

ARIANESPACE FLIGHT 131

ARIANE, THE EXCLUSIVE LAUNCHER FOR EGYPTIAN AND BRAZILIAN SATELLITES

Flight 131 will boost two communications satellites into geostationary transfer orbit, NILESAT 102 the second for Egypt, and BRASILSAT B4, the sixth Brazilian satellite launched by Ariane.

Egyptian operator NILESAT has once again called on the European launcher, following an Ariane launch of NILESAT 101 on Flight 108 in April 1998. The NILESAT 102 direct TV broadcast satellite is being launched as part of a turnkey contract awarded to ASTRIUM. Its coverage zone stretches from North Africa to the Near East.

ARIANESPACE has taken an active role in the development of Brazil's telecommunications capabilities for over 15 years. BRASILSAT B4, built by Hughes Space and Communications, is the sixth satellite in the fleet deployed by EMBRATEL, the Brazilian operator. It follows BRASILSAT A1, A2, B1, B2 and B3, all launched by ARIANESPACE, in February 1985 (Flight 12), March 1986 (Flight 17), August 1994 (Flight 66), March 1995 (Flight 71) and January 1998 (Flight 105), respectively.

BRASILSAT B4 will be positioned at 92 degrees West, and will provide both TV broadcast and communications services to Brazil for 12 years.

For its fifth launch of the year, ARIANESPACE will use an Ariane 44LP, the version of Ariane 4 with two liquid-propellant strap-on boosters.

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ARIANESPACE FLIGHT 131

1. ARIANESPACE FLIGHT 131 MISSION

The 130th Ariane launch (Flight 131) is scheduled to place the NILESAT 102 and the BRASILSAT B4 satellites into a geostationary transfer orbit using an ARIANE 44LP launch vehicle equipped with two liquid strap-on boosters (PAL), two solid strap-on boosters (PAP). This will be the 97th Ariane 4 launch and the 24th in the ARIANE 44LP configuration.

It will be launched from the Ariane launch complex n°2 (ELA2), in KOUROU, French Guiana.

The launch vehicle performance requirement is 4077 kg (8970 lb) of which 3584 kg (7885 lb) represent the mass of the spacecraft to be separated on the injection orbit.

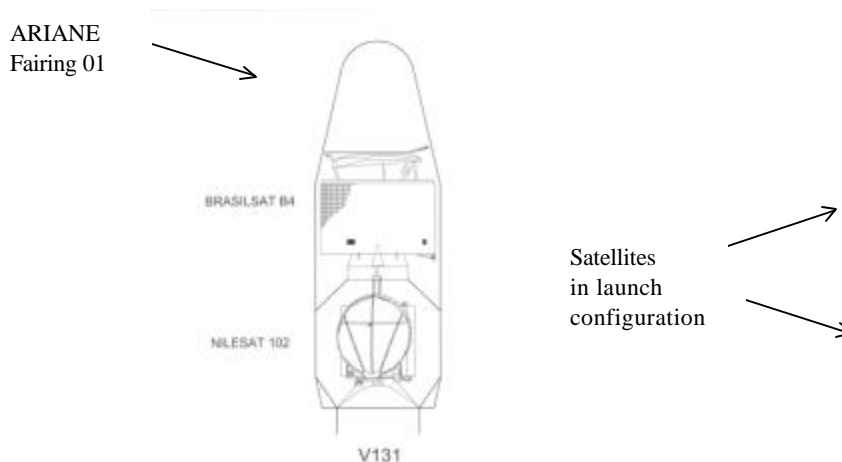
INJECTION ORBIT			
Perigee Altitude	:	250	km
Apogee Altitude	:	35 786	km at injection
Inclination	:	3°	degrees

The ARIANE 44LP launcher liftoff for Flight 131 is scheduled **on the night of August 17 to 18, 2000** as early as possible within the following launch window :

KOUROU TIME
<p>Between 08: 16 pm and 08: 58 pm</p> <p>on August 17, 2000</p>

Launch opportunity (GMT)	Paris Time	Washington Time
from 11: 16 pm	01: 16 am	07: 16 pm
to 11: 58 pm	01: 58 am	07: 58 pm
on August 17, 2000	on August 18, 2000	on August 17, 2000

ARIANE PAYLOAD FLIGHT CONFIGURATION



2. RANGE OPERATIONS CAMPAIGN : ARIANE 44LP – NILESAT 102 et BRASILSAT B4

The actual work for satellite range operations lasts 28 working days for NILESAT 102 and 22 working days for BRASILSAT B4 from their arrival in Kourou (before encapsulation).

