

# A short history of France's space activities and of its space agency, CNES

Jean-Paul Berthias

## Disclaimer

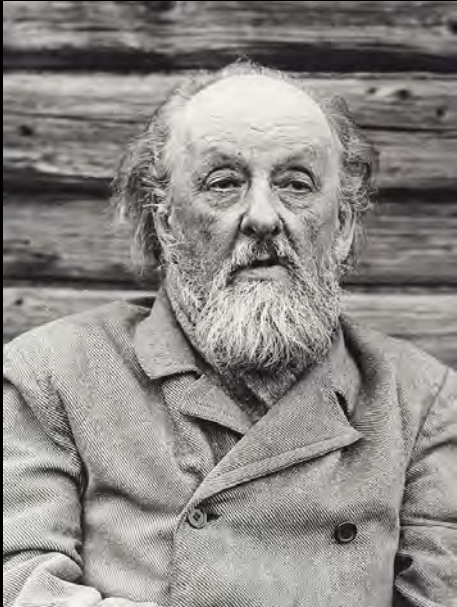
This presentation is a highly simplified recollection of space related historical facts focused on the creation and activities of CNES.

This presentation is not exhaustive, many events, contributions and contributors have been left out, this is mostly intentional but also, sometimes, my mistake.

It is difficult to assign a specific date to space programs which last for tens of years between the initial idea and the flight, decision of program and/or launch dates are used in this presentation.

This presentation borrows material from many sources, too many to quote them all. There is an abundant literature on space history both in books (unfortunately often out of print) and on internet where interested readers can learn a lot more.

At the beginning of the 20<sup>th</sup> century, space exploration is science fiction. Few researchers work seriously in this field, and they are often badly looked upon by their peers.



Konstantin  
Tsiolkovsky  
(1857-1935)



Robert H.  
Goddard  
(1882-1945)



Friedrich  
Zander  
(1887-1933)



Hermann J.  
Oberth  
(1894-1989)

In France Robert Esnault-Pelterie is a pioneer of aviation and a major inventor (he held 120 patents, including the one of the joystick which made his fortune).

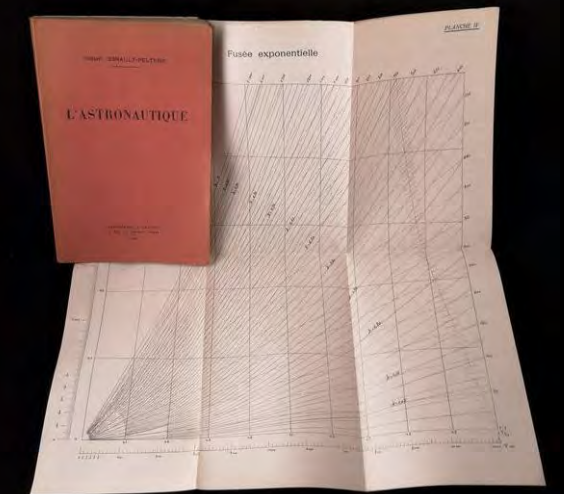
In 1913 he rediscovers the rocket equation.

In 1929 he proposes the idea of the ballistic missile to the army and convinces the government to fund his studies. After 1931 he works with Jean-Jacques Barré on rocket propulsion, but funding is limited and they cannot achieve significant results before the defeat of 1940.

In 1930 he publishes his major work, “L’astronautique”.



Robert Esnault-Pelterie  
(1881-1957)



## 15 March 1945

First launch of a French liquid fuel rocket (flew 5 s). Eight launches take place between March 1945 and July 1946, mostly failures.

Development of this rocket was conducted secretly by Barré during the war.

Ultimately this work fails to create a major interest in rocketry within France at the time. The priority in France is nuclear energy.



Colonel Jean-Jacques Barré  
with the rocket EA-41

**17 May 1946**

The Laboratoire de Recherches Balistiques et Aérodynamiques (LRBA) in Vernon is created to house the German technicians recovered from the V2 program and hired by the “Direction des Etudes et Fabrication d’Armements” (DEFA).

