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I CNES AT THE GUIANA SPACE CENTRE IN 2006

The medium-term general policy of CNES/Guiana Space Centre (CNES/CSG) respects the framework of the six-year Contract between CNES and the French government for the years 2005 - 2010.

Within the framework of this Space policy, CNES's strategy, as the agency in charge of Space programmes and the technical centre, is to remain the leader of advanced Space systems in Europe, collaborating fully with French industrial partners and scientific laboratories. France has an ambitious space policy, in Europe and for Europe, which consists in mastering every aspect of Space exploration and applications while being a driving force behind construction of the European space programme.

There are three facets to this policy:

- a targeted approach with the selection of strategic positions in five fields, access to Space itself and the four fields of exploitation: applications for the general public, contributions to sustainable development, Space as an instrument for scientific and technological research and lastly, security and defence;
- appropriate international cooperation;
- a strategy of European networks for rationalising resources.

The Guiana Space Centre is an indispensable strategic tool for ensuring European access to Space.

1- CNES/CSG' s role¹ in ensuring the competitiveness of the Guiana Space Centre

At the Guiana Space Centre, CNES/CSG² is:

- responsible for organising and coordinating tests and launches, including preparation and performance (excluding industrial partners),
- owner of the whole Guiana Space site,
- design authority for all ground facilities installed at the site,
- the representative of the French Government, since the launches takes place from French territory ,
- responsible for developing and implementing range and on-board safety measures for the whole of the Space Base and measures for protecting the environment,
- responsible for the Protective Security of the entire Space Base,
- owner of all the technical resources used to accomplish its mission, with the exception of the Payload Preparation facilities (EPCUs) and the downrange stations,
- responsible for operating and maintaining the EPCUs,
- managing the activities of the industrialists making up the Guiana Space Manufacturers Community (CISG).

Another of CNES/CSG's missions is to submit to the CNES President a policy for exploiting the Space Base , that will in all circumstances guarantee its security, reliability and availability, thus ensuring competitive access to Space for France and Europe while reinforcing the importance of Europe's Spaceport on an international level.

¹ See annex 2 'CNES/CSG missions at the CSG'.

² CNES/CSG (the CNES establishment in French Guiana) should not be confused with the CSG (Guiana Space Centre, Europe's Spaceport).

Once this policy has been approved by the President, CNES/CSG implements it in close cooperation with ESA and Arianespace, as well as the other industrial partners on the base and the stakeholders present in French Guiana.

1-1 Coordinating industrial reorganisation at the CSG

The Guiana Space Centre has an excellent reputation as the satellite launch base with the best record of customer satisfaction, which considerably strengthens Ariane's competitive market position.

In order to reinforce these strong points and to satisfy the requirements of a highly competitive market the CSG has undertaken the industrial reorganisation of the site since 2005, for the purpose of reorganising the launcher activity as decided by the ESA Council in May 2003.

The objective was to reorganise the entire industrial process to make the Space Base more efficient and competitive, in accordance with the following priorities:

- reducing the costs of operational activities as well as operating/maintenance costs throughout the CSG,
- keeping in mind the impact of the new organisation for the launcher sector and in particular the new roles of Arianespace and Astrium,
- obtaining a more favourable financial distribution according to ESA's 'geographical return' rule.

It should be remembered that maintaining and operating the CNES/CSG was performed via thirteen industrial service contracts, due to be renewed on 31 December 2006. These contracts included services performed for other customers on the Space Base (Arianespace, Regulus, Europropulsion, Astrium and Air Liquide Spatial Guyane) which were invoiced to them under the terms of specific contracts.

A 'project group' had been set up in 2005 to reflect on the best way of reorganising the CSG and to call for tenders for these contracts. The group had arrived at the following major decisions:

- to issue 21 calls for tenders corresponding to 21 separate technical work packages, in order to optimise technical and economic efficiency and to allow the best possible use of the skills available on the base;
- that CNES and Arianespace should jointly select the manufacturers for 14 of these technical packages after which CNES and Arianespace would negotiate their own contracts with the manufacturers in question.

Particular attention was paid to social issues and problems arising from the transition, which led to:

- introducing a social clause into all new industrial contracts, based principally on respect for the site Convention, recently updated with the addition of an obligation to achieve results;
- insisting on full disclosure from companies, in order to ensure that no employee suffers from the effects of the transition between the old and new industrial service contracts.

◆ *Milestones for 2006*

Call for applications. Technical packages	24 October 2005
Deadline for candidate applications	2 December 2005
Call for tenders sent to short-listed companies	15 December 2005
Deadline for tenders	17 February 2006
Tenders opened -> summary report	March to end of May 2006
CNES and CNES/Arianespace selection commissions, with representatives from ESA	June and August 2006
Approval of contracts by the CNES Board of Administration	8 December 2006
Contracts signed	December 2006
Contract notification	January 2007

After the packages had been regrouped, twelve industrial contracts fell under CNES supervision:

◆ *Activities and successful bidders for the period 2007- 2011*

<i>Contracts</i>	<i>Contractors</i>	<i>Activities</i>
Contract 1	TELESPAZIO/GTD/VITROCISSET	Planning
		Telecommunications, Synchronisation
		Location and meteorology
		Telemetry and satellite tracking
		Telecommand functions
Contract 2	IEC / Sarvis	Business IT services
		Optics and video
Contract 3	GIE ESQS / ALSG	Range safety / environment
		Regulatory control
		Quality assurance and dependability
Contract 4	SNECMA	Chemistry laboratory
Contract 5	MT AEROSPACE	Physics laboratory
Contract 6	ENDEL / PEYRANI	Transit and transport
Contract 7	APCO / CEGELEC AT GmbH	EPCU (payload preparation facilities)
Contract 8	ENDEL / RMT / AXIMA	Air conditioning
		Power
Contract 9	CEGELEC AT GmbH / APCO	Technical design bureau
Contract 10	RMT	Protective security system
Contract 11	SODEXHO ALLIANCE	Reception and visits
		Documents and archives
Contract 12	SODEXHO / PEYRANI	Site maintenance

For the transport of individuals, contracts were attributed to local transporters for the period 2007-2011.

1-2 Preparing for the arrival of new launchers

Any change at the CSG, but particularly such a major one as hosting a new launcher (Soyuz or Vega) must still comply with CNES safety doctrine and CSG range safety regulations.

CNES/CSG therefore continues to participate systematically in studies of such changes while simultaneously assuming its full role as technical authority on all safety and security aspects for state authorities.

The principle tasks are:

- *to finalise the master plan for facilities* at the Space Base and to ensure that it is consistent for all CSG facilities (EPCU, Launch base including industrial facilities, BEAP and Ariane, Vega and Soyuz launch facilities), with the help of the overall design authority, the CNES Launcher Directorate.

- *to prepare for the arrival of the Soyuz and Vega launchers*, particularly by providing expertise in the field of range and flight safety, and with due respect for the CNES safety doctrine and CSG range safety regulations within the framework of the Space law which is currently being drafted.

- Technical modifications to the Soyuz launcher are currently in the qualification phase. The preliminary studies of the Soyuz launcher's flight behaviour have been carried out jointly with the Russian partner and have required numerous technical meetings in order to complete the range safety studies.

Concerning the ground implementation aspect of the Soyuz Launch Facilities (ELS), the exact definition of the infrastructures for the launch complex was validated after a traditional project review and the report was submitted to the competent authorities for authorisation to commission the complex. The principal elements in the file are a risk analysis and a study of the impact on the environment for which a public inquiry was held early in 2006 in keeping with normal practice. The building permit was issued by the Prefecture of French Guiana in June 2006.