The ARIANE 44LP preparation campaign lasts 24 working days.

■ SATELLITES AND LAUNCH VEHICLE CAMPAIGN CALENDAR

ARIANE ACTIVITIES	DATES	SATELLITES ACTIVITIES
CAMPAIGN START REVIEW and First stage erection	July 11, 2000	NILESAT 102 arrival in Kourou and beginning of its preparation in S1A building.
Second stage erection	July 12, 2000	
Liquid strap-on boosters erection	July 13, 2000	
Third stage erection	July 18/19	
	July 19, 2000	BRASILSAT B4 arrival in Kourou and beginning of its preparation in S3A building.
	July 20, 2000	
	July 22, 2000	NILESAT 102 transfer from S1B to S3A building.
	July 28, 2000	Beginning of BRASILSAT B4 filling operations.
	July 29, 2000	Beginning of NILESAT 102 filling operations.
Solid strap-on boosters erection	August 3, 2000	
D-7 Sat, August 5	START OF COMBINED OPERATIONS AND LAUNCH COUNTDOWN REHEARSAL (RCL)	
D-6 Mon, August 7	Satellites encapsulation operations	
D-5 Tues, August 8	Satellite encapsulation operations (cont'd)	
D-4 Wed, August 9	Satellite composite transfer to the launch pad	
D-3 Thurs, August 10	Satellite composite mating onto launcher and overall checks & LAUNCH REHEARSAL	
D-2 Fri, August 11	LAUNCH READINESS REVIEW (RAL) and launcher arming	
D-1 Wed, August 16	Filling of 1st stage, and 2nd stage with UH 25 and N ₂ O ₄ .	
D-0 Thurs, August 17	LAUNCH COUNTDOWN including 3rd stage filling with solid oxygen and solid 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
- 14 h 30 mn	Start of final countdown
- 5 h 55 mn	Start of gantry withdrawal
- 3 h 35 mn	Start of the 3 rd stage filling operations with liquid hydrogen and liquid oxygen
- 1 h 05 mn	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
- 9 s	Inertial platform released
- 5 s	Release command to cryogenic arms retraction system
H0	IGNITION Of first stage and liquid strap-on boosters engines
+ 4.2 s	Ignition of solid strap-on boosters
+ 4.4 s	Lift-off
+ 13 s	End of vertical ascent phase of pitch motion (10 s duration)
+ 1 min 09 s	Solid strap-on booster jettison
+ 2 min 28 s	Liquid strap-on booster jettison
+ 3 min 32 s	First stage separation
+ 3 min 33 s	Second stage ignition
+ 4 min 29 s	Fairing jettison
+ 5 min 43 s	Second stage separation
+ 5 min 44 s	Third stage ignition
+ 6 min 40 s	Launcher acquired by Natal station
+ 12 min 30 s	Launcher acquired by Ascension Island station
+ 17 min 25 s	Launcher acquired by Libreville station
+ 18 min 45 s	Third stage shutdown sequence
+ 18 min 47 s	Injection into the required orbit
+ 21 min 25 s	BRASILSAT B4 separation
+ 24 min 08 s	SPELDA top jettison
+ 26 min 14 s	NILESAT 102 separation
+ 26 min 37 s	Start of the third stage avoidance maneuver
+ 30 min 20 s	End of ARIANESPACE FLIGHT 131 Mission