Barré joins LRBA and starts work on an ambitious missile program, EOLE, using liquid oxygen and alcohol. The program is canceled in September 1952, the military seeing no future for liquid oxygen rockets on the battlefield.



EOLE

# 30 September 1950

Astronautics and rocket research picks up in western Europe. Alexandre Ananoff, director of the Groupement Astronautique Français, organizes the first International Congress for Astronautics in Paris, with the help of the German Rocket Society and the British Interplanetary Society.

In September 1951, at the second congress, in London, the International Astronautical Federation (IAF) is established as a non governmental organization.

**PREMIER CONGRÈS INTERNATIONAL D'ASTRONAUTIQUE**  
30 SEPTEMBRE - 2 OCTOBRE 1950

**PROGRAMME**  
DE LA SÉANCE SOLENNELLE DU 30 SEPTEMBRE 1950  
GRAND AMPHITHÉÂTRE DE LA SORBONNE

Présidence d'Honneur : M. Henri MINEUR, directeur de l'Institut d'Astrophysique  
Vice-présidence d'Honneur : Mme Gabrielle Camille FLAMMARION, directrice de l'Observatoire de Juvigny  
Mme de VENDEUVRE, directrice du Service aviation I. P. S. A. de la Croix-Rouge  
Président du Congrès : M. Alexandre ANANOFF, directeur du Groupement Astronautique Français  
Rapporteurs : M. Auguste BUDRY, lauréat de la Société Astronomique de France  
M. GRAS, trésorier de l'Aéronautique-Club de France

**COMITÉ D'HONNEUR**

MM. J. ALLEZ, président de l'Aéro-Club de France ; médecin-général BEYNE, directeur du laboratoire de physiologie appliquée à l'aéronautique ; A. BING, licencié ès-sciences ; J. BIZET, président honoraire de l'Aéronautique-Club de France ; médecin-général BERGERET, de la section médico-physiologique de l'armée de l'Air ; E. ESCLANGON, membre de l'Académie des Sciences ; JEAN FAYARD, éditeur ; Dr GARSIAUX, président du Conseil médical de l'aviation civile et commerciale ; Dr L. GOUGEROT, professeur agrégé à la Faculté de Médecine ; André-Louis HIRSCH, fondateur du Prix International d'Astronautique ; L. KOWARSKI, directeur scientifique au Commissariat à l'Energie atomique ; ingénieur-général LAFARGUE, des fabrications d'armement ; LÉVELLÉ, directeur du Palais de la Découverte ; H. MOUREU, directeur scientifique du Centre d'Études des projectiles autopropulsés du Ministère des Armées et directeur du Laboratoire Municipal ; H. MURAOUR, chef-pieur-général des poudres ; PARICAUD, directeur du service de la production aéronautique ; Joseph PERÈS, membre de l'Institut et de l'Académie des Sciences, professeur à la Faculté des Sciences ; Maurice ROY, membre de l'Institut ; A. VIAUT, directeur de la Météorologie Nationale ; Professeur VASSY, du laboratoire de Physique de l'atmosphère à la Faculté des Sciences.

**ALLOCUTIONS**

FRANCE . . . . M. H. MINEUR, M<sup>me</sup> de VENDEUVRE, M. A. ANANOFF.  
ANGLETERRE . . M. CLEAVER, président de la BRITISH INTERPLANETARY SOCIETY.  
ALLEMAGNE . . M. GARTMANN, directeur scientifique de la GESELLSCHAFT FÜR WELTRAUMFORSCHUNG.  
ARGENTINE . . M. T. TABANERA, président de la SOCIEDAD ARGENTINA INTER-PLANETARIA.  
AUTRICHE . . . M. F. CAP, président de la OESTERREICHISCHE GESELLSCHAFT FÜR WELTRAUMFORSCHUNG.  
DANEMARK . . M. HANSEN, vice-président de la DANSK SELSKAB FOR RUMFARTS-FORSKNING.  
ESPAGNE . . . M. T. MUR, président de la Société Espagnole d'Astronautique.

