

Boeing-built satellites for Japan and Europe

Arianespace Flight 149 will orbit two satellites built by Boeing Satellite Systems, Inc. : JCSAT-8 for JSAT Corporation of Japan, and ASTRA 3A for the Luxembourg-based operator SES ASTRA.

JCSAT-8 will be the 17th Japanese satellite launched by Ariane. It follows earlier launches by Arianespace of the JCSAT-1, JCSAT-5 and JCSAT-110 satellites for JSAT Corp., the leading satcom operator in Asia. Two other satellites, N-STAR a and b, round out JSAT's fleet, and were also launched by Arianespace. Positioned at 154 degrees East, JCSAT-8 will provide telecommunications services across the Asia-Pacific.

ASTRA 3A will be the eighth SES ASTRA spacecraft launched by Ariane, following ASTRA 1A in December 1988, ASTRA 1B in March 1991, ASTRA 1C in May 1993, ASTRA 1D in October 1994, ASTRA 1E in October 1995, ASTRA 2B in September 2000 and ASTRA 2D in December 2000. Weighing about 1,500 kilograms at launch, ASTRA 3A will provide high-power cable and direct-to-home broadband services for all of German-speaking Europe. It has a design life of 10 years.

For its fourth launch of the year, Arianespace will use an Ariane 44L, the version equipped with four liquid-propellant strap-on boosters.

- 1 - ARIANESPACE Flight 149 mission.
- 2 - Range operations :
ARIANE 44L – JCSAT-8 and ASTRA 3A.
- 3 - Countdown and Flight events.
- 4 - Flight 149 trajectory.
- 5 - The ARIANE 44L launch vehicle.
- 6 - The JCSAT-8 satellite.
- 7 - The ASTRA 3A satellite.

Annexes

- 1 - Flight 149 key personnel.
- 2 - Launch environment conditions.
- 3 - Synchronized sequence.
- 4 - ARIANESPACE orderbook.
- 5 - ARIANESPACE, ESA and CNES.



1 - Arianespace Flight 149 mission

The 149th Ariane launch (Flight 149) is scheduled to place the JCSAT-8 and ASTRA 3A satellites into a geostationary transfer orbit using an ARIANE 44L launch vehicle equipped with four liquid strap-on boosters (PAL). This will be the 110th Ariane 4 launch and the 35th in the ARIANE 44L configuration.

It will be launched from the Ariane launch complex n°2 (ELA2), in Kourou, French Guiana. The launch vehicle performance requirement is 4 591 kg (10 100 lb) of which 4 095 kg (9 009 lb) represent the mass of the spacecraft to be separated on the injection orbit.

Injection orbit

Perigee	250 km
Altitude Apogee	35 786 km at injection
Inclination	4° degrees

The ARIANE 44L launcher liftoff for Flight 149 is scheduled on the night of March 28 to 29, 2002 as early as possible within the following launch window :

Launch opportunity

	GMT	Paris time	Washington time	Kourou time	Tokyo time
From	01:29 am	02:29 am	08:29 pm	10:29 pm	10:29 am
to	02:14 am	03:14 am	09:14 pm	11:14 pm	11:14 am
on	March 29, 2002	March 29, 2002	March 28, 2002	March 28, 2002	March 29, 2002

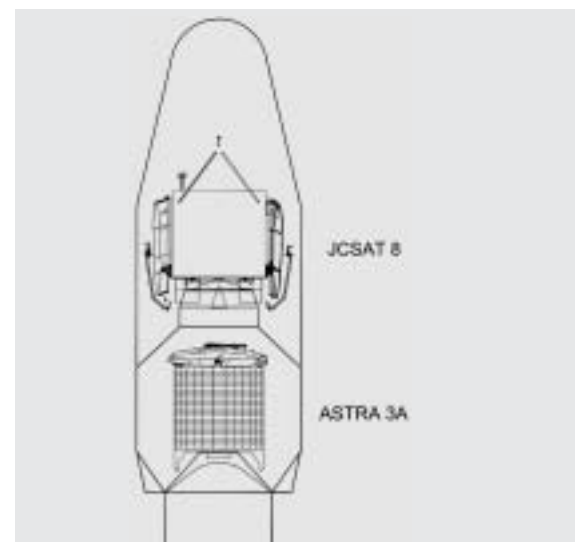
Ariane payload configuration

The JCSAT-8 satellite was built by Boeing Satellite Systems (BSS) in El Segundo (California), for Japanese operator JSAT Corporation.