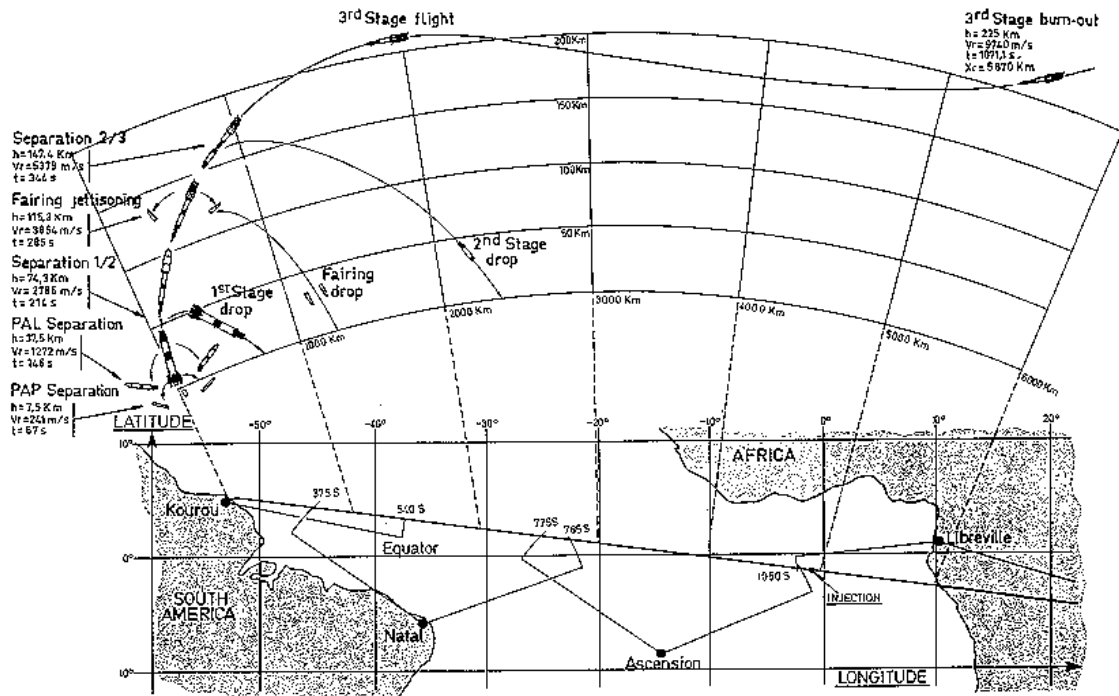
4. FLIGHT 131 TRAJECTORY

The launcher ascends vertically from lift-off to H0+13 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 3^d stage propulsion time necessary to reach the target orbit with a performance margin of about 180 kg (396 lb). This ensures reaching this orbit with a probability of 50% 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