**FILMS**

LA FEMME DANS LA LUNE  
réalisé en 1928 sous la direction scientifique de M. le professeur Hermann OBERTH  
★  
EXPÉRIENCES SUR LES FUSÉES A LA RAKETENFLUGPLATZ  
réalisé et présenté par M. R. Nebel  
★  
LE LANCEMENT DES V-2 A WHITE-SANDS  
★  
DESTINATION MOON  
film de G. Pal

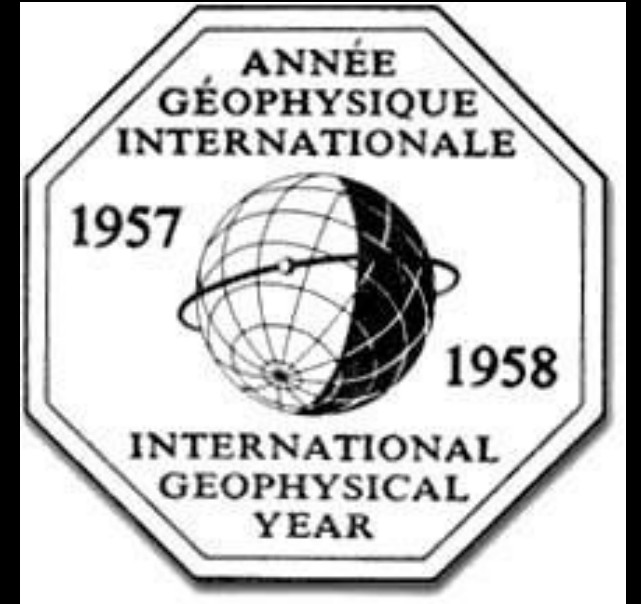
Des messages provenant des Pays n'ayant pu participer au Congrès seront lus au cours de la séance.

## October 1952

The International Council of Scientific Unions (ICSU) establishes an “Année Géophysique Internationale - International Geophysics Year” (AGI-IGY) set for July 1957 – December 1958 to correspond to a maximum of the 11-year solar cycle.

Scientists worldwide are invited to contribute to this project and to coordinate Earth observations on a global scale.

In July 1955 the United States and the Soviet Union announce that they will both launch satellites during the IGY.



