

UPDATE

Arianespace Flight THAICOM 4 (IPSTAR)

The 22nd launch of an Ariane 5 will orbit the THAICOM 4 (IPSTAR) satellite for operator Shin Satellite Plc, which will use the spacecraft primarily for Internet and multimedia services.

The Ariane 5 launcher will carry a payload of 6,695 kg. on this mission, including 6,505 kg. for the THAICOM 4 (IPSTAR) satellite. It will be the largest communications satellite ever launched to geostationary transfer orbit.

Following the completion of additional checks and work to prepare the launcher, lift-off of the Ariane 5 "Generic" launcher is now scheduled from the Spaceport in Kourou, French Guiana on **Thursday, August 11**, as early as possible in the following launch window:

Kourou Time
Between 03:39 a.m. and 05:39 a.m. on August 11, 2005

GMT	Paris Time	Washington Time	Bangkok Time
from 06:39 a.m.	08:39 a.m.	02:39 a.m.	01:39 p.m.
to 08:39 a.m.	10:39 a.m.	04:39 a.m.	03:39 p.m.
on August 11	on August 11	on August 11	on August 11

The final days of the launch campaign:

August 08, 05	Launch Readiness Review (RAL) - Arming of launch vehicle
August 09, 05	Launch vehicle transfer from the Ariane 5 Final Assembly Building to the Launch Zone. Filling of the helium tank in the main cryogenic stage (EPC).
August 10, 05	Final chronology - including fueling of the main cryogenic stage (EPC)
August 11, 05	Synchronized sequence and lift-off

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A satellite launch for Thailand

For its second launch of the year, Arianespace will inject into geostationary transfer orbit the THAICOM 4 (IPSTAR) satellite for operator Shin Satellite Public Company Limited. The satellite will mainly provide Internet and multimedia services.

The Ariane 5 launcher, with its fairing stretching 5 meters in diameter, is the only launcher now available in the commercial market capable of launching satellites of this size.

Following THAICOM 1 in December 1993, THAICOM 2 in October 1994 and THAICOM 3 in April 1997, THAICOM 4 (IPSTAR) will be the fourth satellite launched by Arianespace for the private Thai operator Shin Satellite Plc, formerly Shinawatra Satellite.

THAICOM 4 (IPSTAR) was built by Space Systems/Loral in Palo Alto, California.

It will be the largest communications satellite ever launched, weighing over 6,500 kilograms at lift-off. THAICOM 4 (IPSTAR) will be equipped with 20 Ka band transponders and 51 Ku band transponders.

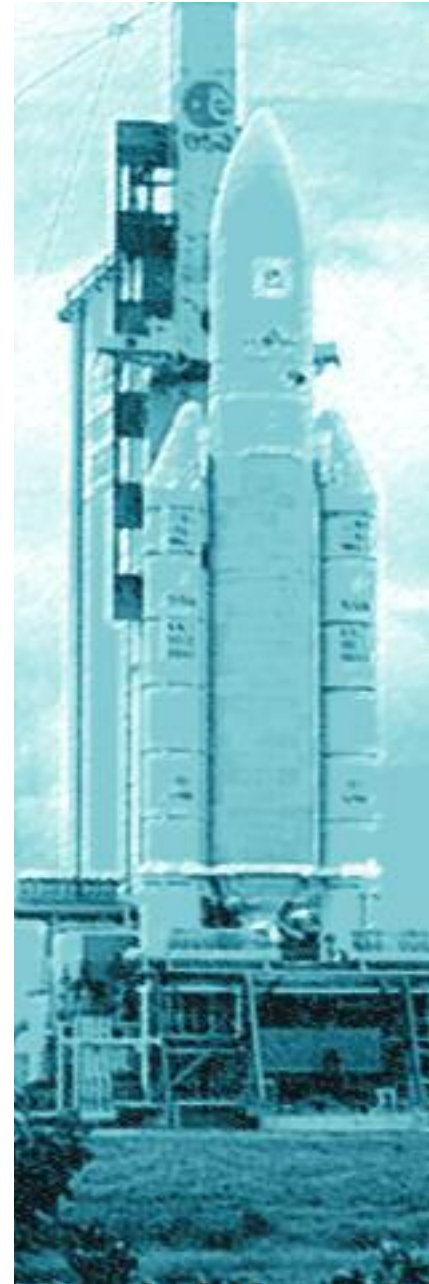
Positioned at 120 degrees East, it will provide Internet access and multimedia services for the entire Asia-Pacific region over a design life exceeding 12 years. THAICOM 4 (IPSTAR) is the world's first satellite dedicated to broadband services.

