and SCA for filling*
Monday, September 24		*Filling of SCA*
Tuesday, September 25		*EPS filling with MMH*
Thursday, September 27		*Launch rehearsal. EPS filling with N2O4*
Friday, September 28		*Arming of launch vehicle*
Saturday, September 29		*Launch readiness review (RAL) and final preparation of launcher, payloads control*
Monday, October 1	*J-1*	*Roll-out from BAF to Launch Area (ZL), launch vehicle connections and filling of the EPC liquid Helium sphere*
Tuesday, October 2	*J-0*	*Launch countdown including EPC filling with liquid oxygen and liquid hydrogen*

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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.

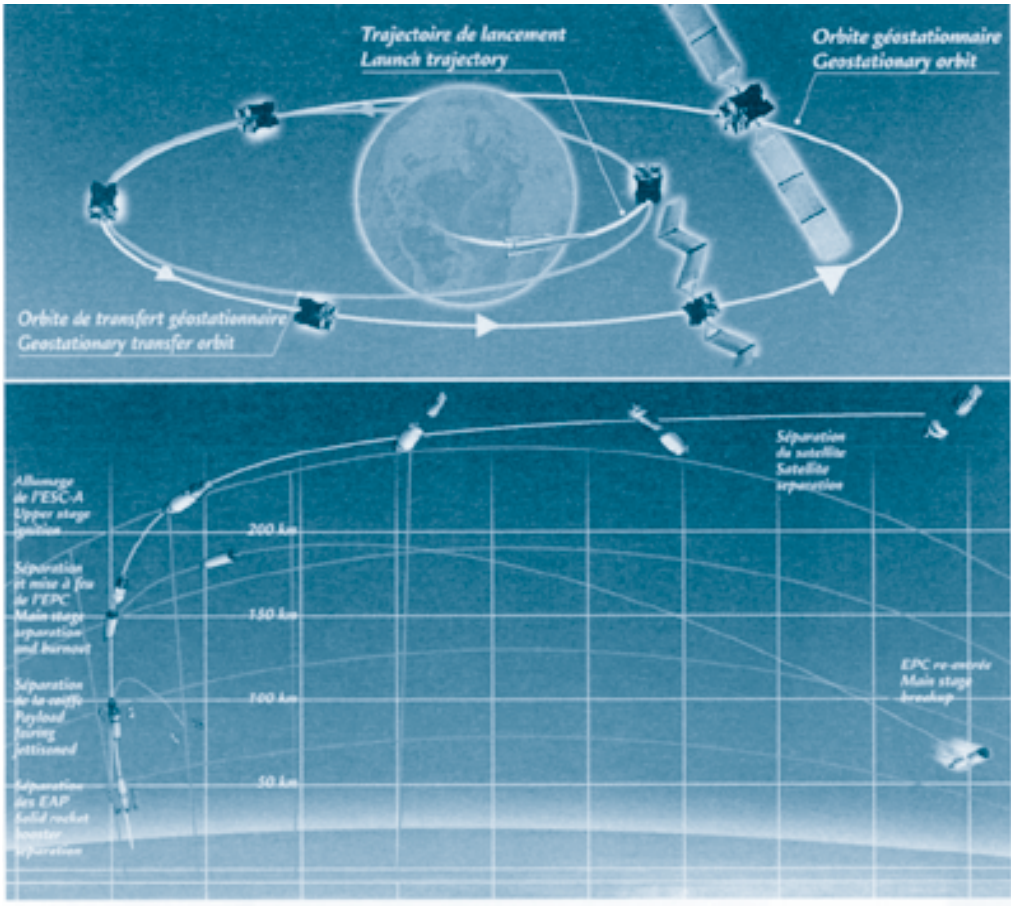
Time		*Events*
– 11 h	*30 mn*	*Start of final countdown*
– 7 h	*30 mn*	*Check of electrical systems*
– 4 h	*50 mn*	*Start of filling of main cryogenic stage with liquid oxygen and hydrogen*
– 3 h	*20 mn*	*Chilldown of Vulcain main stage engine*
– 1 h	*10 mn*	*Check of connections between launcher and 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)*	*0.096*	*40*
	+ 17 s	*Beginning of roll manoeuvre*	*0.373*	*83*
+ 2 mn	*20 s*	*Jettisoning of solid boosters*	*67.1*	*2121*
+ 3 mn	*15 s*	*Jettisoning of fairing*	*106.3*	*2374*
+ 8 mn	*17 s*	*Acquisition by Natal tracking station*	*137.0*	*5856*
+ 9 mn	*37 s*	*Shut-down of main cryogenic stage*	*147.0*	*7685*
+ 9 mn	*43 s*	*Separation of main cryogenic stage*	*149.8*	*7703*
+ 9 mn	*50 s*	*Ignition of storable propellant stage (EPS)*	*153.1*	*7699*
+ 12 mn	*20 s*	*Acquisition by Ascension tracking station*	*234.4*	*7853*
+ 21 mn	*47 s*	*Acquisition by Malindi tracking station*	*899.0*	*8374*
+ 26 mn	*33 s*	*Shut-down of EPS / Injection*	*1582.5*	*8614*
+ 27 mn	*48 s*	*Separation of INTELSAT 11 satellite*	*1821.8*	*8451*
+ 30 mn	*25 s*	*Separation of Sylda 5*	*2342.1*	*8097*
+ 32 mn	*01 s*	*Separation of OPTUS D2 satellite*	*2691.7*	*7879*
+ 1h 36 mn	*05 s*	*End of Arianespace Flight mission*	*16822.6*	*3193*