- For the Vega launcher, the Works Safety Study was formally accepted by the DTEFP³, in November 2006. This milestone meant that the bench firing campaign for the P 80 could begin.

³ DTEFP: Direction du Travail, de l'Emploi et de la Formation Professionnelle, *French Labour, Employment and Vocational Training Authority*.

1-3 Operational activity: 5 launches for Ariane 5 ECA in 2006

- **Ariane 5 ECA – 11 March 2006**

- *Spainsat*, telecommunications satellite on behalf of the operator, Hisdesat.
- *Hot Bird 7A*, direct television satellite for Eutelsat.

- ◆ **Use of the Ariane Marine Station on the MN Toucan vessel (in the Gulf of Guinea) for receiving telemetry data from the launcher.**

- **Ariane 5 ECA – 27 May 2006**

- *Satmex 6*, telecommunications satellite built on behalf of the Mexican operator, SatMex.
- *Thaicom 5*, on behalf of the private Thai operator, Shinsat.

During this launch, Ariane 5 created a new throw-weight record by putting more than 8.2 tonnes into orbit.

- **Ariane 5 ECA – 11 August 2006**

- *JCSAT-10*, telecommunications satellite built for the private Japanese corporation, JSAT.
- *SYRACUSE 3B*, military telecommunications satellite developed for the French Ministry of Defence.

- **Ariane 5 ECA – 13 October 2006**

- *DirecTV 9S*, for the American operator, DirecTV Inc
- *Optus D1* for the Australian operator, Optus
- *LDREX-2*, experimental satellite for JAXA, the Japanese Space Agency.

- ◆ **Activation of a dedicated telemetry chain at the Galliot telemetry station and the downrange Natal and Malindi stations for the reception of real-time video images of the surroundings outside the launcher and the deployment of the LDREX 2 antenna.**

- **Ariane 5 ECA – 8 December 2006**

- *WildBlue-1*, telecommunications satellite built for the operator, WildBlue Communications.
- *AMC-18*, built for SES Americom.

2 CNES/CSG's state-delegated responsibilities

France is the country responsible for launches from the Base, so, as representative of the French government, CNES/CSG is responsible for range safety and the protection of life and property.

2-1 Range safety mission

« The French government has made CNES responsible for range safety, which entails controlling the technical risks involved in preparing and launching Space vehicles from the CSG. CNES is responsible for protecting human life, property and the environment from damage in accordance with French legislation and France's international obligations. CSG range safety regulations comply with the CNES safety doctrine, laying down safety requirements and rules to be applied by all launch base users. They cover all activities from design to preparation and implementation of all launch vehicles from the CSG »⁴.

Raising public awareness through talks and exhibitions

CNES/CSG continues its communication policy of explaining and describing its assignments to all stakeholders and interested parties, from the Guianese population and local policy-makers to industrial firms working for or on the launch base, its own customers and CNES and ESA's ministerial authorities.

Each year, CNES/CSG distributes a quadrilingual brochure in Kuru and Sinnamary to inform the public of the risks inherent in CSG's activities and the safety measures taken to protect life, property and the environment. The brochure describes the safety measures taken for launches and gives instructions on what to do in the event of an in-flight launcher accident.

Risk control and environmental protection activities are also described during visits to or lectures at the CSG (e.g. for secondary school pupils, nuclear engineers, Caribbean doctors, congresses or scientific symposia, etc.). These presentations focus on the monitoring system and on the CNES/CSG's own environmental monitoring and protection activities.

⁴ Taken from the CNES/CSG Strategic Plan for 2001-2005 – December 2001

2-2 Mission to monitor the environment

Measurement plans

- ◆ In 2006, the Range Safety/Environment department drew up a plan for annual measurements and for measurements to be taken during and after all Ariane 5 ECA flights and P80 tests.

For Ariane 5, the results are very similar to measurements taken during previous plans. Furthermore, changes in simulation models have been completely validated, following observations taken in the field (meteorological conditions are now taken into account more accurately).

The measurements taken for the P 80 are still being analysed.

Most CSG facilities have to comply with specific regulations due to the risks involved. At CNES/CSG, one of the key assignments of the Safety and Environment department is environmental protection. It therefore carries out regulatory studies prior to operating the facilities, monitors the impact of Space activities on the environment and implements the CSG environmental measurement plans which are designed to monitor the effect of Space activities on the ecosystem on a regular basis.

A series of annual and occasional checks are used to determine the impact of Ariane 5 launch activities on the environment. They cover air quality, chemical fall-out on the ground, the quality of industrial, surface and groundwater, sediment quality, the impact on tree cover, on aquatic fauna in the Karouabo, Malmanoury and Passoura creeks and on birdlife (by sampling feathers and monitoring the wader colony, especially the ibis population).

- ◆ Since 2006, the fish population is monitored twice a year. Environmental measurement plans have also been extended to include aquatic invertebrates, particularly with the use of a water quality index recently introduced in French Guiana, the SMEG (*Score Moyen des Ephémères Guyanais* – mean score for ephemera in French Guiana).

For some of these measurements, CNES/CSG has joined forces with outside partners. Aquatic wildlife is monitored with the help of Hydréco⁵, birdlife with Ecobios⁶ and the study of the initial environment prior to Soyuz with the IRD (Institute for Development of Research).

The main impact is felt in the area downwind (west) of the launch pad up to about two kilometres. Occasional fall-out may be felt between two and ten km from the launch base. Beyond that, the values found have not been significant and are close to natural levels.

It should be remembered that CNES orders synoptic reports to be drawn up on these measurements. The reports, written by independent specialised organisations, are submitted to the regional directorate for industry, research and the environment (DRIRE⁷), various scientific organisations and the SPPPI⁸. They are then submitted to and discussed by the SPPPI's environment commission.

The public can access these reports via the web site of the SPPPI (www.ggm.drire.gouv.fr) or through the communes of Kuru and Sinnamary and several other organisations.

⁵ A private environmental studies bureau

⁶ A private environmental studies bureau

⁷ DRIRE: Direction Régionale de l'Industrie, de la Recherche et de l'Environnement – Regional Authority for Industry, Research and the Environment

⁸ SPPPI: Secrétariat Permanent pour la Prévention de la Pollution Industrielle – Permanent Secretariat for the Prevention of Industrial Pollution

These reports also serve to underline the diversity of animals and biotopes in the territory occupied by the CSG and help improve our knowledge of the fauna and flora of French Guiana.

Partnerships with environmental protection organisations and associations

Risk control and environmental protection activities are also described during visits to or lectures at the CSG.

These presentations focus on the monitoring system and on CNES/CSG's own monitoring and environmental protection activities.

- ***Partnership with ORA (the regional air observatory)***

CNES/CSG presented its environmental measurement plans at the symposium organised by ORA in March on the quality of air in French Guiana.

The continuing partnership with ORA is an example of CNES's determination to work with outside bodies on environmental matters.

- ***Joint actions with SPPPI***

In 2006, CNES/CSG made two presentations, one on the results from the 2005 environmental measurement plans for the Ariane 5 launches, the other on the results of the study of health risks at the CSG.

- ***Partnership with the CNRS⁹***

CNES is supervising a doctoral thesis on the kinetics of the cloud produced by the combustion of the solid propellants of Ariane 5, jointly with the CNRS of French Guiana and the LCSP (CNRS laboratory for combustion and propulsion systems) at Orleans.