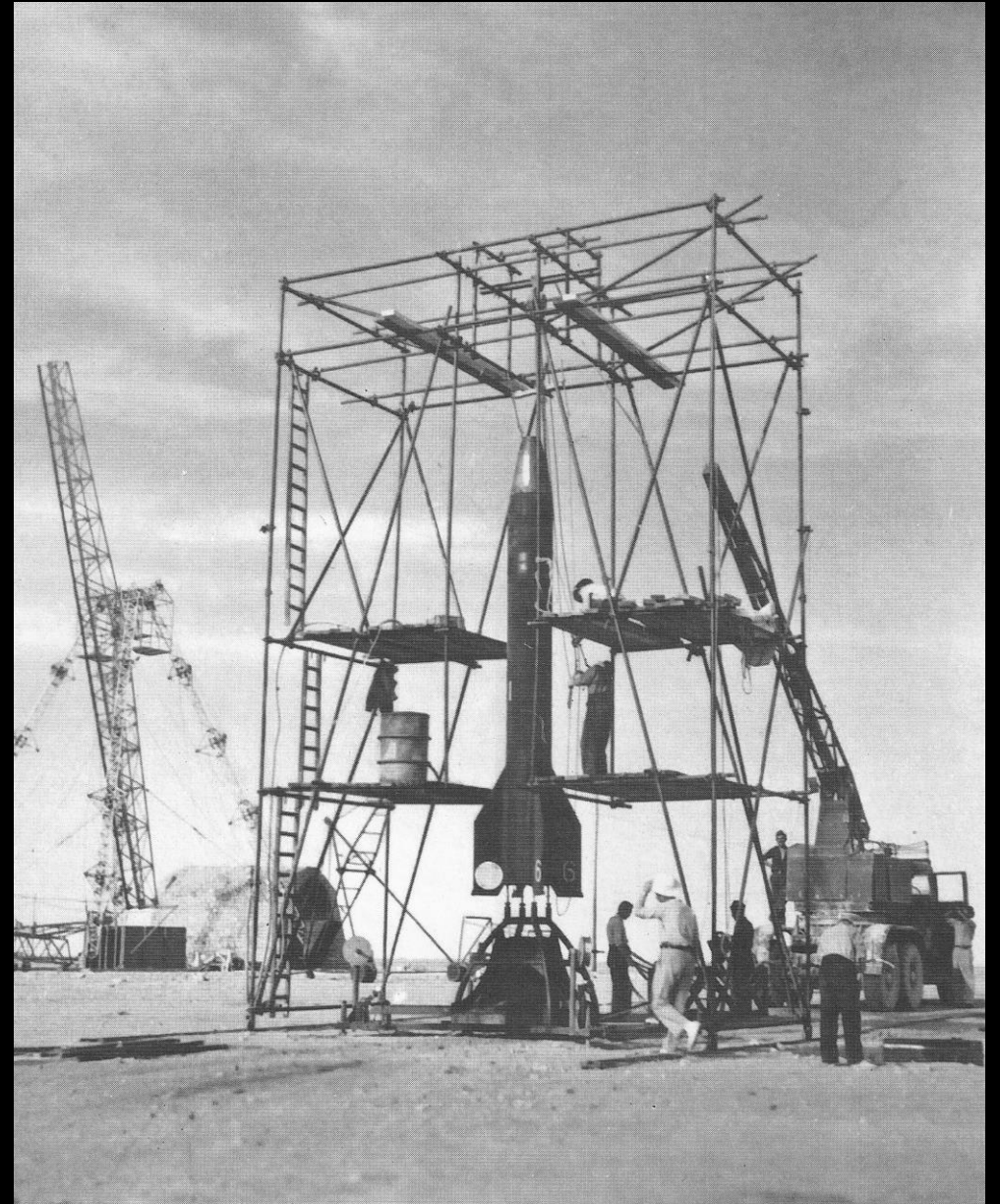


**29 October 1954**

In the early 50's in France many uncoordinated rocket programs are pursued by the armies and industry.

The most advanced one is the sounding rocket Véronique developed by the German team of LRBA. It launches for the first time in March 1954 from the Centre Interarmées d'Essais d'Engins Spéciaux (CIEES) in Hammaguir, Algeria.

This is an unguided rocket.



Véronique at Hammaguir (©LRBA)



**6 December 1957**

Failed launch of the Vanguard rocket.

**1 February 1958**

Launch of EXPLORER-1, first american artificial satellite.

Backup solution developed by the Jet Propulsion Laboratory (JPL) using a Jupiter-C rocket of the Army Ballistic Missile Agency (ABMA).



*William Pickering, James Van Allen, Wernher von Braun  
(©NASA)*

## 29 July 1958

Creation of the National Aeronautics and Space Administration (NASA).

NASA inherits the National Advisory Committee for Aeronautics (NACA) with its 8000 employees and 5 research centers, then incorporates Von Braun's team at ABMA and JPL.

Sec. 102. (a) The Congress hereby declares that it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind.

(b) The Congress declares that the general welfare and security of the United States require that adequate provision be made for aeronautical and space activities. The Congress further declares that such activities **shall be the responsibility of, and shall be directed by, a civilian agency exercising control over aeronautical and space activities** sponsored by the United States, except that activities peculiar to or primarily associated with the development of weapons systems, military operations, or the defense of the United States (including the research and development necessary to make effective provision for the defense of the United States) shall be the responsibility of, and shall be directed by, the Department of Defense; and that determination as to which such agency has responsibility for and direction of any such activity shall be made by the President in conformity with section 201 (e).