Orbital position: 154° East, over the Papua - New Guinea.

The ASTRA 3A satellite was also built by Boeing Satellite Systems (BSS) in El Segundo (California), for Luxembourg operator SES ASTRA.

Orbital position: 23.5° East, over Congo.



2. Range operations campaign: ARIANE 44L – JCSAT-8 and ASTRA 3A

The actual work for satellite range operations lasts 11 working days for JCSAT-8 and ASTRA 3A from their arrival in Kourou (before encapsulation).
The ARIANE 44L preparation campaign lasts 25 working days.

Satellites and launch vehicle campaign calendar

<i>Ariane activities</i>	<i>Dates</i>	<i>Satellite activities</i>
Campaign start review	February 11, 2002	
First stage erection	February 11, 2002	
Second stage erection	February 12, 2002	
Third stage erection	February 22, 2002	
Liquid strap-on boosters erection	February 18-22, 2002	
Flight 148	February 23, 2002	Launch of INTELSAT 904
Flight 145	February 28, 2002	Launch of ENVISAT
	March 6, 2002	JCSAT-8 and ASTRA 3A arrival in Kourou and beginning of its preparation in S3 buildings.
Roll-out to launch pad	March 7, 2002	
	March 12, 2002	Beginning of ASTRA 3A filling operations.
	March 14, 2002	Beginning of JCSAT-8 filling operations.
D-9	Monday, March 18, 2002	Start of combined operations with ASTRA 3A.
D-8	Tuesday, March 19	Start of combined operations with JCSAT-8.
D-7	Wednesday, March 20	Satellite encapsulation operations.
D-6	Thursday, March 21	Satellite encapsulation operations and fairing enclosure.
D-5	Friday, March 22	Satellite composite transfer to the launch pad.
D-4	Saturday, March 23	Satellite composite mating onto launcher and overall checks.
D-3	Monday, March 25	Launch Rehearsal
D-2	Tuesday, March 26	Launch Readiness Review (RAL) and launcher arming.
D-1	Wednesday, March 27	Filling of 1st stage, and 2nd stage, and liquid boosters with UH 25 and N2O4.
D-0	Thursday, March 28	Launch Countdown including 3rd stage filling with liquid oxygen and liquid hydrogen.

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.

HO	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 30 s	First stage separation.
+ 3 mn 32 s	Second stage ignition.
+ 4 mn 16 s	Fairing jettison.
+ 5 mn 42 s	Second stage separation.
+ 5 mn 46 s	Third stage ignition.
+ 6 mn 30 s	Launcher acquired by Natal station.
+ 12 mn 20 s	Launcher acquired by Ascension Island station.
+ 17 mn 20 s	Launcher acquired by Libreville station.
+ 18 mn 51 s	Third stage shutdown sequence.
+ 21 mn 27 s	JCSAT-8 separation.
+ 26 mn 59 s	ASTRA 3A separation.
+ 27 mn 22 s	Start of the third stage avoidance maneuver.
+ 30 mn 44 s	End of Arianespace Flight 149 mission.