After take-off and during the first few seconds, the jet is directed downwards and is then influenced by atmospheric currents. The pollution cloud is carried by the wind and the fall-out in the form of particles, gases and dissolved matter occurs mainly in a region close to the launch site (the near field).

The two main categories of products are chloride and aluminium compounds with a large majority of hydrochloric acid (HCl) and alumina (Al₂O₃).

This study will detail how the fallout is transported in the atmosphere and the corresponding chemistry.

The CSG is a natural refuge for wildlife because of its total ban on hunting and the environmental safety measures taken by CNES/CSG to protect the fauna and the flora.

In addition to its cooperation with the French forestry commission (ONF¹⁰), CNES/CSG has organised practical actions through numerous partnerships with environmental protection associations.

◆ Some examples for 2006:

- SEPANGUY¹¹: a camp was set up on an isolated beach in the CSG for observing the laying habits of sea turtles.
- GEPOG¹² (Groupe d'Etude et de Protection des Oiseaux de Guyane): the Agami site was made available for observing the birdlife and particularly the Chestnut-Bellied Seed-Finch.
- ADNG¹³, the Kwata association, etc.

⁹ CNRS: Centre National de la Recherche Scientifique – *National Centre for Scientific Research*

¹⁰ ONF: Office National des Forêts – *National Forestry Commission*

¹¹ SEPANGUY: Société d'Etudes, de Protection et d'Aménagement de la Nature en Guyane – *Association for the Study, Protection and Reasoned Development of Nature in French Guiana*

¹² *An ornithological society whose purpose is to identify, study and protect birds and their habitats in French Guiana*

¹³ Association pour la Découverte de la Nature en Guyane – *a nature-study society*

Follow-up audit for ISO 14001

- ◆ **In 2006, the follow-up audit for CNES/CSG's ISO 14001 certification confirmed the CSG's commitment to consider the environmental issues arising from Space activities. The results authorised the CNES establishment at the CSG to retain its certification.**

A renewal audit in 2007

The ISO 14001 certificate is awarded after an external audit performed by a certification organisation, valid for three years. In the first two years after certification, there are two follow-up audits. A renewal audit is performed in the third year.



Title: CNES/CSG: Reach Space without losing Earth

It should be remembered that the objectives of the ISO 14001 standard are to *“control and monitor significant environmental features, to eliminate, reduce and/or control pollution of the environment and to satisfy any concerned parties that this has been achieved”*.

“In order to permit the sustainable development of Space activities in Guiana and to encourage greater respect for our natural environment, I hereby commit the CNES/CSG to comply with the following guidelines:

- *strengthen consideration for the environment in our current and future activities;*
- *manage any environmental risks, particularly regarding waste management at CNES/CSG;*
- *use natural resources in a rational way;*
- *include these guidelines in the continuous improvement process within our management system;*
- *develop a genuine corporate culture with regard to our environmental policy and get everybody involved.*

Through these commitments, CNES/CSG declares its determination to play a major role in environmental management and to be able to prove it at any time”.¹⁴

2-3 Responsibility for protective security

France is responsible for the security and defence of Space activities in French Guiana. CNES answers to the French government for the application of French security and defence rules on CSG premises.

These rules concern the physical protection of CSG sites as well as protection of French and European scientific and technical know-how.

The government departments responsible for implementing these rules refer to CNES/CSG alone for all security and defence matters.

¹⁴ Taken from the document declaring Management's commitment to 'A CNES/CSG Environment Policy' – December 2003

3- Work in progress overseen by the CNES Ground Segment Sub-Directorate

The CNES Ground Segment Sub-directorate CNES Launcher Directorate (CNES/DLA/SDS) is conducting major projects to extend and develop industrial facilities and equipments throughout the Guiana Space Centre, Europe's Space port.

The principles SDS customers are ESA, which owns the launch facilities, CNES/CSG and Arianespace, in the context of their investment plan.

The principal challenge is to conduct these large-scale works while the base remains in operation, without disturbing the activities of the various users or the launch schedules.

3-1 The main achievements of 2006

3-1-a The Soyuz project

◆ **In 2006**

- The earthworks begun in January 2005 have been completed: tracks were laid out, forests cleared and land drained and prepared, which meant bringing 500,000 m³ of sand and laterite to the 120 hectares of the site.

Quarries of sand and laterite which had been opened to supply the Soyuz site, have now been closed. The report by the DRAC concerning the archaeological research carried out on the EVA quarry mentions the discovery of Amerindian remains, several thousand years old¹⁵.

- Work has begun on the infrastructures.

The flame trench, which deflects the launcher's exhaust gases, has been dug. Excavating required the removal of 200,000 m³ of matter, half of which was granite. This is then crushed for reuse at the appropriate calibre for civil engineering, roads and other services¹⁶.

The foundations of the principal buildings have been laid or are being completed, as have the initial layers of front pad (launch pad) and the Launch Centre (CDL).

The roads and services, power networks and air conditioning systems are being installed in line with the provisional schedule.

At the same time calls for tender were issued concerning the 'Fluids and low voltage systems' and 'Safety and protection resources'.

Vitrociset (Italy) was awarded the first contract and Clemessy the second. The contracts were signed for a total amount of 17 million Euros, out of a total investment for infrastructures of 135 million Euros before tax.

Reminder

The Russian Soyuz launcher is being bought to French Guiana as an ESA programme. It is motivated by Europe's ambition to have a range of launchers made up of the Ariane 5 heavy launcher, the medium-sized Soyuz ST launcher and the small Vega launcher.

The object of the "Soyuz in French Guiana" programme is to launch an improved version of the Russian Soyuz FREGAT launcher known as Soyuz ST from the Guiana Space Centre.

¹⁵ A press release "Preventive archaeology at the Eva 2 Quarry - Soyuz site at the Guiana Space Centre" dated September 2005, is available on request.

¹⁶ Roads, power and IT networks, sewage and other utilities.

The principal task will therefore be to build and qualify a Soyuz Launch Complex based on those at Baïkonur and Plessetsk and adapted to French standards and the specific conditions of the Guiana Space Centre.

CNES has been designated system architect, which means that it is responsible for designing the entire launch pad, and is also prime contractor for the whole project in which Europe and Russia are partners¹⁷.

3-1-b The Vega project

◆ - The site

The old ELA 1 site has been cleared of all unnecessary equipment to make way for the Vega launcher.

The mock-up of the P80, the first stage of Vega, has been brought by road from Regulus on a special transporter (a heavy-load trailer with very low centre of gravity) as far as the entrance to the Vega site (ELA 1). The earthworks for an access road for the transporter have been completed.

The gantry track and the buildings housing the technical resources are currently being renovated to take the first ground equipment.

On-site assembly work for the mobile gantry will begin in 2007.

◆ - Test-firing the P80 - November 2006

The CNES Launcher Directorate is responsible for developing the first stage of Vega, the P80. Europropulsion (Snecma/Avio) is prime contractor for the test-firing for this development. The Ground Systems Sub-Directorate is responsible for test-firing the thrusters at the BEAP¹⁸, on the CSG site.

Activities began at the BEAP in May 2006 with calibration tests of the thrust measurement device in a P80 configuration, followed by tests in controlling the electric nozzle actuators, powered from the ground.

The campaign began in November 2006 with the arrival of the P80. After connecting up and verifying 600 measurement channels and mechanically integrating the thruster, a first firing took place on November 30, 2006.