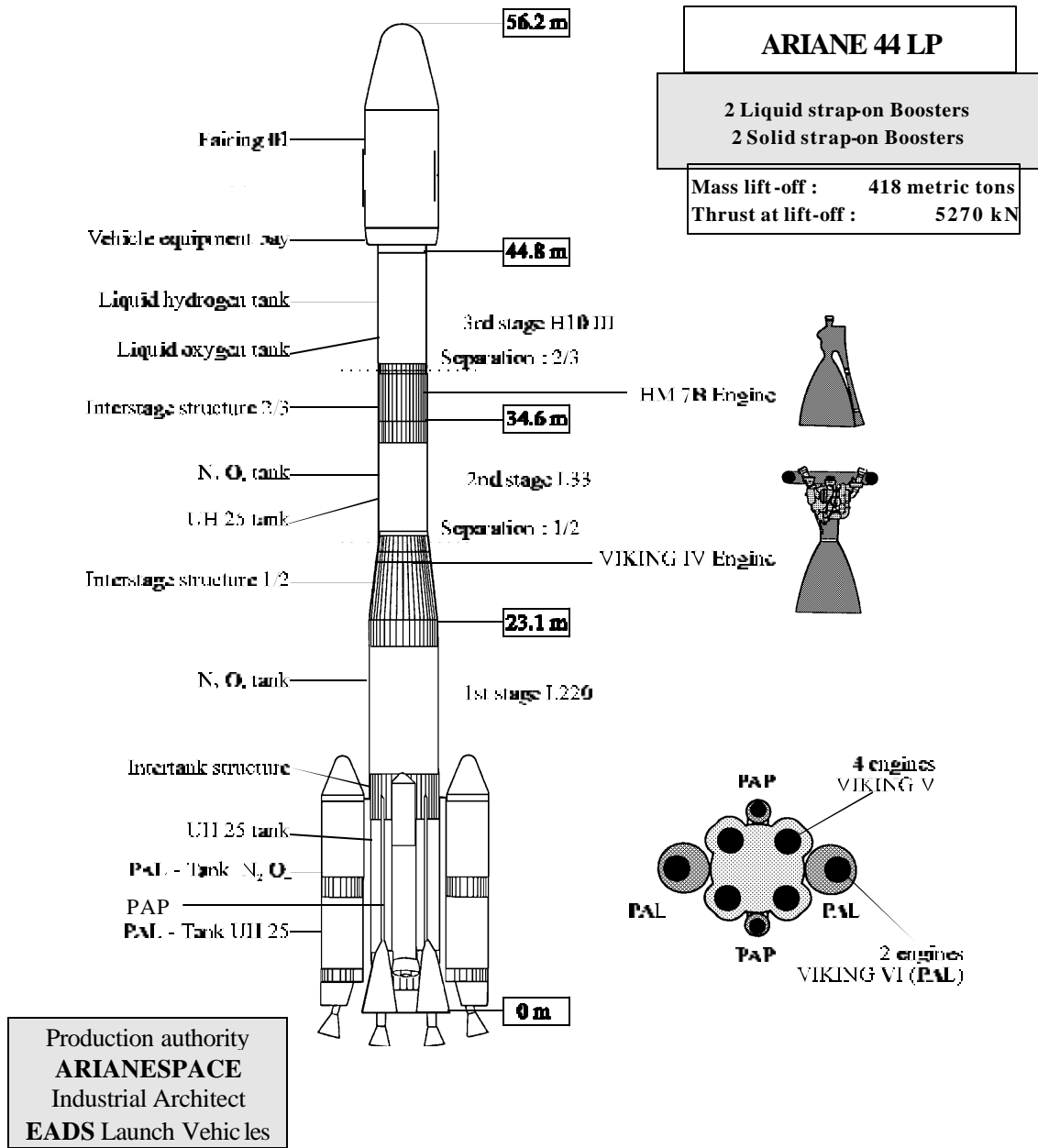
Down-range stations

In French Guiana : KOUROU (Montagne des Pères)
 And CAYENNE (Montabo)
 In Brazil : NATAL
 Atlantic Ocean : ASCENSION ISLAND
 In Gabon : LIBREVILLE

Launch main events

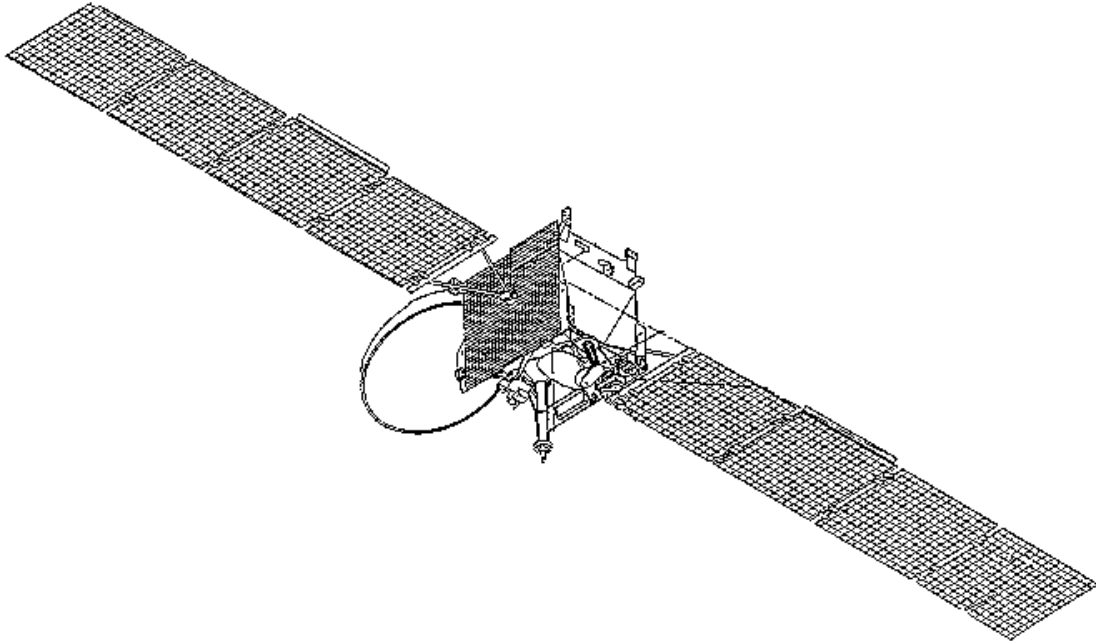
1 : First stage separation
 2 : Fairing jettison
 3 : Second stage separation
 4 : Third stage shutdown

5. THE LAUNCH VEHICLE



	Length	AE	Dry mass	Prime
FAIRING	8.62 m	4 m	740 kg	CONTRAVES
VEB	1.03 m	4 m	530 kg	ASTRIUM
3rd stage	11.05 m	2.6 m	1.25 t	EADS Launch Vehicles
2nd stage	11.61 m	2.6 m	3.28 t	ASTRIUM
1st stage	28.39 m	3.8 m	17.6 t	EADS Launch Vehicles
PAL	19 m	2.2 m	4.5 t	ASTRIUM
PAP	12.05 m	1.1 m	3.1 t	FIAT AVIO
VIKING IV, V, VI				SNECMA
HM 7B				SNECMA

6. THE NILESAT 102 SATELLITE



CUSTOMER: ASTRIUM for NILESAT SA (Egypt).

