

19th launch for Intelsat

Arianespace's sixth launch of the year will orbit the Intelsat 902 communications satellites. This is the second spacecraft in Intelsat's new generation IX series, and this launch provides confirmation of Intelsat's confidence in Arianespace. The Intelsat IX generation is providing two to three times the power of the satellites being replaced, offering customers better quality and the ability to implement more cost-effective ground facilities.

Intelsat 902 will be the 19th Intelsat satellite launched to date by Ariane. Built by Space Systems/Loral in Palo Alto, California, it will be positioned at 62 degrees East. Intelsat 902 joins the Intelsat fleet of satellites providing Internet, broadcast, telephony and corporate network solutions services for Europe, sub-Saharan Africa, Central Asia, the Far East and Australia.

The first series 9 satellite, Intelsat 901, was launched by Arianespace Flight 141 on June 9.

Four more Intelsat satellites are scheduled for launch by Arianespace.

For Flight 143, Arianespace will use an Ariane 44L, the version fitted with four liquid-propellant strap-on boosters.

- 1 - ARIANESPACE Flight 143 mission.
- 2 - Range operations :
ARIANE 44L - Intelsat 902.
- 3 - Countdown and Flight events.
- 4 - Flight 143 trajectory.
- 5 - The ARIANE 44L launch vehicle.
- 6 - The Intelsat 902 satellite.

Annexes

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1 - Arianespace Flight 143 - to be launched August 30 with the Intelsat 902 satellite

To allow Intelsat additional routine checks on the spacecraft in Kourou, Arianespace has rescheduled Flight 143 from the original August 24 launch date.

Final mission preparations with the spacecraft and its Ariane 4 launch vehicle are now set to begin on Monday, August 20.

Liftoff of Flight 143 using an **ARIANE 44L** is now scheduled for **Thursday, August 30**, at the opening of the following launch window:

Heures du lancement

GMT	Paris Time	Tokyo Time	Washington Time	Kourou Time
From 06:46 am	08:46 am	15:46 pm	02:46 am	03:46 am
to 07:46 am	09:46 am	16:46 pm	03:46 am	04:46 am
on August 30, 2001	August 30, 2001	August 30, 2001	August 30, 2001	August 30, 2001

2. Range operations campaign: ARIANE 44L – INTELSAT 902

The actual work for satellite range operations lasts 23 working days for Intelsat 902 from its arrival in Kourou (before encapsulation).

The ARIANE 44L preparation campaign lasts 25 working days.

Satellite and launch vehicle campaign calendar

Ariane activities	Dates	Satellite activities
	July 17, 2001	Intelsat 902 arrival in Kourou and beginning of its preparation in S1B building.
Campaign start review	July 19, 2001	
First stage erection	July 19, 2001	
Second stage erection	July 20, 2001	
Third stage erection	July 27 2001	
Liquid strap-on boosters erection	July 24-27, 2001	
Roll-out to launch pad	August 9, 2001	
	August 13, 2001	Intelsat 902 transfer from S1B to S3B building.
	August 16, 2001	Beginning of Intelsat 902 filling operations.
D-7 Monday, Aug. 20, 2001	Start of combined operations	
D-6 Tuesday, August 21	Satellite encapsulation operations.	
D-5 Wednesday, August 22	Satellite composite transfer to the launch pad.	
D-4 Thursday, August 23	Satellite composite mating onto launcher and overall checks.	
D-3 Friday, August 24	Launch Rehearsal	
D-2 Monday, August 27	Launch Readiness Review (RAL) and launcher arming.	
D-1 Tuesday, August 28	Filling of 1st stage, and 2nd stage, and liquid boosters with UH 25 and N2O4.	
D-0 Wednesday, August 29	Launch Countdown including 3rd stage filling with liquid oxygen and liquid hydrogen.	
H-0 Thursday, August 30		

Erratum: To read p7, Payload section, 72 C-band transponders (36MHz equivalent units) and 22 Ku-band transponders (36 MHz equivalent units).

3. Launch countdown and flight events

The final launch countdown runs through all the final launcher and satellites related operations. It configures the vehicle and its payload for ignition of the first stage and PAL engines at the selected launch time, as soon as possible within the launch window authorized by the spacecraft.