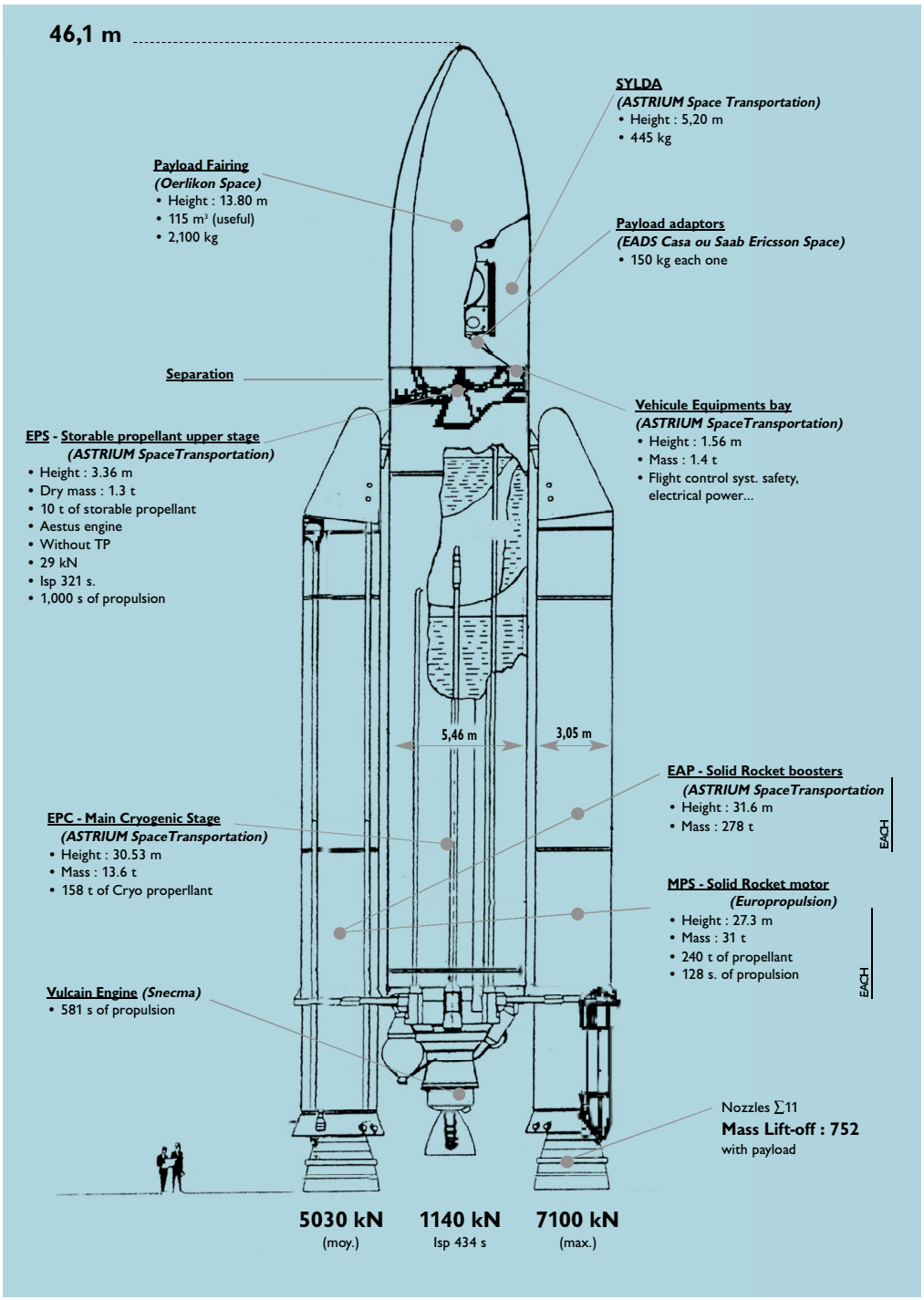
4. Flight trajectory

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 storable propella 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 8614 meters/second, and will be at an altitude of about 1582 kilometers.