The resulting data were available for analysis in a matter of days¹⁹.

3-1-c The other projects

• The No. 1 Ariane 5 launch table (Arianespace took delivery in July 2006)

This was the last phase of the work for raising the height of ELA 3 in order to receive Ariane 5 ECA. As a result of the propellant tests carried out in June 2006 the table was validated for operational use with the launch of October 2006.

Table No. 1 now has the same configuration as Table No. 2 and can be used by Arianespace for ESCA launches.

¹⁷ A press file, 'Soyuz at the Guiana Space Centre', dated December 2005, is available on request.

¹⁸ BEAP: Banc d'essai des Etages d'Accélération à Poudre – Solid-fuel booster test-bench

¹⁹ The main participants are: ESA/ESRIN, ELV/IPT, CNES/DLA, EUROPROPULSION, SNECMA, AVIO, SABCA, CAEPE, SNPE, etc.

- **Redeployment of ELA 2 site**

After 17 years of service and 119 launches of Ariane 2, 3 and 4, ELA 2 was decommissioned in February 2003.

The site is now undergoing a major 'redeployment'. This involves dismantling the various buildings which make up ELA 2, with the exception of those which will be reused for the Ariane 5, Vega and ATV programmes.

Some equipment will be reused for other programmes such as Soyuz and Vega.

DLA/SDS has been designated prime contractor for this task which should require work from about ten local companies and should be finished in the course of 2007.

- **ATVdock (the old ELA 2 assembly hall)**

The building has now been completed and will be turned over to the user at the beginning of 2007.

- **Propellant storage zone**

This solid fuel storage zone has been designed to meet all environmental protection requirements. It will henceforth replace the previous storable propellant storage areas in ELA 1. These areas will also be dismantled in the course of 2007 and part of them will be made available for the Vega site.

At the same time, a study has been carried out on ways to make it possible for the public to visit the launch area in the context of a policy for preserving the industrial heritage.

- **The ARTA²⁰ programme in French Guiana**

In 2006, ESA as prime contractor delegated the following tasks to CNES/DLA/SDS for the years to come:

- the renewal or renovation of the Ariane resources belonging to ESA at the Space Centre
- the preparation and execution of test campaigns on the solid propellant motor at the BEAP
- the maintenance of the BEAP from 2007 to 2010
- a mission to retrieve the EAP or solid fuel booster stages (on both land and sea).

- **The CSG investment plan**

Each year, the Guiana Space Centre invests to improve its facilities. Some of these tasks are delegated to the DLA/SDS.

Worth noting in particular are:

- protecting the perimeter of the Space Centre,
- updating the fire detection systems, the obsolete circuits of the telecommunications equipment and the telemetry receiving equipment for the network of launcher tracking stations,
- the preliminary modifications for changing the air compressors of the EPCU S5, with the aim of replacing the system (for compression, cooling and drying) with a more reliable system, better adapted to conditions in French Guiana (in respect of temperature, hygrometry and salt air environment).

²⁰ Programme d'Accompagnement de Recherche et de Technologie – *Ariane-5 Research and Technology Accompaniment programme*

3-2 A heavy work load for 2007

- **Work on the Soyuz launch facility (ELS)**

Construction of the main buildings will start in the course of 2007. The number of people working on the site will increase from 250 to 500 when the Russian personnel arrive.

- **Work on the VEGA launch facility (ELV)**

Work on the infrastructure will intensify during 2007, with the raising of the flame trenches and installation work on the launch pad and the mobile gantry.

- **A qualification firing of P80 at the BEAP**

The P 80 should be test fired for qualification during the summer of 2007.

- **The French Guiana ARTA programme**

- **Firing ARTA 4 at the BEAP**

The test- firing of ARTA 4 should take place at the end of 2007.

- **Obsolescent aspects of the French Guiana ARTA programme**

Some of the obsolescent aspects of the command and control structure for ELA3 will be dealt with in 2007 between launch campaigns. Plans have also been made to improve lightning protection of the booster integration building and to upgrade the 'fluids' production process at ELA3 (the ELA 3 compressor).

- **Redeployment of ELA 2**

- **ELA 2 propellant storage zone (ZSE)**

The final stage of this project consists in dismantling the previous propellant reservoirs. These will then be prepared for being sent out of French Guiana for recycling elsewhere.

- **Ariane 3 and 4 launch pads**

The Ariane 3 and 4 pads will be dismantled, cut up and prepared for being sent out of French Guiana for recycling elsewhere.

- **The ESTEC Galileo project for a 'Kourou Galileo Hosting Service'**

Negotiations between CNES and ESA are currently being finalised concerning the creation of the largest site for Galileo stations in the world at the CSG Technical Centre. Eight to ten antennas should be installed on the four hectares of the site, the tallest being almost 20 m high. Once formally approved by ESA, earthworks will be undertaken to prepare the site for the stations in the course of 2007. These stations, which will be automatically operated from two control centres in Europe, will be used to control the 30 satellites making up the constellation. The stations should become operational in 2009.

- **The CSG investment plan**

Work on the above-mentioned projects will be continued in 2006.

Among other examples, the operational video wall in the Jupiter 2 control centre will be replaced, a start will be made to upgrade the computing equipment for launcher tracking and telemetry processing, etc.

II- CNES IN THE ECONOMIC AND SOCIAL ENVIRONMENT OF FRENCH GUIANA

Although its principal mission in French Guiana concerns Space activities and coordination of operations at the Guiana Space Centre in agreement with the ministries to whom it reports, CNES also wished to reinforce its action by taking advantage of its know-how and national and international networks to help develop the region further. For this purpose, the CNES/CSG French Guiana Mission was created in January 2000.

The French Guiana Mission is responsible for proposing and supporting projects and actions to promote the economic development of French Guiana according to the strategic and political guidelines determined by the French government and the French Guiana region under the terms of the current state-region contract plan (CPER) for 2000-2006 and the future contract for the 2007-2013 plan for new operational programmes.²¹

1- Participation in sustainable and diversified economic development for French Guiana

1-1 Actions for training, employment and creation of companies

- **CNES annex to the 2000-2006 CPER**

CNES showed its long-term commitment to the development of French Guiana by renewing its contribution to the 2000-2006 CPER Plan by means of a CNES annex amounting to €26.7 million, whose principal objective was to promote projects that would create jobs.

- ◆ **Results for 2000 - 2006: a financial commitment to job creation**
 - One thousand, five hundred and twenty-nine long-term jobs have been created. The goal of creating 1,000 jobs set in the year 2000 has been exceeded
 - Almost €26 million has been allotted
 - Over 1,250 project applications have been examined
 - Three hundred and twenty projects have been retained including 200 from VSEs (Very Small Enterprises).
- ◆ **The following are a few examples of projects chosen in 2006:** participation in the 2006 marketing plans of the French Guiana Committee for tourism; financing a business village and a floating wharf for leisure and tourism at Sinnamary; participation in the trade fair for local produce in 2006; financing studies for a business park at the port of Degrad des Cannes commissioned by the French Guiana Chamber of Commerce and Industry; an 'innovative business' nursery on Cayenne Island; a feasibility study for installing a wind farm and various investments for tourism (a launch for sports fishing, a catamaran, a riding school etc).
- **Local initiative hubs (PFIL, for *Plate-Forme d'Initiative Locale*)**

The purpose of local initiative hubs is to detect and promote initiatives which will create jobs by granting a personal loan with no guarantee or interest required. It helps those with projects for small companies. There are three initiative hubs in French Guiana: one in Saint-Laurent du Maroni (Western French Guiana Initiative), one in Kourou (Central Guiana Initiative) and one in Cayenne (Central Eastern Guiana Initiative).