*Excerpt from the National Aeronautics and Space Act of 1958*

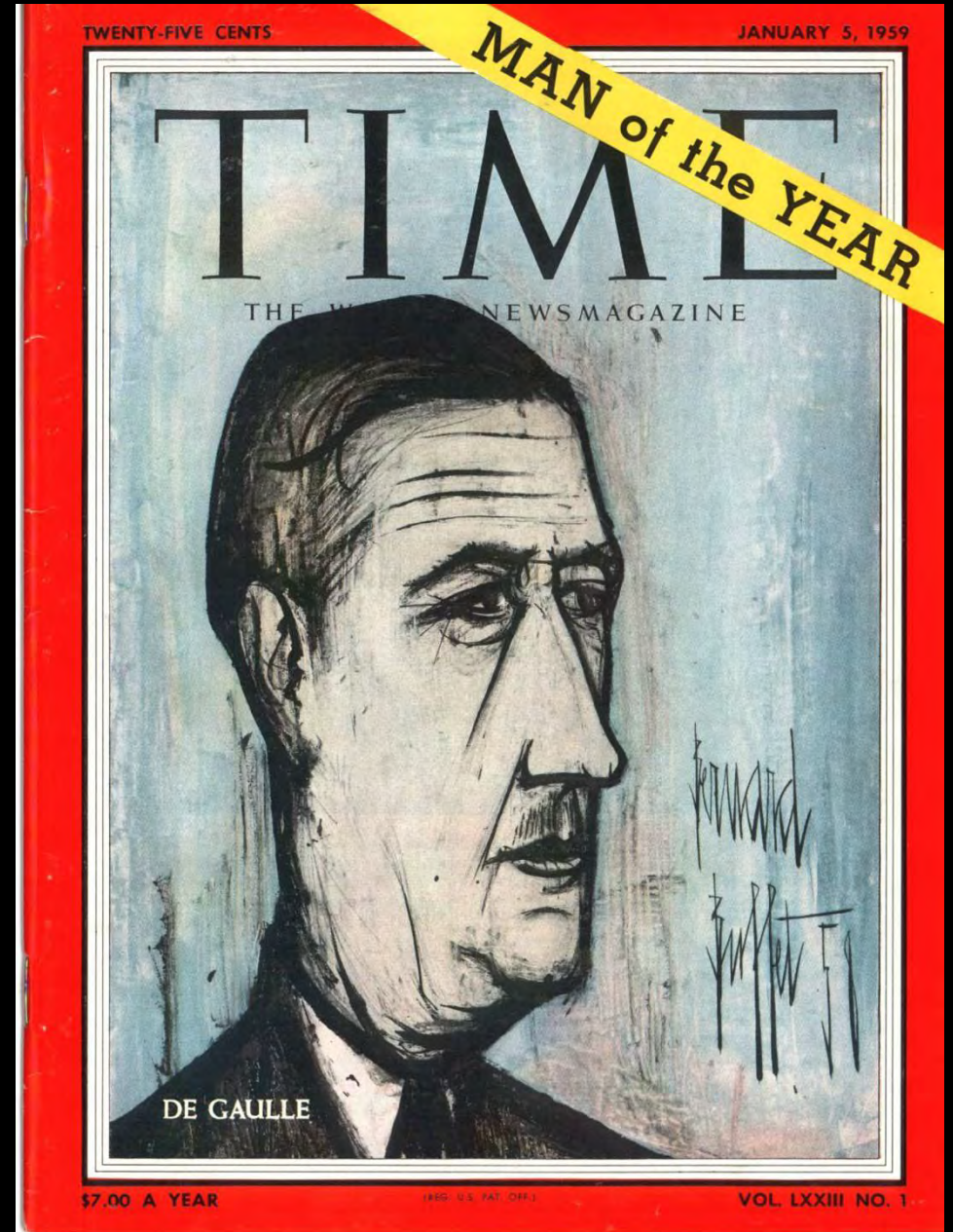


**1<sup>st</sup> July 1958**

The National Assembly names Charles de Gaulle president of the republic. He strongly supports national independence in key technological domains.

**28 November 1958**

Creation of the Comité Interministériel de la Recherche Scientifique at Technique (CIRST) headed by the prime minister.



## 2-4 October 1958

During a meeting in Washington, D.C., the International Council of Scientific Unions (ICSU) establishes the Committee on Space research (COSPAR) to promote research in space and the exchange of results, information and opinions.

COSPAR organizes its first plenary meeting in London the following month. It meets regularly ever since.

Early on COSPAR plays an important role as a bridge between East and West for cooperation in space.