Arianespace will use a standard Ariane 5G launcher for this mission.

- 1 - The ARIANESPACE - THAICOM 4 (IPSTAR) mission
- 2 - Range operations campaign: ARIANE 5 - THAICOM 4 (IPSTAR)
- 3 - Launch countdown and flight events
- 4 - Trajectory
- 5 - The ARIANE 5 launch vehicle
- 6 - The THAICOM 4 (IPSTAR) satellite

Appendix

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



1. Arianespace Flight mission

The 166th Ariane launch will orbit the THAICOM 4 (IPSTAR) satellite for operator Shin Satellite Plc, primarily for Internet and multimedia services.

This will be the 22nd launch of an Ariane 5.

The Ariane 5G launcher will carry a payload of 6,695 kg on this mission, including 6,505 kg for the THAICOM 4 (IPSTAR) satellite.

The launch will be performed from the ELA 3 launch pad at Kourou, French Guiana.

Injection orbit

<i>Perigee altitude</i>	575 km
<i>Apogee altitude</i>	35,894 km at injection
<i>Inclination</i>	7° degrees

The lift-off is scheduled on the morning of July 11, 2005 as soon as possible within the following launch window:

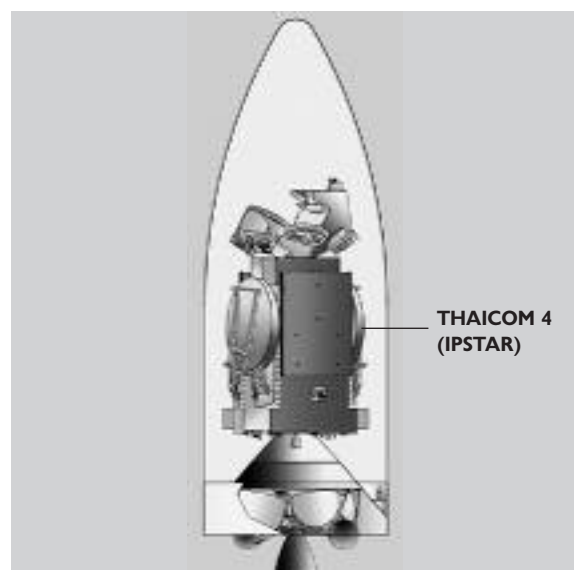
Launch opportunity

	<i>Universal time (GMT)</i>	<i>Paris time</i>	<i>Washington time</i>	<i>Bangkok time</i>	<i>Kourou time</i>
<i>Between</i>	06:40 am	08:40 am	02:40 am	01:40 pm	03:40 am
<i>and</i>	08:40 am	10:40 am	04:40 am	03:40 pm	05:40 am
<i>on</i>	July 11, 2005	July 11, 2005	July 11, 2005	July 11, 2005	July 11, 2005

Ariane payload configuration

THAICOM 4 (IPSTAR) was built by Space Systems/Loral in Palo Alto, California, for private Thai operator Shin Satellite Plc.

Orbital position: 120° East, above Indonesia.