A synchronized sequence (see Appendix 3), controlled by the Ariane ground check-out computers, starts at H0 - 6mn and concludes the countdown.

Should a hold in the countdown delay the H0 time beyond the launch window, the launch is postponed to (in days) : D + 1 or D + 2 (or later) depending on the source of the problem and the time to resolve it.

Time	Events
- 12h 30 mn 00 s	Start of final countdown.
- 5 h 35 mn 00 s	Start of gantry withdrawal.
- 3 h 35 mn 00 s	Start of the 3rd stage filling operations with liquid hydrogen and liquid oxygen.
- 1 h 5 mn 00 s	Activation of launcher telemetry, radar transponders, telecommand.
- 6 mn 00 s	"Green status for all systems" to authorize : start of synchronized launch sequence
- 3 mn 40 s	Spacecraft switched to on-board power (latest time).
- 1 mn 00 s	Launcher equipment switched to on-board batteries.
- 09 s	Inertial platform released.
- 05 s	Release command to cryogenic arms retraction system.
H0	Ignition of first stage and liquid strap-on boosters engines
+ 4,4 s	Lift-off.
+ 16 s	End of vertical ascent phase of pitch motion (10 s duration).
+ 2 mn 30 s	Liquid strap-on booster jettison.
+ 3 mn 31 s	First stage separation.
+ 3 mn 34 s	Second stage ignition.
+ 4 mn 22 s	Fairing jettison.
+ 5 mn 43 s	Second stage separation.
+ 5 mn 48 s	Third stage ignition.
+ 6 mn 30 s	Launcher acquired by Natal station.
+ 12 mn 30 s	Launcher acquired by Ascension Island station.
+ 17 mn 30 s	Launcher acquired by Libreville station.
+ 18 mn 42 s	Third stage shutdown sequence.
+ 20 mn 49 s	Intelsat 902 separation.
+ 21 mn 00 s	Start of the third stage avoidance maneuver.
+ 22 mn 23 s	End of Arianespace Flight 143 mission.