## 13 December 1958

The United Nations, during its General Assembly 13<sup>th</sup> session, creates a Committee on the Peaceful Uses of Outer Space (COPUOS) which soon becomes a permanent body.

COPUOS serves as a focal point for international cooperation. It grows from 28 members states in 1958 to 102 in 2022.



*Early COPUOS meeting  
©UN Office for Outer Space Affairs*

## **7 January 1959**

Creation of the Comité des Recherches Spatiales (CRS) to inform the government on space issues and coordinate actors.

## **9 April 1959**

CRS publishes the first French Space Plan, focused on science with the development of laboratories, sounding rockets and ground facilities.

## **16 November 1959**

Pierre Auger, well-known scientist who contributed to the creation of the Commissariat à l'Énergie Atomique (CEA) and of the European Organization for Nuclear research (CERN), is named president of the CRS.



*Pierre Auger (1899-1993)*



**10 March 1959**

A Véronique “IGY” rocket launches from the CIEES d’Hammaguir (directed by General Aubinière) and reaches an altitude of 210 km. The launch campaign is funded by the Comité d’Action Scientifique de la Défense Nationale (CASDN).

The rocket carries an instrument from Jacques Blamont which releases sodium in the high atmosphere, leading to the discovery of the turbopause.

This successful launch generates a lot of publicity and leads many to believe that France is capable of developing its own rockets and missiles.

<https://www.ina.fr/ina-eclair-actu/video/caf92029699/depart-de-la-fusee-veronique-a-colomb-bechar-sahara>



## 17 September 1959

The government decides to develop a 100% French ballistic missile to deliver nuclear warheads and creates the Société pour l'Etude et la Réalisation d'Engins Balistiques (**SEREB**).

SEREB is a public conglomerate formed by Nord- and Sud-Aviation, SNECMA, SEPR, MATRA, Dassault, ONERA, the army's unit in charge of powders and explosives.

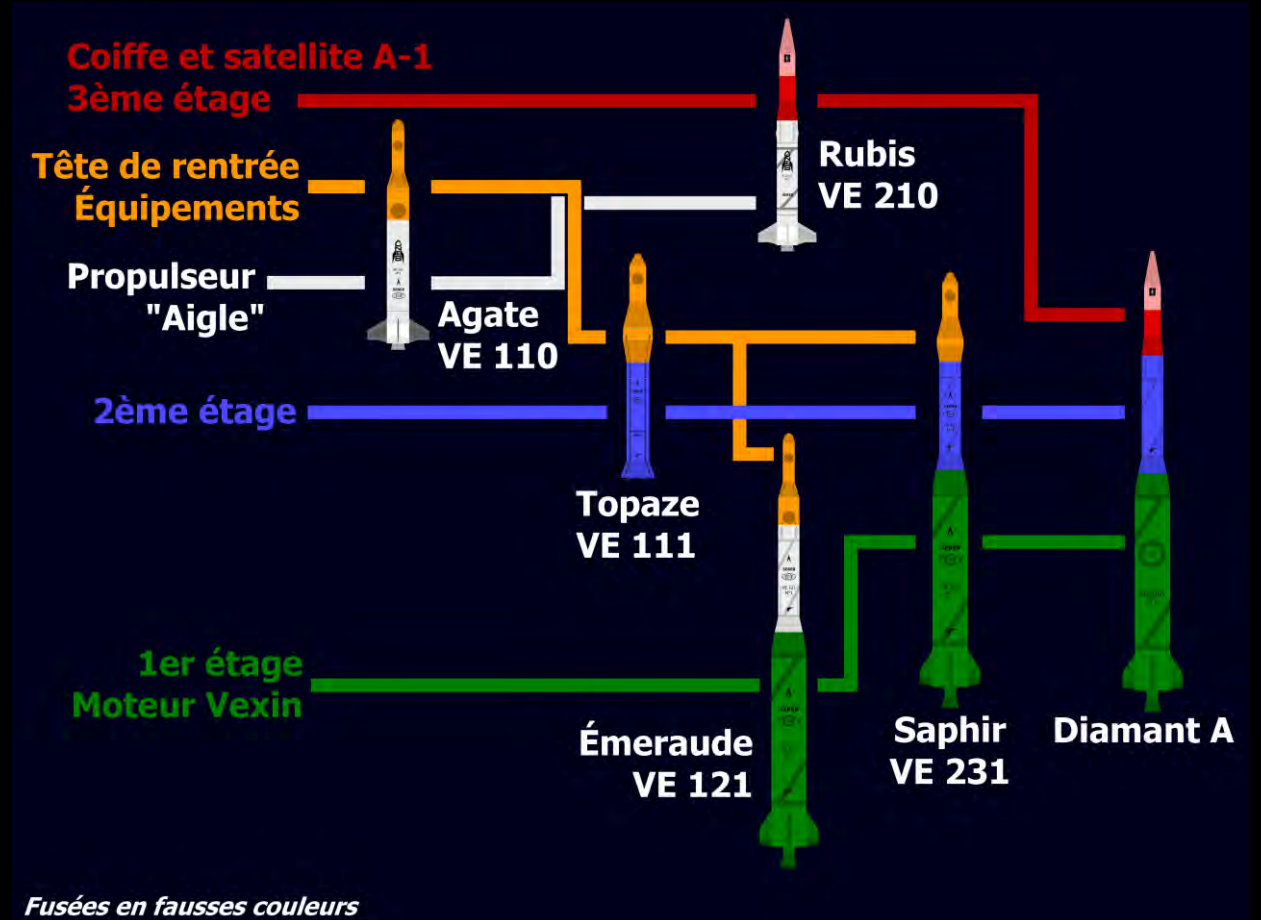
In 1960 SEREB studies the possibility to place a satellite into orbit. The minister of defense, Pierre Messmer, likes the idea and brings it to the attention of General De Gaulle in the Spring of 1961.