2. Range operations campaign: ARIANE 5 - THAICOM 4 (IPSTAR)

Satellite and launch vehicle campaign calendar

Ariane activities	Dates	Satellites activities
<i>Campaign start review</i>	<i>April 4, 2005</i>	
<i>EPC Erection</i>	<i>April 5, 2005</i>	
<i>EAP transfer and positioning</i>	<i>April 6, 2005</i>	
<i>Integration EPC/EAP</i>	<i>April 7, 2005</i>	
<i>EPS Erection</i>	<i>April 13, 2005</i>	
<i>Integration equipment bay</i>	<i>April 13, 2005</i>	
<i>Roll-out from BIL to BAF</i>	<i>April 29, 2005</i>	
	<i>June 8, 2005</i>	<i>Arrival in Kourou and beginning of THAICOM 4 (IPSTAR) preparation campaign in S5C building</i>
	<i>June 23, 2005</i>	<i>Transfer of THAICOM 4 (IPSTAR) into S5A building</i>
	<i>June 25, 2005</i>	<i>THAICOM 4 (IPSTAR) filling operations in S5A building</i>

Satellite and launch vehicle campaign final calendar

<i>J-7</i>	<i>Wednesday, June 29</i>	<i>THAICOM 4 (IPSTAR) integration on adaptor and transfer into BAF building</i>
<i>J-6</i>	<i>Thursday, June 30</i>	<i>THAICOM 4 (IPSTAR) integration on the launcher</i>
<i>J-5</i>	<i>Friday, July 1</i>	<i>Fairing integration on the launcher</i>
<i>J-4</i>	<i>Monday, July 4</i>	<i>Filling of SCA with N₂H₄</i>
<i>J-3</i>	<i>Tuesday, July 5</i>	<i>Filling of EPS with N₂O₄ - Launch rehearsal</i>
<i>J-2</i>	<i>Friday, July 8</i>	<i>Launcher final preparation and arming of launch vehicle - Launch readiness review (RAL)</i>
<i>J-1</i>	<i>Saturday, July 9</i>	<i>Roll-out from BAF to Launch Area (ZL), launch vehicle connections and filling of the EPC Helium sphere</i>
<i>J-0</i>	<i>Sunday, July 10</i>	<i>Launch countdown including EPC filling with liquid oxygen and liquid hydrogen</i>
<i>H-0</i>	<i>Monday, July 11</i>	<i>H.O.</i>

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.

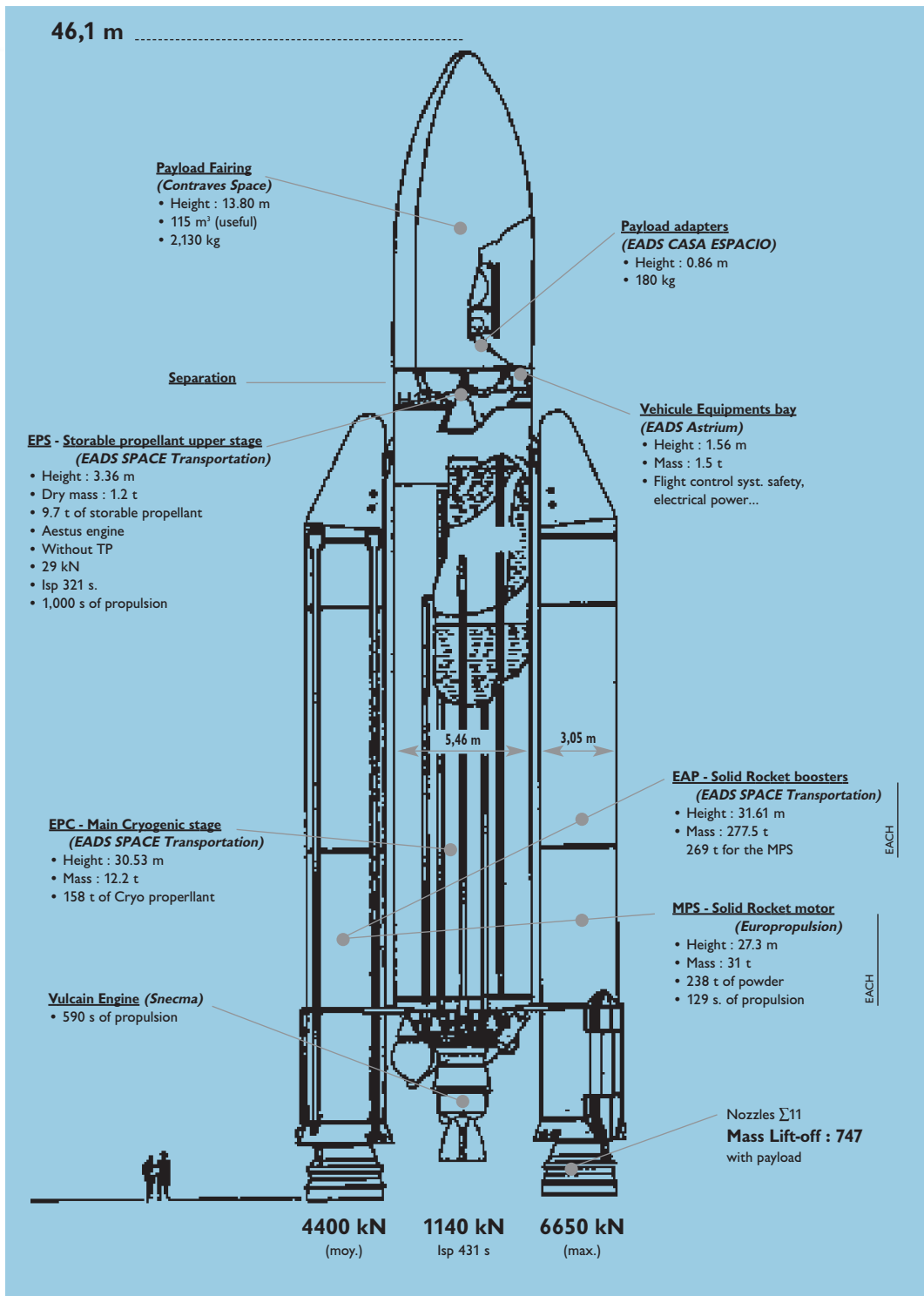
The countdown culminates in a synchronized sequence (see appendix 3), which is managed by the control station and onboard computers starting at T-7 minutes.