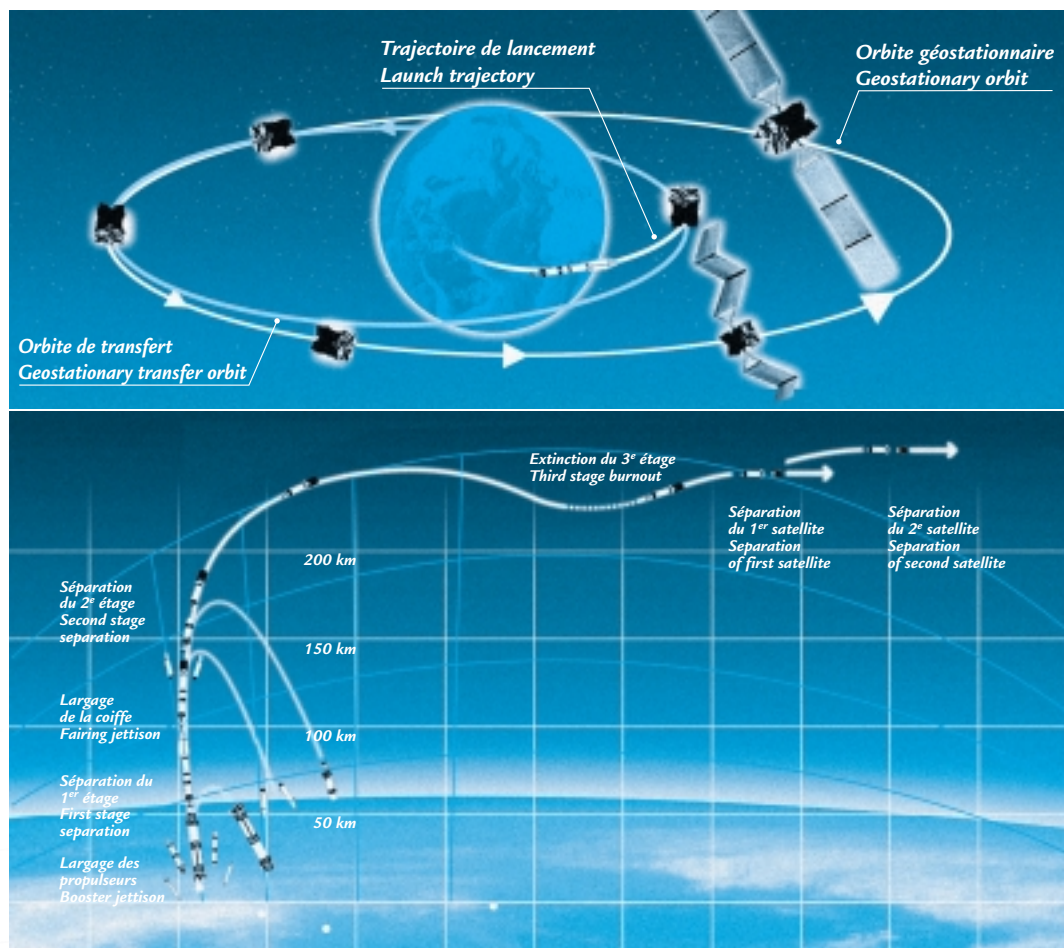
4. Flight 143 Trajectory

The launcher ascends vertically from lift-off to H0+16 sec. During a period of 10 sec. after this vertical ascent, the launch vehicle tilts in the pitch plane defined by the trajectory and pre-calculated by the on-board computer.

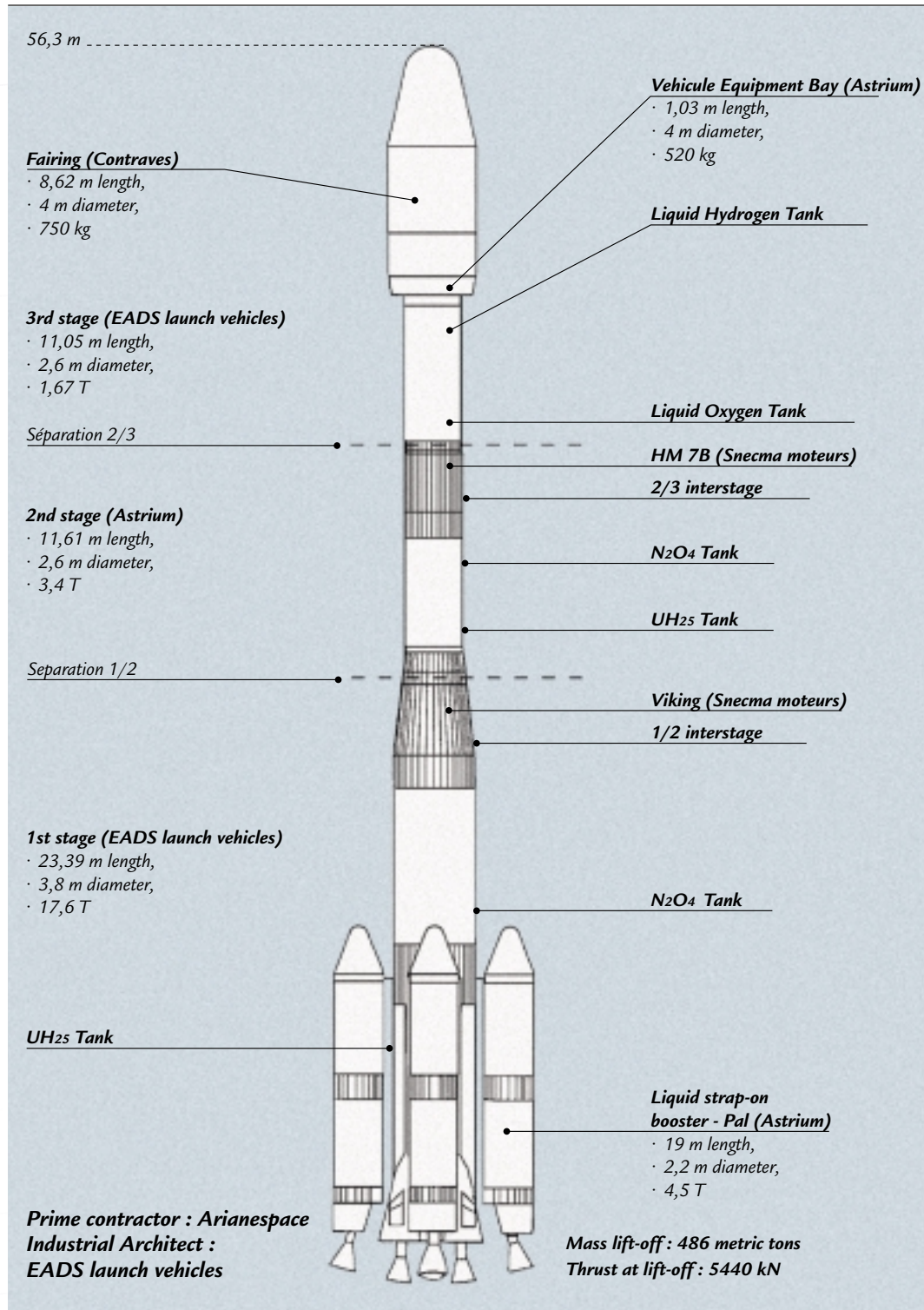
The vehicle's attitude is commanded by a predetermined law. The guidance phase is initiated 10 sec. after ignition of the 2nd stage. The attitude law in the pitch-and-yaw plane is optimized in order to minimize the 3rd stage propulsion time necessary to reach the target orbit with a performance margin of about 164 kg (360 lb). This ensures reaching this orbit with a probability of about 99% before the exhaustion of third stage propellant.