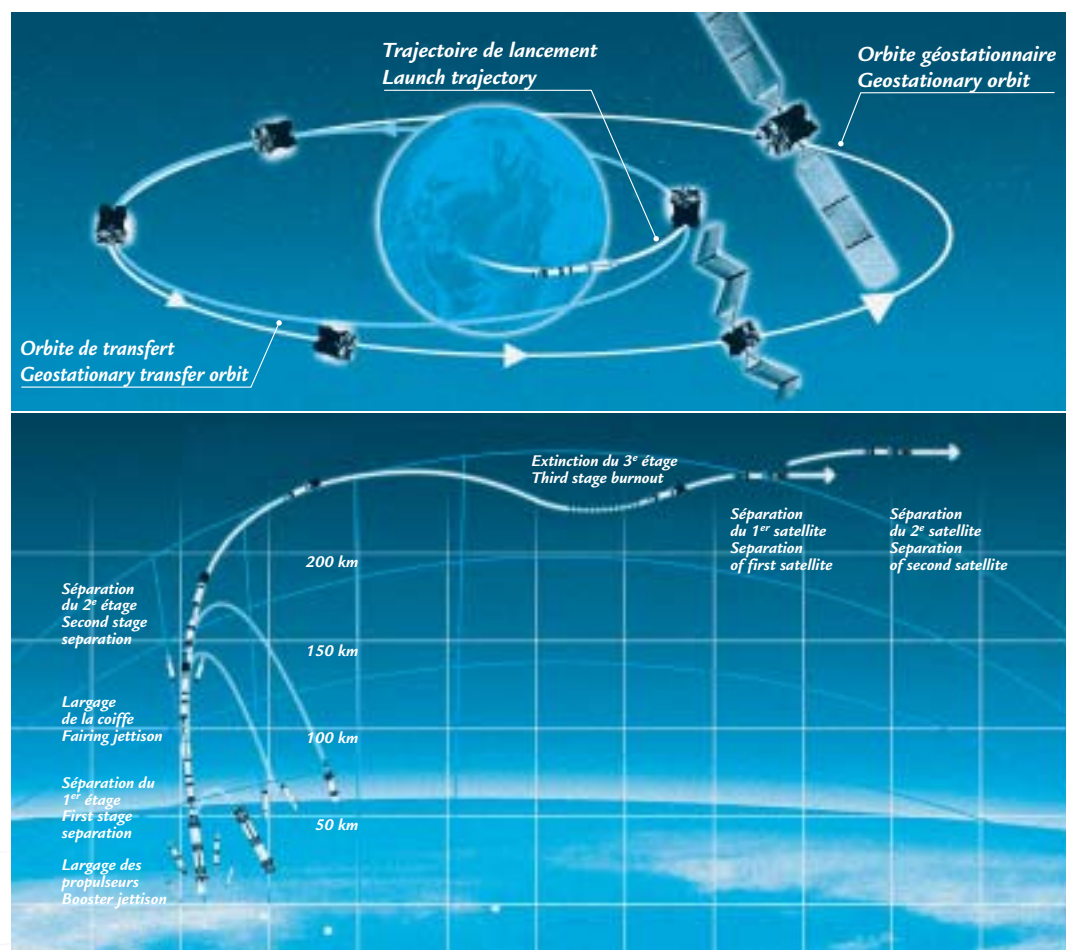
4. Flight 149 Trajectory

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.