²¹ A more detailed press file, 'Le CNES, partenaire du développement économique de la Guyane', dated September 2006 is available on request.

CNES (through the CPER annexe) is one of the sources of finance for these local initiative hubs and sits on loan commitment boards as well as the three Boards of Directors.

- ◆ **For 2000-2006, CNES contributed over 1 million euros to the three hubs. The three hubs between them succeeded in creating 489 jobs.**

- **The economic initiative association (ADIE)**

ADIE is designed to enable people excluded from the traditional banking system to create their own jobs, by proposing different types of loans according to need. The association has had a branch in French Guiana since July 2003

CNES participates in micro-loan arrangements through its annex to the CPER.

- ◆ **Between 2003 and 2006, CNES contributed €235,000 for a total of 202 jobs created.**

- **Financial engineering**

Financial engineering is a vital issue for the business sector in French Guiana. Two financial institutions, *Alyse Guyane* and *Guyane Investissement*, have been created with the French Guiana region and CCIG as principal partners, to provide businesses with extra capital for development.

CNES sits on the investment committee that examines applications and as an observer on the board of *Alyse Guyane* which manages the funds.

- ◆ **For 2003-2006, 1.25 million euros were allotted to these two funds. Since the system was set up in 2005, 71 jobs have been created.**

- **Fostering an entrepreneurial attitude**

In the context of its partnership with local stakeholders who assist with the creation of new businesses, the CNES/ CSG Guiana Mission participated in various activities.

Particularly worthy of note are actions undertaken with:

- the *Boutique de Gestion*: granting awards for micro-activities for a public suffering from literacy problems²²;
- the ACREDEG²³: participation in various steering committees of the *Baskets Enterprises* programme.

Apart from its work in Cayenne and Kourou, the CNES/CSG Guiana Mission, in partnership with the local authorities, too part in various actions to raise awareness of business creation in the communes.

- **Participation in the Guiana Technopole²⁴**

CNES sits on the technical committee and on the various steering committees (organisation of breakfast discussion sessions, the RETIS congress, etc.).

CNES/CSG also participates financially in the different actions undertaken by the Guiana Technopole.

For the construction of the 'innovative business' nursery to be managed by the Guiana Technopole, CNES will contribute €1.5 million from the current Annex to the CPER.

- ◆ **Four hundred and eighteen thousand euros have so far been drawn on the annex to the CPER.**

²² Covered by the DPLI: Dispositif Pédagogique de Lutte contre l'Illettrisme.

²³ ACREDEG: Agence pour la CRéation Et le Développement des Entreprises de Guyane.

²⁴ The mission of the Guiana Technopole is to promote economic development and create jobs in the Region by helping to set up and develop companies in a wide range of activities.

It should be remembered that CNES, together with the French Guiana Regional Council and other partners, helped to set up the first business hub in overseas French territory. The first two Directors (Roberto Visigalli and Pierre Zammit) were seconded to the hub by the CNES/CSG. The Director of CNES/CSG, Jean-Louis Marcé, is currently the First Vice-President of the association.

1-2 Helping French Guianese businesses operate on an international level

Pierre Zammit, the Director delegate of the CNES/CSG Guiana Mission was appointed as French Trade Advisor (CCEF).

Among actions taken, we may note the creation of a French Guiana branch of the CCEF and marketing initiatives to help businesses in French Guiana operate more widely in South America and the Caribbean.

1-3 Helping to make French Guiana more attractive by setting up business clusters

• Business clusters with the accent on Space

As a result of the adoption by the Regional Council of the Regional Economic Development Plan, various major projects were decided upon. One of these involves the future installation of a business cluster with the accent on Space activities in French Guiana.

CNES/CSG sits on the Steering Committee and one of its first actions was to create a partnership with the Aeronautics, Space and On-board Systems cluster located in the Midi-Pyrénées and Aquitaine regions on the French mainland.

• ‘Health in a tropical environment’ business cluster

During the visit of the Minister for Territorial Development, Christian Estrosi, in August 2006, the possibility of setting up a primarily medical business cluster was discussed with the local authorities. At the suggestion of the Regional Prefect, meetings were held at the Prefecture, bringing together stakeholders from research, universities and businesses, in order to finalise French Guiana’s application to create a tropical health business cluster with support from the *Lyon-Biopôle* cluster.

CNES would be involved in this cluster through its activities in telemedicine and EMERGESAT.²⁵

In both cases, CNES/CSG participated actively in the different work sessions.

1-4 Partnership agreements between CNES and French Guianese communes

CNES aims to foster the economic, cultural and social development of French Guianese communes. To encourage sustainable development and an evenly-balanced distribution, 10 agreements have been signed since 2000, with the communes of Cayenne, Matoury, Sinnamary, Kourou, Saint-Laurent-du-Maroni, the CCOG²⁶, Iracoubo, Roura, Montsinéry-Tonnegrande and Macouria. These 10 agreements cover a total of 16 out of the 22 communes in French Guiana.

²⁵ *Emergesat, a crisis-management tool, is designed to assist disaster relief teams. It was developed by several partners besides CNES and is progressively entering its operational phase, ready for testing in French Guiana. It consists of a container for humanitarian work that can be easily transported to a disaster site by helicopter, providing all disaster relief teams with an overview of the crisis and assistance in coordinating their work.*

²⁶ CCOG: Communauté des Communes de l’Ouest Guyanais – Community of West Guianese Communes

The financial support provided to the communes was over €9 million between 2000 and 2006, enabling them to set up development actions covering areas as diverse as the rehabilitation of the French Guiana heritage and the development of tourist, sporting and cultural activities as well as economic and social activities.

- ◆ **Steering Committee meetings were held, during which all the grants for the year 2006 were allotted. The annual commitment is of the order of €1.4 M.**

1-5 Space applications in French Guiana

• Remote medical diagnosis or telemedicine

The particular geographical conditions in Guiana mean that the inhabitants of the inland communes face more difficulties in getting health care than the population along the coast.

CNES has been working with the Andrée Rosemon hospital in Cayenne (CHC) since 2000 to improve health care in French Guiana with the help of Space applications.

In the context of this partnership a telemedicine project was developed in June 2001.

It is now five years since the first remote sites in Guiana were equipped with portable telemedicine stations and remote medical consultation has now become a daily reality for the population along the rivers.

The arrangement has been progressively extended to 12 health centres in the Guianese interior and now allows remote diagnosis in several fields of medicine.

At the same time, this example of Space technology benefiting the population in a very real way has made Guiana a world showcase for telemedicine.

◆ **In 2006**

Remote consultation continues to grow significantly. Taking all the sites together, the telemedicine unit recorded 474 cases dealt with in 2006, compared to 373 in 2005.

- The gateway between the telemedicine server and the laboratory results server has been commissioned with the result that all the health stations and centres can receive biological results for haematology, biochemistry and parasitology over the telemedicine network, which is an enormous advantage.

- The epidemiology module has been installed at each of the sites (except for Trois Sauts and Régina) to measure activity at the centres.

Perspectives for 2007 include extending the device to three sites close to the coast (Kaw, Régina, Iracoubo) to ensure a more unified network, which will bring the number of sites equipped to a total of 14.