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.

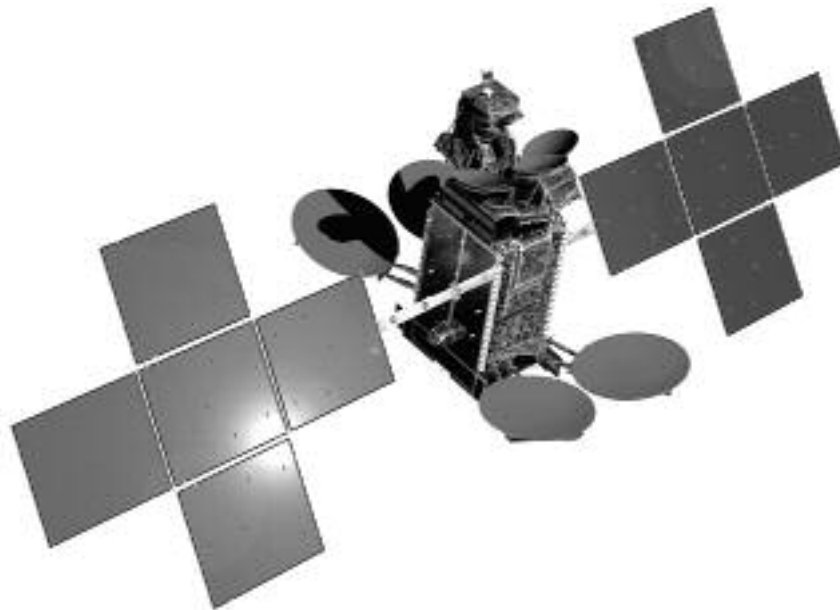
Time	Events
- 11 h 30 mn	Start of final countdown
- 7 h 30 mn	Check of electrical systems
- 4 h 50 mn	Start of filling of main cryogenic stage with liquid oxygen and hydrogen
- 3 h 20 mn	Chilldown of Vulcain main stage engine
- 1 h 10 mn	Check of connections between launcher and telemetry, tracking and 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
- 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
+ 12,8 s	End of vertical climb and beginning of pitch rotation (10 seconds duration)	0,08	35,0
+17 s	Beginning of roll manoeuvre	0,29	79,0
+ 2 mn 20 s	Jettisoning of solid boosters	64	2117
+ 3 mn 23 s	Jettisoning of fairing	107	2411
+ 7 mn 56 s	Acquisition by Natal tracking station	135	5330
+ 9 mn 44 s	Extinction of main cryogenic stage	145	7697
+ 9 mn 50 s	Separation of main cryogenic stage	148	7710
+ 9 mn 57 s	Ignition of the storable propellant stage (EPS)	151	7706
+ 12 mn 18 s	Acquisition by Ascension tracking station	222	7847
+ 21 mn 52 s	Acquisition by Malindi tracking station	879	8345
+ 26 mn 55 s	Extinction of EPS	1618	8592
+ 28 mn 20 s	Separation of THAICOM 4 (IPSTAR) satellite	1884	8406
+ 45 mn 40 s	End of Arianespace mission	5954	6260