The fairing protecting the INTELSAT 11/ OPTUS D2 spacecraft is jettisoned shortly after the boosters are jettisoned at about T+195 seconds.

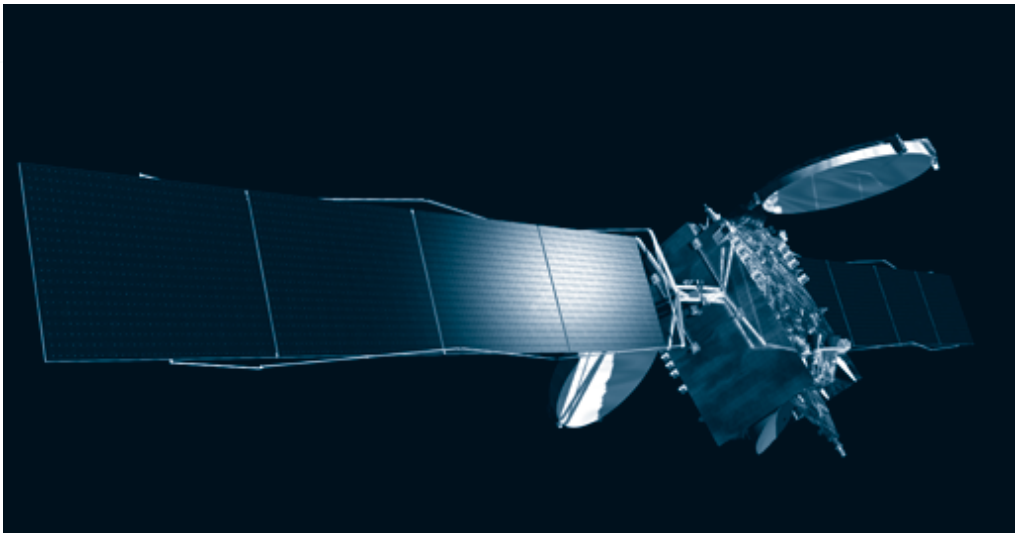
Standard Ariane 5 trajectory for geostationary transfer orbit