Charles Cristofini , président de la SEREB

The « Pierres Précieuses » (“Jewels”) program is elaborated by SEREB to develop the technologies needed for an intercontinental missile, and, opportunistically, a satellite launcher, Diamant.

This program is managed by the Délégation Ministérielle pour l’armement.



Amaury67 - CC BY-SA 4.0, Wikimedia Commons



**12 April 1961**

Youri Gagarine becomes the first man to fly in space.

**5 May 1961**

Alan Shepard becomes the first american to fly toward space on a rocket (suborbital flight).



*Youri Gagarine ©AFP*



*Alan Shepard ©NASA*

**25 May 1961**

President John F. Kennedy delivers a speech to a joint session of congress on urgent national needs where he request that congress expand funding of space activities.

"I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth."



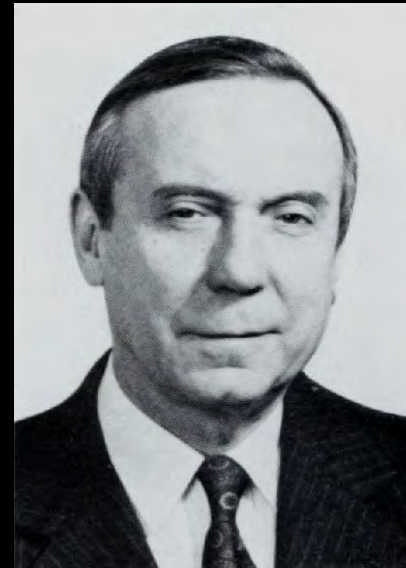
*Kenedy adressing the joint session of congress  
on 25 May 1961 ©NASA*

**22 July 1961**

Pierre Auger proposes the creation of a financially independent public entity dedicated to space to an interministerial committee presided by Michel Debré.

When De Gaulle joins the meeting he decides

- The creation of the new entity, the Centre National d'Etudes Spatiales (CNES),
- The funding of the Diamant-A launcher.



*Michel Debré  
(1912-1996)*



*Pierre Guillaumat  
(1909-1991)*

**29 August 1961**

The text of the law creating CNES is sent to the National Assembly. CNES replaces CRS, and is placed under the authority of the prime minister.