The roll law is applied so as to improve the launcher/ground station radio link budget.

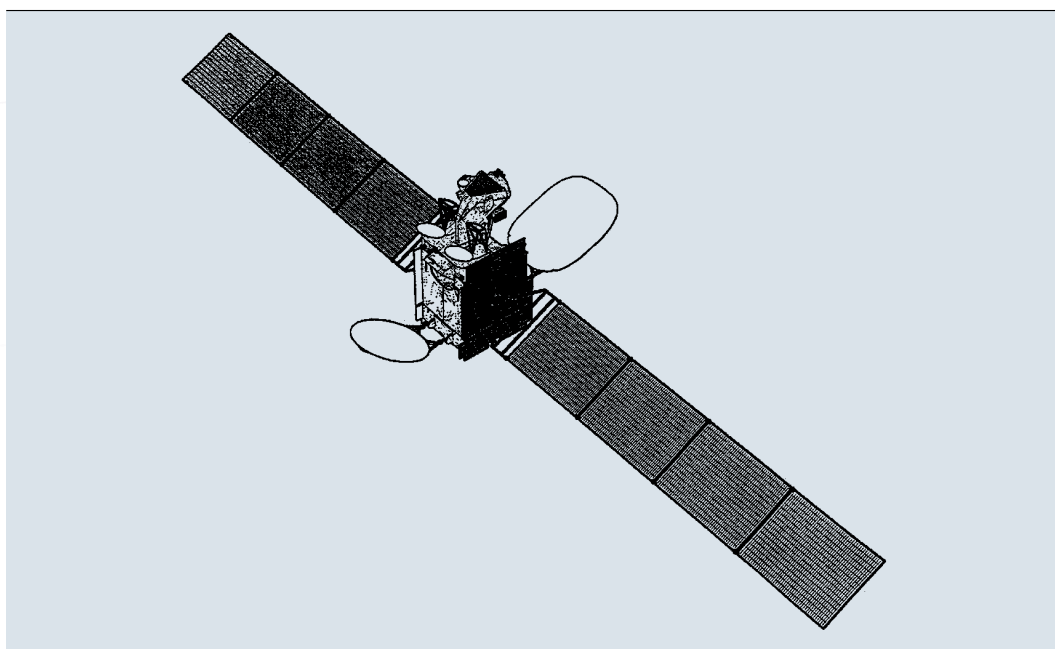
Typical trajectory for standard geostationary transfer orbit and ground station visibility



5. The launch vehicle



6. The Intelsat 902 satellite



Customer	Intelsat	
Prime contractor	Space Systems/Loral in Palo Alto (California)	
Mission	Internet, broadcast, telephony and corporate network solutions	
Mass	Total mass (at lift-off)	4 723 kg (10 410 lb)
Dry mass		1 978 kg (4 351 lb)
Stabilization	3 axis	
Dimensions		2,80 m x 3,50 m x 5,56 m
Span in orbit	31 m	
Platform	FS1300 Extended	
Payload	44 C Band transponders 14 Ku Band transponders	
On-board power	8,5 kW (beginning of life)	
Life time	13 years	
Orbital location	62° East, above the Indian Ocean	
Coverage area	Global with beams over Europe, Sub-Saharan Africa, Central Asia, Far East and Australia.	