Four of the latest generation of satellite phones will replace the Inmarsat M4s, which will solve the communication problems encountered by the sites equipped with Inmarsat (Camopi, Saül, Ouanary and Apatou).

On the regional level, the project managers believe that cooperation with the neighbouring countries and the Caribbean may be developed and would enable activities to be created. The fact that French Guiana has become a showcase for telemedicine means that it might be possible to sell the system to our neighbours and to develop service activities around it, particularly for maintaining and operating the tools being used.

- **The SEAS²⁷ project for monitoring the Amazonian environment by satellite**

CNES/CSG considers that this project will have an impact on all aspects of economic development, research and training. It has therefore helped finance the station, contributing €2.9 million (75% of the total cost) and making its Montabo site available for installing the satellite receiving antenna.

Jean-Louis Marcé, Director of CNES/CSG, is a member of the Steering Committee.

The IRD (*Institut de Recherche pour le Développement* – a government research institute for sustainable development) has set up a high-resolution receiving station to exploit the data from the European Earth Observation satellites SPOT 2, 4 and 5 and ENVISAT.

This technical platform of the Guiana university hub (PUG) is the only one of its kind in Europe and South America. The research, training and service activities it will develop will contribute directly to regional development.

- ◆ **In February 2006, the platform was opened in the presence of the principal project stakeholders.**

1-6 Actions to promote French Guiana

- **Support for the French Guiana Tourist Board**

CNES/CSG actively supports the French Guiana Tourist Board (CTG) by:

- participating in the Board of Directors, the Executive Board and the 'Promotion' Committee meetings;

- granting a subsidy of €4 million through the CNES Annex to the CPER (since 2000), via promotional activities and advertising undertaken by the French Guiana Tourist Board;

- taking part in the tourist fairs in Guiana and on the French mainland (Tourism and Leisure fair, *Foire de Paris*, *Top Résa Deauville*, etc.);

- awarding a specific grant of €155,000 to CTG. CNES financed the publicity for the sporting event *RAMES Guyane*, a transatlantic rowing race between Saint-Louis in Senegal and Cayenne (November 2006 to January 2007).

- **Promoting the Salvation Islands (*Iles du Salut*)**

The Salvation Islands are the property of CNES, which, since 1965, has been preserving the historic heritage of the penal colony, with a view to developing its tourist potential in a context of sustainable development²⁸.

Every year, some 50,000 tourists visit the Salvation Islands making them one of the most visited sites in French Guiana.

²⁷ *Surveillance de l'environnement amazonien par satellite*

²⁸ *A detailed press file, 'CNES and the Salvation Islands', dated February 2007 is available on request.*

2- Educating about Space

CNES has for several years been pursuing a policy of popularising Space sciences and technology amongst young people and schools.

The CNES/CSG communication department extends this policy of popularising CNES science and Space technology to French Guiana.

Raising awareness of Space activities amongst young people, assisting teachers in their projects and developing the image of CNES amongst the general public by publicising practical Space applications that benefit society, are all pursued through appropriate actions, particularly in the field of teaching. There are special events and school visits for presenting and promoting Space techniques as well as the events organised by the Space Museum.

2-1 The partnership between CNES and the French Guiana education authority

The director for education in French Guiana has decided to include Space as an integral part of the teaching programme. Two essential themes must be introduced in state teaching schools over four years: Space and Biodiversity. Children must follow these themes from their earliest school years.

An agreement was signed on 10 March 2006 by CNES and the French Guiana education authority for raising awareness about Space activities amongst young people and assisting teachers in their teaching projects.

In order to give real substance to this partnership, working groups were set up to bring together Space personnel in Guiana and teachers and officials from the education system, in order to develop teaching materials on particular themes.

The Steering Committee including CNES/CSG personnel and officials from the French Guiana education authority met 4 times in 2006 between April and December.

2-1-a Specific actions in 2006

- First session of 'Space Wednesdays' in French Guiana – Wednesday 25 March 2006

Space Wednesdays are free talks and visits on Space themes organised jointly by CNES/CSG and the French Guiana education authority. Their originality stems from their dual approach to the subjects, both scientific and educational, which means that participants go away with clear information and practical examples of how to use the material in class.

In 2006, 67 of French Guiana's school teachers visited the CSG and the Space Museum and discovered the world and environment of launchers through three talks.

- School teachers at Space school- Wednesday 26 April 2006

At the request of the French Guiana education authority, CNES/CSG organised a conference for teachers on 'Astronomy and Space', for about 250 teachers from the Kourou area. The purpose was to help make science and technology more accessible to them. The teachers were provided with all the information necessary to help them set up new curricula in the fields of science and technology. As well as talks on specific subjects, various teaching aids were proposed such as visits to the Centre, the Space Kit or the mobile exhibition. A document was also distributed to the teachers, summarizing the services to be found at the documentation centre.

- First participation by French Guiana at the Mathematics Olympiads – 20 May 2006

The purpose of this national event is to develop initiative and a taste for research amongst pupils. A total of 79 pupils from Guianese High Schools spent 4 hours solving four 'open problems'.

CNES provided logistical support for the event and contributed the three first prizes as well as inviting the winners to the Jupiter Room.

- Chess Open Tournament – 2 June 2006

Turning now to strategy, a major Chess tournament was organised in front of the Kourou Cultural Centre. You could have seen 450 pupils concentrating intensely with one hand on the chess board and the other on the clock.

CNES provided the chess boards, the clocks, the cups and the transport.

- Solar eclipse – 22 September 2006

French Guiana was lucky to witness an annular eclipse of the Sun of considerable scientific and educational interest. Together with the Education Authority, CNES/CSG set up several activities concerning the event for the benefit of pupils: talks in schools and training sessions for teachers run by Jean-Louis Heudier, an astronomer from the Nice Observatory on the Côte d'Azur.

CNES/CSG provided 7 coaches running to the observation sites at Carapa, Ibis and Montabo, for 350 pupils from primary and secondary schools in Kourou. On D-day, the pupils used special glasses, 35,000 of which have been provided by CNES/CSG. Forty-five Solarscopes and 6 astronomy telescopes were also made available to schools and astronomy clubs.

Lastly, still and moving images of the eclipse were sent to the Education Authority for use in schools.

- Launch of Ariane 5 ECA – 8 December 2006

For this last launch of the year, CNES/CSG provided coaches so that 150 school children from Guiana and Guadeloupe could watch Ariane 5 lift off from the Ibis site.

- The 'Ambition: success' network (RAR)

In French Guiana, 20,000 pupils are involved in the Teaching Authority's 12 'Ambition: success' networks. This programme seeks to boost the educational resources available to pupils in most need when passing between primary and secondary levels. The Justin Catayée RAR in Cayenne has chosen Space as its theme and the Omeba Tobo RAR in Kourou has chosen science, technology and mathematics.

CNES/CSG participates by supporting the projects run by both networks, each of which is made up of one secondary and three primary schools.

- Teaching materials

Through its partnership with the French school system, CNES regularly designs educational materials concerning Space.

In 2006, CNES offered teachers two resources for treating science in an entertaining way.

- An exhibition named 'Riding the wave' (*Au fil de l'onde*), a set of 16 illustrated panels for secondary pupils and the general public. Waves are all around us, both on Earth and in Space whether visible or invisible, radio, microwave, infrared, ultraviolet, X-rays or Gamma rays. CNES created this exhibition about the electromagnetic spectrum and its uses in the field of Space as a part of the World Year of Physics.