5. The Ariane 5G (Industrial architect: EADS SPACE Transportation)



6. The THAICOM 4 (IPSTAR) satellite



Customer	SHIN SATELLITE PUBLIC COMPANY LIMITED	
<i>Prime contractor</i>	<i>Space Systems / Loral</i>	
<i>Mission</i>	<i>Broadband and IP based communications</i>	
<i>Mass</i>	<i>Total mass at lift-off</i>	<i>6.505 kg</i>
<i>Stabilization</i>	<i>3 axis</i>	
<i>Dimensions</i>	<i>at launch</i>	<i>3,8 x 4,1 x 8,1 m</i>
	<i>in orbit</i>	<i>8,1 x 10,1 x 26,0 m</i>
<i>Platform</i>	<i>LS1300-SX</i>	
<i>Payload</i>	<i>20 Ka band transponders and 51 Ku band transponders</i>	
<i>On-board power</i>	<i>14.5 kW (end of life)</i>	
<i>Life time</i>	<i>12 years</i>	
<i>Orbital position</i>	<i>120° East</i>	
<i>Coverage area</i>	<i>84 spot beams and 3 shaped beams covering Asia Pacific, Australia and New Zealand</i>	

Press Contact:

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Appendix 1. Arianespace THAICOM 4 (IPSTAR) launch key personnel

In charge of the launch campaign

<i>Mission Director</i>	<i>(CM)</i>	<i>Philippe ROLLAND</i>	<i>ARIANESPACE</i>
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In charge of the launch service contract

<i>Ariane Payload Manager</i>	<i>(RCUA)</i>	<i>Michaël CALLARI</i>	<i>ARIANESPACE</i>
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<i>Ariane Deputy Mission Manager</i>	<i>(RCUA/A)</i>	<i>Patrick LOIRE</i>	<i>ARIANESPACE</i>
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In charge of THAICOM 4 (IPSTAR) satellite

<i>Satellite Mission Director</i>	<i>(DMS)</i>	<i>Thanapong JATURAVANICH</i>	<i>SHINSAT</i>
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<i>Satellite Program Manager</i>	<i>(CPS)</i>	<i>Grant GOULD</i>	<i>SS/L</i>
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<i>Satellite Preparation Manager</i>	<i>(RPS)</i>	<i>Jeff LAKIN</i>	<i>SS/L</i>
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In charge of the launch vehicle

<i>Launch Site Operations Manager</i>	<i>(COEL)</i>	<i>Jean-Pierre BARLET</i>	<i>ARIANESPACE</i>
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<i>Ariane Production Project Manager</i>	<i>(CPAP)</i>	<i>Pierre-Yves TISSIER</i>	<i>ARIANESPACE</i>
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In charge of the Guiana Space Center (CSG)

<i>Range Operations Manager</i>	<i>(DDO)</i>	<i>Bruno GILLES</i>	<i>CNES/CSG</i>
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<i>Flight Safety Officer</i>	<i>(RSV)</i>	<i>Fleur LEFEVRE</i>	<i>CNES/CSG</i>
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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, 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, its relations with ESA and CNES

From a production base in Europe, Arianespace, a private company, serves customers all over the world.