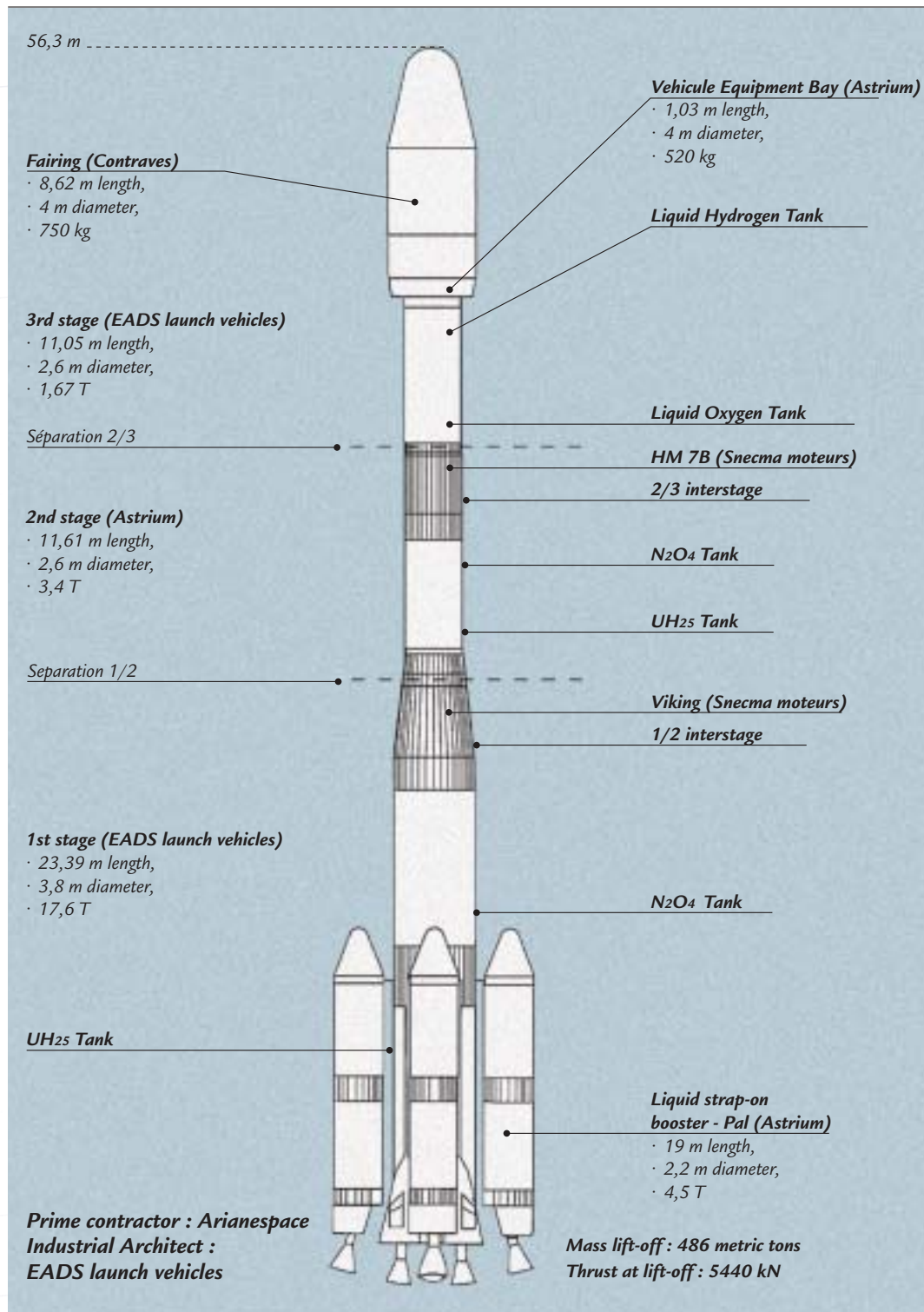
The vehicle's attitude is commanded by a predetermined law. The guidance phase is initiated 10 sec. after ignition of the 2nd stage. The attitude law in the pitch-and-yaw plane is optimized in order to minimize the 3rd stage propulsion time necessary to reach the target orbit with a performance margin of about 167 kg (367 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.