- The Space Kit ('Earth: our Spaceship') includes 10 teaching projects for discovering the Space environment. It is a cross-discipline resource enabling teachers to address several aspects of the science programme experimentally: air, energy and radiation, conditions of life on Earth, the Space vacuum, weightlessness, gravity, etc. It comes with a guidebook for

teachers and is designed for loan to schools throughout French Guiana on request to the CNES/CSG Documentation Centre.

- Scholarships

CNES awards five scholarships each year, allowing students from French Guiana to study engineering in mainland France.

A full programme has been planned for 2007, with several events such as training for teachers, participation in the *Forum Métiers de l'Ouest* (a careers fair), the Mathematics Tournament for the Caribbean and French Guiana, the 2nd edition of Space Wednesday concerning Space applications in the Amazon Basin, the Inter-Guianese Games, the Space Forum, the Book Fair, regular visits to the CSG by primary and secondary pupils, a specific programme of action benefiting primary and secondary schools along the rivers, etc.

2-1-b Hosting schoolchildren

CNES/CSG coordinates and organises school visits for promoting awareness of Space science and technology on behalf of the organisations and industrial partners present on the Base.

For several years, conscious of the importance of tailoring information to the needs of school pupils, the CNES/CSG has organised tours of the launch base for Guianese schools (primary, secondary and high schools). Most of these tours follow a request from a teacher or archivist.

For pupils, the first observation phase is a tour of the Guiana Space Centre's facilities, the ideal way of getting to grips with the world of science, going behind the scenes of the Ariane adventure and discovering how the launch base operates, why it is necessary to send rockets into Space and what a launch actually entails. In other words, to understand what the launch base is used for, how it works and the advantages of having a launch base in French Guiana. The reasoning behind the school visits is that they should be an integral part of the teaching process, designed with the help of teachers and open to constant improvement, should help children acquire new knowledge and should be developed in the context of teaching activities. Each visit organised is adapted to the level of the children and the project being followed.

- ◆ **In 2006, CNES/CSG reinforced its policy of promoting awareness of new technologies and Space activities amongst school children and welcomed 7,775 visitors from schools in French Guiana, of which 2,574 visited the CSG and nearly 5,200 the Space Museum. This covers approximately 12% of Guianese students, taking all levels together.**

Micro-rocket activities at the Space Museum

In order to promote Space techniques as a part of Space education, CNES/CSG has for some years now been organising workshops for making and launching micro-rockets and stratospheric balloons for the benefit of school children in French Guiana, in partnership with the Space Museum

The theoretical part of these workshops teaches some aeronautics and physics, knowledge which is crucial to understanding the basic principles behind the construction of the rockets that participants make and decorate themselves, in their class rooms. For the practical part, pupils can either launch their micro-rockets within their own communes or come to the Space Museum to launch them. This operational phase includes the final count-down, take-off and observing the flight. Lastly, the children compare the different micro-rockets and their trajectories in order to understand the reasons for success or failure.

This method of raising awareness of Space activities — going beyond educational theory to practice in close partnership with teachers — is becoming increasingly popular among school teachers.

- ◆ **In 2006, 10 micro-rocket operations were organised and approximately 500 young people from Saint-Laurent, Cayenne, Kourou, Montsinéry and Cacao participated in the different construction workshops and launch operations.**

The Space Museum team twice went out to meet the children, at the Awara primary school and the Saint-Georges de l'Oyapock secondary school, where children could launch their own rockets on two consecutive days.

Events have already been planned for the start of 2007, with pupils from the communes of Cayenne, Saint-Laurent and Sinnamary.

2-2 Events for the Guianese public in 2006

- "From Earth to Space" - March 2006

This talk was organised by CNES and given by Christophe Bonnal, an expert-systems engineer, from the Space Technology Sub-Directorate at the CNES Launcher Directorate.

The occasion was organised jointly with the French Association for Aeronautics and Astronautics (AAAF) and the 'Environment and Heritage' association and offered the general public an introduction to past and future launch vehicles.

- Tourism and Leisure Fair- April 2006

CSG participated with a stand where visitors could learn about Space activities and find useful information on free visits to the only launch base in activity open to visitors from the general public, how to watch the launch of an Ariane 5 rocket from an observation site and the new programme of events at the Space Museum for 2006.

- European Heritage Days - September 2006

For the second year running, CNES/CSG gave visitors a chance to discover some of the industrial history of the CSG, via the rocket probe activity, less well known than the Ariane saga.

The programme included a visit to the original facilities built for Space activities in French Guiana and an exhibition compiled from contemporary documents.

- National Science Festival - November 2006

CSG participated with a 'fun' day at Kourou, offering an entertaining approach to the world of Space (a workshop for building Ariane 5 out of LEGO blocks, colouring in pictures, games, painting on tee-shirts etc.) and free entry to the Space Museum.

Two hundred and three people enjoyed this day out, intended particularly for youngsters.

Another feature was an introduction to the Planetarium at the Science village in the PROGT of Matoury.

Two hundred and twenty people watched displays of the night sky over French Guiana, from their seats under the dome.

3- The CSG: a showcase for Europe's Space achievements

3-1 Industrial tourism: the CSG attracts tourists to French Guiana

Space tourism is one of the main reasons why tourists choose to come to French Guiana. The Guiana Space Centre and Space Museum are two of the most popular tourist attractions.

- ◆ **In 2006, 33,525 visitors came to the CSG either as visits by the general public (19,475), VIP visits (3,460), school visits (2,730), press visits (230) or invitations to Ariane launches (7,630).**

Sixteen thousand, two hundred and fifty-five visitors discovered the Space Museum, of whom 5,200 were school children.

- **The visits**

Entry is free to the CSG, the only active launch base in the world open to the general public. CNES/CSG coordinates visits by the general public and VIPs on behalf of the organisations and industrial partners present on the base and also interfaces between the visit operator (responsible for welcoming and taking charge of visitors) and the different technical departments on the Base. Organising the tours means providing transport (organized by the CSG transport department) as well as staff and audiovisual equipment in the Jupiter Room, with assistance from the safety and security departments.

Close coordination is necessary because the launch base is operational and tours must not perturb the preparation of satellites or launch vehicles.

- ◆ **Four hundred and seven organised visits brought 19,475 visitors from the general public to the Guiana Space Centre.**

One hundred and one visits were organised for 3,460 VIP visitors, such as Sérgio Maurício Brito Gaudenzi (President of the Brazilian Space Agency), a delegation of 12 members of the French Parliament, François Goulard (Minister for Higher Education and Research), Catherine de Brechignac (President of the CNRS), Lygia Kraag-Keteldijk (Surinam Minister for Foreign Affairs), Christian Estrosi (Minister for Regional Development), Michèle Alliot-Marie (French Defence Minister), 124 members of the European parliament participating in the UEO/CIEE symposium about Space, Defence and Security, Hamlaoui Mekachera (Minister for Military Veterans), etc.

- **Reception of visitors for Ariane launches**

CNES/CSG also coordinates and hosts visits for guests invited by companies or entities on the launch base.

These visits are possible on the five sites operated by CNES/CSG (Agami, Carapa, Vénus, Jupiter, Ibis). Personnel have to be mobilised to handle guest lists, create, print and send out invitations, coaches have to be laid on to take guests to observation centres, guides have to be trained not only in public relations but also in safety procedures and technical and audiovisual equipment enabling guests to follow the count-down and launch on a big screen, has to be maintained and operated.