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Annex 1 - Arianespace flight 143 key personnel

In charge of the launch campaign

<i>Mission Director</i>	<i>(CM)</i>	<i>Daniel MURÉ</i>	<i>ARIANESPACE</i>
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In charge of the launch service contracts

<i>Intelsat 902 Mission Manager and ARIANE Payload Manager</i>	<i>(RCUA)</i>	<i>Steve HALL</i>	<i>ARIANESPACE</i>
<i>Deputy Mission Manager</i>	<i>(RCUA/A)</i>	<i>Michael CALLARI</i>	<i>ARIANESPACE</i>

In charge of Intelsat 902 satellite

<i>Satellite Mission Director</i>	<i>(DMS)</i>	<i>Terry EDWARDS</i>	<i>INTELSAT</i>
<i>Satellite Project Manager</i>	<i>(CPS)</i>	<i>Erick LEVINE</i>	<i>SPACE SYSTEMS/LORAL</i>
<i>Satellite Preparation Manager</i>	<i>(RPS)</i>	<i>Peter PALLIN</i>	<i>SPACE SYSTEMS/LORAL</i>

In charge of the launch vehicle

<i>Launch Site Operations Manager</i>	<i>(COEL)</i>	<i>Christel STURBOIS</i>	<i>ARIANESPACE</i>
<i>Ariane Production Project Manager</i>	<i>(CPAP)</i>	<i>Rudeger ALBAT</i>	<i>ARIANESPACE</i>

In charge of the Guiana Space Center (CSG)

<i>Range Operations Manager</i>	<i>(DDO)</i>	<i>Philippe Maubert DEBRAINE</i>	<i>CNES/CSG</i>
<i>Flight Safety Officer</i>	<i>(RSV)</i>	<i>Patrice BENARROCHE</i>	<i>CNES/CSG</i>

Annex 2 - Launch environment conditions

The allowable weather conditions for gantry withdrawal depend on the Ariane stage pressurization values.

Wind speed has to be below 17 m/s.

Acceptable wind speed limits at liftoff range from between 9 m/s to 14 m/s according to the wind direction.

The most critical is a northerly wind. For safety reasons, the wind speed on the ground (at Kourou) and at a high altitude (between 10,000 and 20,000 m) also is taken into account.

Annex 3 - Synchronized sequence

The synchronized sequence starts at H0 -6 min. This sequence is used for final preparation of the launcher, and for checkout operations related to switchover to flight configuration. The sequence is fully automatic, and is controlled in parallel, up to H0-5 sec., by two computers in the Ariane Launch Center (CDL). All resources used for launch are synchronized on a common countdown sequence.

One computer configures fluids and propellants for flight and performs associated checks. The other computer executes final preparation of the electrical systems (initiation of flight program, start-up of servomotors, switchover from ground power to flight batteries, etc.) and corresponding checkout operations.

After H0 - 5 s. and retraction of the cryogenic arms retraction from the launcher, a majority logic sequencer delivers the main timing pulses for :

- first stage & liquid booster engine ignition (H0) ;
- engine parameter checkout (conducted in parallel by the two computers, starting at H0 + 2.8 s.) ;
- opening of the launch table clamps (releasing the launch vehicle between H0 + 4. 1s. and H0 + 4.6 s.) as soon as engine parameters are judged as nominal by one of the computers.

Any hold in the synchronized sequence before H0 - 5 s. automatically resets the launcher to the H0 - 6 min. configuration

Annex 4 - Arianespace order book

To date 190 satellites and 38 auxiliary payloads have been launched by Arianespace.
Out of the 242 launch services contracted since 1981 by Arianespace and before Flight 142, 43 satellites and 9 ATV missions remain to be launched (3 confidential contracts at the request of customers).