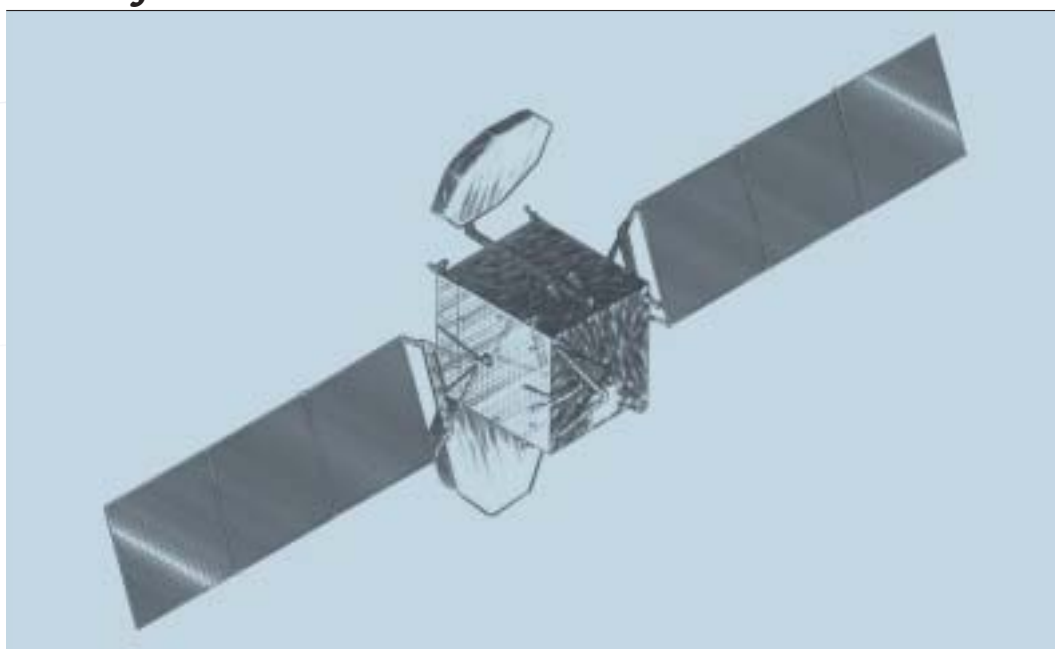
Typical trajectory for standard geostationary transfer orbit and ground station visibility



5. The launch vehicle



6. The JCSAT-8 satellite



Customer	JSAT Corporation	
Prime contractor	Boeing Satellite Systems in El Segundo(California)	
Mission	Communications and broadcasting	
Mass	Total mass (at lift-off)	2 600 kg (5 735 lb)
Stabilization	3 axis	
Dimensions	3.6 m x 2.7 m x 4.3 m	
Dimensions in orbit	7.6 m x 4.3 m x 21 m	
Platform	Boeing 601	
Payload	5 C Band transponders (in 54 MHz equivalent units) 11 C Band transponders (in 36 MHz equivalent units) 16 Ku Band transponders (in 57 MHz equivalent units)	
On-board power	3.7 kW (end of life)	
Life time	11 years	
Orbital location	154° East, above Papua - New Guinea	
Coverage area	Japan, Asia, Australia and Hawai.	

Press Contact
 Corporate Communications Department
 JSAT Corporation
 Tél. : + 81 3 5219 7778
 e-mail : info@jsat.net

Sales Enquires
 International Business Development Division
 JSAT Corporation
 Tél. : + 81 3 5219 7747
 e-mail : intl-busi@jsat.net

7. The ASTRA 3A satellite



Customer	Boeing Satellite Systems for SES ASTRA	
Prime contractor	Boeing Satellite Systems in El Segundo (California)	
Mission	Cable TV and Direct-to-home Broadband Services	
Mass	Total mass (at lift-off)	1 495 kg (3 289 lb)
Stabilization	Spinned	
Dimensions	3.15 m x 2.17 m x 2.17 m	
Dimensions in orbit	7.97 m (height)	
Platform	BSS - 376 HP	
Payload	20 Ku Band transponders	
On-board power	1.525 kW (end of life)	
Life time	10 years	
Orbital location	23.5° East, above Congo	
Coverage area	German speaking European countries.	

Press Contact
 Diana BALL
 Boeing Satellite Systems, Inc.
 Tél. : +1 310 662 7473 – Fax : +1 310 364 6397
 e-mail : diana.ball@boeing.com

Press Contact
 Yves FELTES
 SES GLOBAL
 Tél. : +(352) 710 725 311
 e-mail : Yves.Feltes@ses-global.com

Annex 1 - Arianespace flight 149 key personnel

In charge of the launch campaign

Mission Director	(CM)	Daniel MURE	ARIANESPACE
------------------	------	-------------	-------------

In charge of the launch service contracts

JCSAT-8 and ASTRA 3A Mission Manager and ARIANE Payload Manager	(RCUA)	Michael CALLARI	ARIANESPACE
Deputy Mission Manager	(RCUA/A)	Christophe BARDOU	ARIANESPACE