- ◆ **In 2006, over 7,600 people (VIPs and guests from Guiana) watched five Ariane launches.**

- **Press visits**

Every year, the press office plays host to local and foreign journalists and broadcasters wishing to write articles or broadcast documentaries or other types of programmes for the general public on a national or international scale.

- ◆ **In 2006, over 230 journalists visited the CSG.**

3-2 Events at the Space Museum: new activities in 2006

The Space Museum does not deal exclusively with Space activities, but more generally with the dissemination of science and technology.

To this end, the operator of the Space Museum is in constant touch with the network of great scientific and technical museums in mainland France such as the *Palais de la Découverte* in Paris, the *Cité de l'Espace* in Toulouse and the *Cité des Sciences at La Villette*, as well as the CCSTI, the network of science, technology and industrial culture centres

Through an agreement with the *Palais de la Découverte*, it stages two temporary educational exhibitions every year.

This agreement has been such a success that it has recently been renewed for the period 2007-2011 and will henceforth include the *Palais'* itinerant, animated displays.

- ◆ **In 2006, 16,255 people visited the Museum, 1/3 of which were local residents, a significant proportion.**

The Museum held the following events:

- '*Electrostatic*' – since February 2006

One thousand, six hundred and fifty-two pupils from 38 schools and 470 members of the general public (adults and children) came to this exhibition. 'Electrostatic' includes experiments that make children's hair stand on end and helps them understand the basic principles of electricity.

- '*Ouda Bougetoutletemps*' – from February to June 2006

This was seen by 2,190 young children and 250 members of the general public.

This event, specifically intended for younger children (3-6 years), was designed and created by the *Forum des Sciences* at Lille. It included games, mime, trails, dance and stories for children to show the mechanisms behind body movements.

- '*Planetarium*' - July to September 2006

The inflatable Planetarium is one of the Museum's major attractions. It is used alternately with other exhibitions and events.

This year, it had 2,745 visitors.

It next appears in the Museum programme from April to September 2007.

- '*A thousand and one numbers*' - October 2006

This exhibition, intended specifically for primary and secondary pupils and created by Cap Sciences (CCSTI France's Aquitaine region), involved instructive panels and discovery workshops showing the history of numbers and methods of calculation (the Chinese abacus, cryptography, etc.).

The exhibition will remain at the Museum until March 2007. Special openings for the general public are organised on Wednesdays and Saturdays.

- '*Space Snakes and Ladders*' - permanent

This child-sized board game was designed by the Museum teams with the help of the CSG optics department. The children become the pieces, rolling huge dice to decide their moves across the board which is 2 metres by 1.5 metres while 'Ariane' and 'Pepito the satellite' take them through a Space mission.

Lastly, the Museum continued its Saturday afternoon events, which have drawn the public with programmes related to current events: updates on the latest flights, Planetarium sessions, visits to temporary exhibitions or animated displays from the *Palais de la Découverte*.

Other innovations are planned for 2007:

- from February 2007, the Museum will have an animated display about water (*Planète Eau*) from the Paris *Palais de la Découverte*. Models will show aspects of water in a practical way (the different states of water, the water cycle, aquifers) and current problems mentioned in the news (the impact of territorial development, water pollution);
- from April to September 2007, the Planetarium will be open again with sessions every day from 11:15 a.m. to 4:15 p.m.;
- from September 2007, there will be a new animated display for children from 3 to 6. In "Machine Island", the children will learn about turning, lifting, tightening, pulling, etc.
- lastly, the hologram show which previously featured Sherlock Holmes and Doctor Watson has been entirely modified with a new interactive display concerning the International Space Station where visitors will be able to manipulate the Canadian-built mechanical arm and repair a solar panel on the station.

Synopsis of future prospects: CNES/CSG in 2007

As part of its assignments, CNES/CSG contributes to the wider role and general missions of the French Space Agency. It conducts activities ensuring Europe's access to Space, is constantly innovating to lay the groundwork for the future, works for the success of international partnership and helps to construct the new Spacefaring Europe.

In 2007, CNES/CSG commits itself to:

- ensuring that the launch base remains available for France to fully exercise its responsibilities as a launch power on behalf of Europe, and the success of:
 - o the six planned launches including that of the ATV²⁹,
 - o the two test firings at the BEAP planned for 2007 (P80 and ARTA 4),
- controlling development of the base and its operations as part of the arrangements for receiving the Soyuz and Vega launchers;
- ensuring smooth operation of the new industrial organisation at the CSG;
- pursuing the partnership between CNES and French Guiana to foster diversified and sustainable economic development by:
 - o extending CNES assistance for future agreements covering the years 2007-2013 in the context of the new operational programmes;
 - o renewing current agreements with the communes of French Guiana;
 - o continuing a policy for keeping the local population informed and promoting Space science in French Guiana;
 - o pursuing the policy agreed upon with the Guianese Education Authorities to promote education on Space;
 - o making French Guiana a show case for the EmergeSAT project.

²⁹The ATV, the European Automated Transfer Vehicle, will be launched from the CSG and will be one of the principal supply ships for the International Space Station.

ANNEXES

ANNEX 1

GLOSSARY

BEAP	<i>Banc d'essai des Etages d'Accélération à Poudre</i> – Solid-fuel booster test-bench
CISG	<i>Communauté Industrielle et Spatiale de Guyane</i>
CNES/CSG	CNES establishment in French Guiana
CSG	Guiana Space Centre, Europe's Spaceport
EPCU	<i>Ensemble de Préparation des Charges Utiles</i> – Payload preparation facilities
ESA	European Space Agency

The principal operational missions of CNES/CSG are as follows:

- to organise and coordinate all preparation for and execution of tests and launches taking place at the Guiana Space Centre, with the exception of the manufacturing facilities,
- to acquire and process launch data (location, telemetry, optics), with the assistance of the downrange stations,
- to plan and implement Range Safety (for the protection of individuals, property and ground and flight operations),
- to manage, operate and ensure the maintenance of CSG facilities used for preparing and launching Ariane. Chief among these facilities are:
 - a Control Centre (CdC Jupiter 2),
 - a Payload Preparation Facility (EPCU),
 - tracking and telemetry stations,
 - communications resources,
 - a meteorology station,
 - power plants, etc.
- to manage and maintain the solid fuel booster test bench (BEAP)
- to supply appropriate support for preparing launchers and payloads,
- to define and implement safety and protection measures for all personnel working at the Centre as well as for launchers, payloads and related equipment on Guianese soil.

In addition, CNES/CSG carries out the following missions:

- locating and tracking satellites on behalf of CNES and ESA networks,
- preparing the Centre for missions for new European projects (in particular Vega and Soyuz),
- drawing up an overall blueprint of the Space Base facilities, for approval by the President of CNES and overseeing its implementation,
- favouring CNES involvement in French Guiana through the Guiana Mission by encouraging varied economic development,
- providing support services for ESA.

The Director of CNES/CSG is delegated by the President of CNES to liaise with all the local authorities (communes, departments and regions) and to provide support as and when necessary. He is also the sole functional authority at CNES concerning Protective Security and Range Safety, in the context of the Space law currently being drafted.

CNES/CSG is also responsible for:

- coordinating the social policy on the Space Base site ,
- overseeing and coordinating actions and propositions emanating from the industrial and Space community in French Guiana,
- providing the services agreed upon between CNES and ESA concerning downrange stations.

³⁰ Taken from 'Présentation générale du CNES/CSG' – ref. CSG-NT-Q-9168-CNES - 06/03/2006