Europe 13 satellites

Astra 1K, X, 3A
Atlantic Bird 2
e-Bird
Envisat-1/PPF
Hot Bird 6
MSG-1 & 2
Rosetta
Spot 5
Stentor
Syracuse III

+ 9 ATV launches

International organizations 9 satellites

Ameristar (Worldspace)
Intelsat 902, 904, 905, 906, 907
New Skies Satellites 6 & 7
Stellat

Middle-East and Africa 1 satellite

Amos 2

Americas 9 satellites

Anik F2 (Canada)
Directv-4S (USA)
Galaxy 12 (USA)
Galaxy VR & IRR (USA)
GE TBD (USA)
Loralsat 3 (USA)
Wild Blue 1 & 2 (USA)

Asia 8 satellites

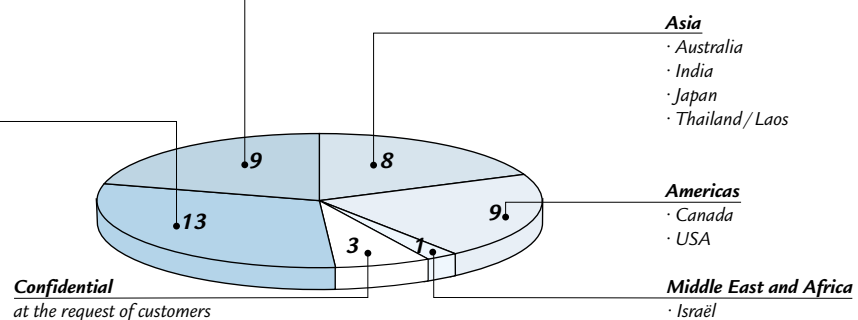
Insat 3C, 3A & 3E (India)
JCSat 8 (Japan)
L-Star A & B (Thailand/Laos)
N-Star C (Japan)
Optus C1 (Australia)

International

- Intelsat
- New Skies
- Stellat
- Worldspace

Europe

- ESA
- Eumetsat
- Eutelsat
- France
- Luxembourg



Appendix 5 - Arianespace, its relations with ESA et 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).

Arianespace is a European venture--, the direct result of the participating nation's commitment to bringing the Ariane family of launch vehicles from the drawing board to the launch pad. To do so, they turned to the European Space Agency (ESA) and mobilized the scientific and technological expertise of CNES.

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 380. Share capital totals FF 2,088 million.

As a space transportation company, Arianespace :

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

Personalized reliable service forms an integral part of Arianespace's launch package. It includes the assignment of a permanent team of experts to each mission for the full launch campaign. Our customers appreciate the time and cost savings made possible by our efficiency and flexibility.

Most of the world's commercial satellite operators have contracted to launch at least one payload with Arianespace. This record is the result of our company's realistic cost-effective approach to getting satellites into orbit.

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 launch of operational launchers to a private-law industrial structure, in the form of ARIANESPACE, placing at its disposal the facilities, equipment and tooling needed to build and launch the ARIANE vehicles.

Ariane follow-on development programs have been undertaken by ESA since 1980. They include a program for developing uprated 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 ELA 3 launch facility. All these programs are run under the overall direction of ESA, which has appointed CNES as prime contractor.

In general, as soon as an uprated version of the launcher has been qualified, 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.

Use of the guiana space center

The "Centre Spatial Guyanais" (CSG), CNES's launch base near Kourou, has all the equipment needed for launching spacecraft : radar tracking stations, telemetry receiving stations, a meteorology station, a telecommand station, safety facilities, etc...

It became operational in 1968 for the purpose of the French National Space Program.

ESA built its own launch facilities, the ELA 1 and ELA 2 complexes (for Ariane 4) and ELA 3 (for Ariane 5) and the EPCU payload preparation complex. These facilities comprise Europe's Spaceport. The use of these facilities requires, CSG's technical and operational resources, especially during launch operations. The French Government has granted ESA the right to use the CSG for its space programs. In return, ESA shares in the costs of operating the CSG.

Arianespace directly covers the costs of use, maintenance and upgrading of the Ariane launch sites and the payload preparation complex.