Arianespace is the world's first commercial space transportation company, created in 1980 by 36 leading European aerospace and electronics corporations, 13 major banks and the French space agency CNES (Centre National d'Etudes Spatiales).

The shareholder partners in Arianespace represent the scientific, technical, financial and political capabilities of 12 countries: Belgium, Denmark, Germany, France, Great Britain, Ireland, Italy, Netherlands, Norway, Spain, Switzerland and Sweden.

In order to meet the market needs, Arianespace is present throughout the world: in Europe, with its head office located near Paris, France at Evry, in North America with its subsidiary in Washington D.C. and in the Pacific Region, with its representative offices in Tokyo, Japan, and in Singapore.

Arianespace employs a staff of 250. Share capital totals 395,010 €.

Arianespace is in charge of these main areas:

- markets launch services to customers throughout the world ;
- finances and supervises the construction of Ariane expendable launch vehicle ;
- conducts launches from Europe's Spaceport of Kourou in French Guiana ;
- insures customers for launch risks.

Personalized reliable service forms an integral part of Arianespace launch package. It includes the assignment of a permanent team of experts to each mission for the full launch campaign.

Today, Arianespace's offer is mainly based on Ariane 5. With its proven experience, demonstrated business model and unquestioned credibility, Arianespace has been committed for more than 24 years to providing its customers - satellite operators around the world - a technically and economically reliable means offer to place their satellites on the targeted orbit at the right moment. This offer is strengthened by the flexibility provided by the three launcher fleet - Ariane 5, Soyuz and Vega - and by the Launch Services Alliance, which gives customers mission back-up aboard alternative launch systems.

Relations between ESA, CNES and ARIANESPACE

Development of the Ariane launcher was undertaken by the European Space Agency in 1973. ESA assumed overall direction of the ARIANE 1 development program, delegating the technical direction and financial management to CNES. The ARIANE 1 launcher was declared qualified and operational in January 1982. At the end of the development phase which included four launchers, ESA started the production of five further ARIANE 1 launchers. This program, known as the "promotion series", was carried out with a management arrangement similar to that for the ARIANE 1 development program.

In January 1980 ESA decided to entrust the commercialization, production and launching of operational launchers to a private-law industrial structure, in the form of ARIANESPACE company, placing at its disposal the facilities, equipment and tooling needed of producing and launching the ARIANE launchers. ARIANE follow-on development programs have been undertaken by ESA since 1980. They include a program for developing updated versions of the launcher: Ariane 2 and Ariane 3 (qualified in August 1984) ; the program for building a second ARIANE launch site (ELA 2) (validated in August 1985) ; the Ariane 4 launcher development program (qualified on June 15th, 1988) ; and the preparatory and development program of the Ariane 5 launcher and its new launch facilities: ELA 3 (qualified on November, 1997). All these programs are run under the overall direction of ESA, which has appointed CNES as prime contractor. In general, as soon as an updated version of the launcher has been qualified 5 oct, 1998, ESA makes the results of the development program together with the corresponding production and launch facilities available to ARIANESPACE.

ESA is responsible (as design authority) for development work on the Ariane launchers. The Agency owns all the assets produced under these development programs. It entrusts technical direction and financial management of the development work to CNES, which writes the program specifications and places the industrial contracts on its behalf. The Agency retains the role of monitoring the work and reporting to the participating States.

Since Flight 9 Arianespace has been responsible for building and launching the operational Ariane launchers (as production authority), and for industrial production management, for placing the launcher manufacturing contracts, initiating procurements, marketing and providing Ariane launch services, and directing launch operations.

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 (EPCU), in particular the new 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.

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 in charge of launcher integration in the Launcher Integration Building (BIL), coordinates satellite preparation in the payload processing facility (EPCU), and integrates them on the launcher in the Final Assembly Building (BAF). It is also responsible for launch operations, from the CDL 3 Launch Center.

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.