MISSION: Digital and direct television

PRIME CONTRACTOR: ASTRIUM SAS, Toulouse (France)

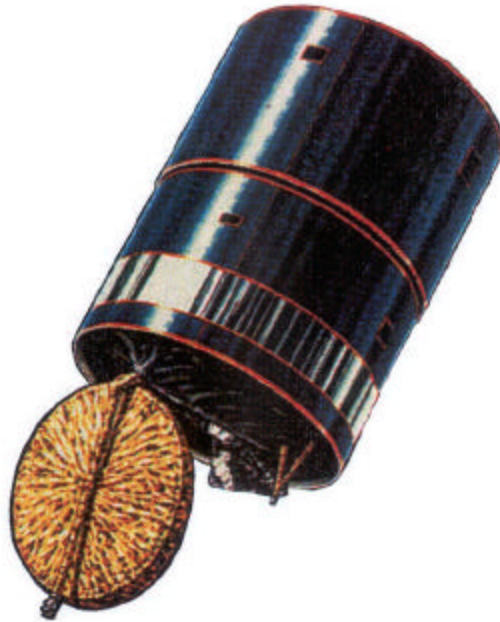
<p>MASS:</p> <ul style="list-style-type: none"> - Total mass (at lift-off) 1,827 kg (4,019 lb) - Dry mass : 813 kg (1,788 lb) 	<p>DIMENSIONS:</p> <ul style="list-style-type: none"> - Dimensions at launch : 2.4 m Main body: 2.3 m x 1.7 - Span in orbit: 21.5 m
<p>STABILIZATION: 3 axis</p>	
<p>ON-BOARD POWER: 3 750 W (end of life)</p>	<p>LIFE TIME: 12 years</p>
<p>PLATFORM: EUROSTAR 2000</p> <p>PAYLOAD:</p> <ul style="list-style-type: none"> 12 Ku-band transponders Frequency bands : 17.3 to 17.7 GHz Channel Bandwidth : 33MHz 	
<p>ORBITAL LOCATION: 7° West. over the Gulf of Guinea</p>	

Press Contact:

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7. THE BRASILSAT B4 SATELLITE



CUSTOMER: EMBRATEL

MISSION: Telecommunications and television

PRIME CONTRACTOR: Hughes Space & Communications (El Segundo, California, USA)

<p>MASS :</p> <ul style="list-style-type: none"> - Total mass (at lift-off): 1,757 kg (3,865 lb) - Dry mass: 820 kg (1,804 lb) 	<p>DIMENSIONS :</p> <ul style="list-style-type: none"> - Height at launch: 3.65 m - Main body: 3.65 m x 3.43 m - Height in orbit: 8.3 m
<p>STABILIZATION: spin stabilized</p>	<p>LIFE TIME: 12 years</p>
<p>ON-BOARD POWER: 1 660 W (beginning of life)</p> <p>PLATFORM: HS-376HP</p> <p>PAYLOAD:</p> <ul style="list-style-type: none"> 28 transponders in C-band Frequency bands: 17.3 to 17.7 GHz Channel Bandwidth: 33 MHz 	
<p>ORBITAL POSITION: 92° West. over Galápagos islands</p>	

Press Contact:

Luiz FREITAS – EMBRATEL

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ANNEXES

ANNEX 1 - ARIANESPACE FLIGHT 131 KEY PERSONNEL

<i>In charge of the launch campaign</i>			
Mission Director	(CM)	Jean-Marc ARTAUD	ARIANESPACE
<i>In charge of the launch service contracts</i>			
<i>GALAXY IVR</i> Mission Manager and ARIANE Payload Manager	(RCUA)	Patrick LOIRE	ARIANESPACE
ARIANE Payload Deputy Manager	(RCUA/A)	Michael CALLARI	ARIANESPACE
<i>In charge of the NILESAT 102 satellite</i>			
Satellite Mission Director	(DMS)	Marcelo LAVRADO	EMBRATEL
Satellite Project Manager	(CPS)	Kenneth NASH	HSC
Satellite Preparation Manager	(RPS)	Robert BOUCHARD	HSC
<i>In charge of the BRASILSAT B4 satellite</i>			
Satellite Mission Director	(DMS)	Philippe LE BOUARD	ASTRIUM
Satellite Project Manager	(CPS)	J. François VALOBRA	ASTRIUM
Satellite Preparation Manager	(RPS)	Christophe PIERRART	ASTRIUM
<i>In charge of the launch vehicle</i>			
Launch Site Operations Manager	(COEL)	Philippe HERS	ARIANESPACE
ARIANE Production Project Manager	(CPAP)	Wolf HAAN	ARIANESPACE
<i>In charge of the Guiana Space Center (CSG)</i>			
Range Operations Manager	(DDO)	Bertrand MONCUQUET	CNES/CSG
Flight Safety Officer	(RSV)	Tony HERTLE	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 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 $H0 + 4.1$ s. and $H0 + 4.6$ s.) as soon as engine parameters are judged as nominal by one of the computers.

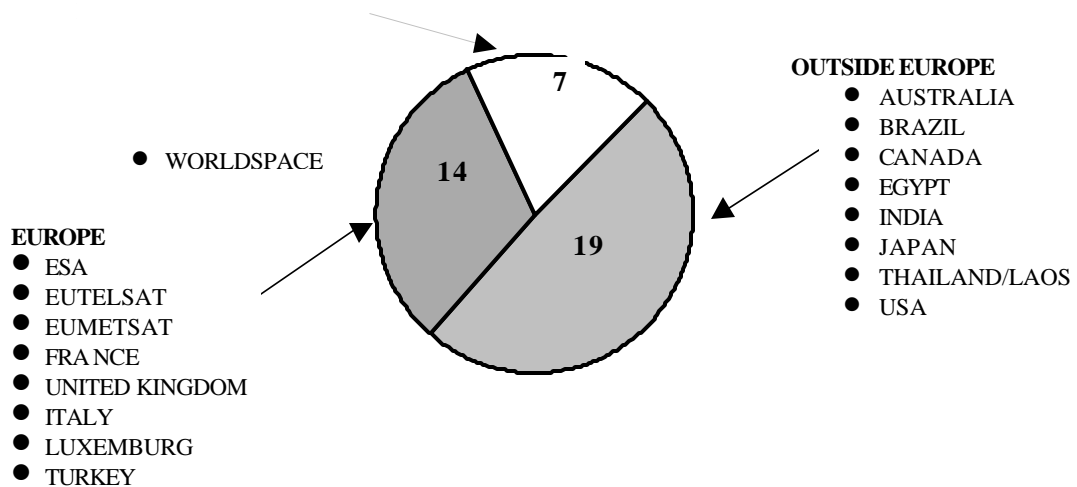
Any hold in the synchronized sequence before $H0 - 5$ s. automatically resets the launcher to the $H0 - 6$ min. configuration

ANNEX 4 - ARIANESPACE ORDER BOOK

To date **170** satellites and **34** auxiliary payloads have been launched by Arianespace.

Out of the **211** satellites signed for launch since 1981 by Arianespace and **before** Flight 131, **40** satellites and **9** ATV launches remain to be launched.

EUROPE 14 SATELLITES	OUTSIDE EUROPE 25 SATELLITES
ASTRA 1K, 2B, X, 2D ENVISAT-1/PPF EURASIASAT 1 EUROBIRD MSG-1 & 2 SICRAL 1 SKYNET 4F SPOT 5 STENTOR W1 + 9 ATV launches	INTERNATIONAL ORGANIZATIONS: 7 satellites AMERISTAR (WorldSpace) EUROPESTAR FM 1 INTELSAT 902, 903, 904 NEW SKIES SATELLITES 1 & 7 OTHERS: 19 satellites ANIK F1 & F2 (Canada) BRASILSAT B4 (Brazil) BSAT 2A & 2B (Japan) GE 7, 8 & TBD (USA) INSAT 3A (India) ISKY 1 & 2 (USA) JC SAT 8 (Japan) LORALSAT 3 (USA) L-STAR A & B (Thailand/Laos) NILESAT 102 (Egypt) N-SAT 110 (Japan) OPTUS C1 (Australia) PAS-1R (USA)
35 %	65 %



APPENDIX 5 - ARIANESPACE, its relations with ESA & 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 350. Share capital totals FF 2,088 million.

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 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.