In charge of JCSAT-8 satellite

Satellite Mission Director	(DMS)	Yuichi HAYASAKA	JSAT Corp.
Deputy Satellite Mission Director	(DMS/A)	William HSIONG	BSS
Satellite Preparation Manager	(RPS)	James FRANKLIN	BSS

In charge of ASTRA 3A satellite

Satellite Mission Director	(DMS)	Gary McNAMARA	BSS
Satellite Project Manager	(CPS)	Lou CASTELLANO	BSS
Satellite Preparation Manager	(RPS)	Robert BOUCHART	BSS

In charge of the launch vehicle

Launch Site Operations Manager	(COEL)	Philippe HERS	ARIANESPACE
Ariane Production Project Manager	(CPAP)	Hans ZELLER	ARIANESPACE

In charge of the Guiana Space Center (CSG)

Range Operations Manager	(DDO)	Jean-Yves TREBAOL	CNES/CSG
Flight Safety Officer	(RSV)	Raymond VOYCE	CNES/CSG

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 limit at liftoff is 9,5 m/s for any wind direction. 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 :

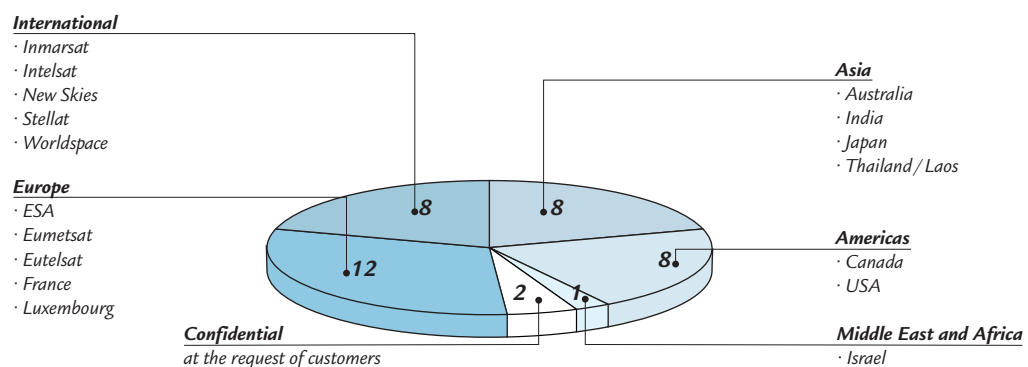
- first stage & liquid booster engine ignition (H0) ;
- engine parameter checkout (conducted in parallel by the two computers, starting at H0 + 2.8 s.) ;
- opening of the launch table clamps (releasing the launch vehicle between H0 + 4. 1s. and H0 + 4.6 s.) as soon as engine parameters are judged as 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 196 satellites and 38 auxiliary payloads have been launched by Arianespace.
Out of the 244 launch services contracted since 1981 by Arianespace and before Flight 149, 39 satellites and 9 ATV missions remain to be launched.

Europe 12 satellites	International organizations 8 satellites	Americas 8 satellites	Asia 8 satellites
Astra 3A, Y, X	Ameristar (Worldspace)	Anik F2 (Canada)	B Sat 2C (Japan)
e-Bird	Inmarsat 4	Galaxy 12 (USA)	Insat 3A & 3E (India)
Hot Bird 6 & 7	Intelsat 905, 906, 907	Galaxy VR & IRR (USA)	JCSAT-8 (Japan)
MSG-1 & 2	New Skies Satellites 6 & 7	GE TBD (USA)	L-Star A & B (Thailand/Laos)
Rosetta	Stellat	Loralsat 3 (USA)	N-Star C (Japan)
Spot 5		Wild Blue 1 & 2 (USA)	Optus C1 (Australia)
Stentor			
Syracuse III			
+ 9 ATV launches	Middle-East and Africa 1 satellite	Confidential contract at the request of customers 2 satellites	
	Amos 2		



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 317 M€.

As a space transportation company, Arianespace:

- markets launch services to customers throughout the world;
- finances and supervises the construction of Ariane expendable launch vehicles;
- conducts launches from Europe's Spaceport in Kourou in French Guiana;
- 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 (qualified in October 21st 1998) 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.