5. The Ariane 5GS (Industrial prime cartractor: ASTRIUM Space Transportation)



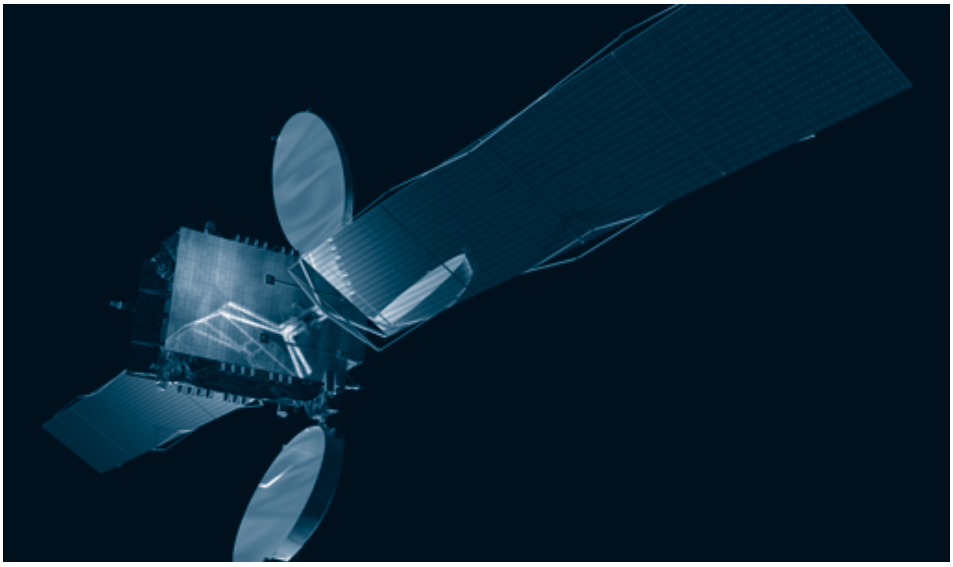
6. The INTELSAT 11 satellite



Customer	**INTELSAT**
Prime contractor	*Orbital Sciences Corporation*
Mission	*Direct TV and data transmission*
Mass	*Total mass at lift-off* *2 450 kg*
Stabilization	*3 axis stabilized*
Dimensions	*4.1 x 3.3 x 2.3 m*
Span in orbit	*22.4 m*
Platform	*STAR 2*
Payload	*16 C band transponders and 18 Ku band transponders*
On-board power	*4400 W (end of life)*
Life time	*15 years*
Orbital position	*43° West*
Coverage area	*CONUS, Mexico, Latin and South America*

Press Contact
Nick Mitsis
Corporate Communications
INTELSAT
3400 International Drive NW
Washington DC 20008-3006
Tél : +1 202 944 7044
E-mail : nick.mitsis@intelsat.com

7. The OPTUS D2 satellite



Customer	*OPTUS*
Prime contractor	*Orbital Sciences Corporation*
Mission	*DTH, Internet, voice and data transmission*
Mass	*Total mass at lift-off 2.350 kg*
Stabilization	*3 axis*
Dimensions	*4.0 x 3.2 x 2.4 m*
Span in orbit	*22.4 m*
Payload	*24 Ku-band transponders*
On-board power	*4 000 W (end of life)*
Life time	*15 years*
Orbital position	*152° East*
Coverage area	*Australia and New Zealand*

Press contact
Simone Bergholcs
OPTUS Corporate Affairs
Tel. : +61 2 9342 7850
Mob. : +61 412 206 602
E-mail : simone.bergholcs@optus.com.au

Appendix 1. Arianespace INTELSAT 11/OPTUS D2 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)*	*Luca CHIECCHIO*	*ARIANESPACE*
Ariane Deputy Mission Manager	*(RCUA/A)*	*Michael CALLARI*	*ARIANESPACE*
In charge of INTELSAT 11 satellite			
Satellite Mission Director	*(DMS)*	*Brian SING*	*INTELSAT*
Satellite Program Manager	*(CPS)*	*Marcy TAYLOR*	*ORBITAL*
Satellite Preparation Manager	*(RPS)*	*Jim MOONEY*	*ORBITAL*
In charge of OPTUS D2 satellite			
Satellite Mission Director	*(DMS)*	*Gordon PIKE*	*OPTUS*
Satellite Program Manager	*(CPS)*	*Naguesh KRISHNAMURTHY*	*ORBITAL*
Satellite Preparation Manager	*(RPS)*	*Don HATCH*	*ORBITAL*
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)*	*Pierre RIBARDIERE*	*CNES/CSG*
Flight Safety Officer	*(RSV)*	*Laurent JOLIVET*	*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 290 launch contracts and launched 246 satellites. More than two-thirds of the commercial satellites now in service worldwide were launched by Arianespace.
The company posted sales of 983 million euros in 2006, and stayed in the black for the fourth year in a row.
At January 1, 2007, Arianespace had 271 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 44 satellites to be launched, as well as four more launches to be handled by Starsem. .

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.