**18-19 December 1961**

Diamant-A is officially approved and law 61-1382 is promulgated.

**10 February 1962**

The decree creating CNES is signed.

**LOI n° 61-1382 du 19 décembre 1961  
instituant un centre national d'études spatiales (1).**

L'Assemblée nationale et le Sénat ont adopté,

Le Président de la République promulgue la loi dont la teneur suit :

Art. 1<sup>er</sup>. — Il est institué sous le nom de Centre national d'études spatiales un établissement public scientifique et technique, de caractère industriel et commercial, doté de l'autonomie financière et placé sous l'autorité du Premier ministre.

Art. 2. — Le centre national d'études spatiales a pour mission de développer et d'orienter les recherches scientifiques et techniques poursuivies dans le domaine des recherches spatiales.

Il est notamment chargé :

1° De recueillir toutes informations sur les activités nationales et internationales concernant les problèmes de l'espace, son exploration et son utilisation ;

2° De préparer et de proposer à l'approbation du comité interministériel de la recherche scientifique et technique les programmes de recherche d'intérêt national dans ce domaine ;

3° D'assurer l'exécution desdits programmes, soit dans les laboratoires et établissements techniques créés par lui, soit par le moyen de conventions de recherche passées avec d'autres organismes publics ou privés, soit par des participations financières ;

4° De suivre, en liaison avec le ministère des affaires étrangères, les problèmes de coopération internationale dans le domaine de l'espace et de veiller à l'exécution de la part des programmes internationaux confiée à la France ;

5° D'assurer soit directement, soit par des souscriptions ou l'octroi de subventions, la publication de travaux scientifiques concernant les problèmes de l'espace.

## 1<sup>st</sup> March 1962

CNES is officially open for business.

General Aubinière is named director, Pierre Auger president.

CNES has

- 3 directorates (science & technology, international relations, administration)
- 2 services (documentation, relations with universities)
- Facilities at the Flight Test Center of Brétigny-sur-Orge



*The staff of the Science & Technology directorate on 23 March 1962  
From left to right*

*Jacques Blamont, director*

*Jean-Pierre Causse, head of satellites*

*Pierre Morel, head of programs*

*Bernard Golonka, head of sounding rockets*

*Jean Dinkespiler, head of facilities*

*Pierre Chiquet, head of ground support equipments*



**18 March 1962**

Algeria becomes independent. Launch sites must be vacated within 5 years.

The search for a new launch site is immediately started. Kourou is officially selected during the ministerial council of **14 April 1964**.



*Negotiations preceding the signature of the Evian accords ©AFP*

**14 June 1962**

The protocol creating the Conseil Européen de Recherche Spatiale – European Space Research Organization (CERS - ESRO) is signed by 10 countries to develop scientific satellites.

Pierre Auger is named general director of ESRO. Jean Coulomb, general director of CNRS, becomes the new president of CNES.

ESRO officially starts on **20 March 1964**. It has 4 centers, Esrange (SE), ESOC (D), ESTEC (NL) and ESRIN (I).



*ESRO members  
( plus Austria & Norway as observers)*

**23 July 1962**

In parallel, the Centre National d'Etude des Télécommunications (CNET) was working in the field of space technologies with the americans.

First commercial TV broadcast of the Telestar satellite, the first wold-wide TV program.



<https://youtu.be/0ui1iu4H7Ec>

## 31 July 1963

An interministerial committee meeting authorizes the construction of the Centre Spatial de Toulouse (CST) to replace the technical center in Brétigny-sur-Orge.

The land requisition is signed on 10 February 1965 and construction work starts in February 1967.

Activities are progressively transferred from Brétigny to Toulouse (balloons in 1968, sounding rockets in 1969, satellites in 1971, operations in 1974).



*The CST before work started*

## 29 February 1964

France, Germany, Italy, Belgium, Netherlands and the United-Kingdom sign the 29 mars 1962 convention creating the Centre Européen pour la Construction de Lanceurs d'Engins Spatiaux – European Launcher Development Organisation (CECLES-ELDO)

ELDO's goal is to build a launch vehicle capable of placing a 1 ton satellite into low Earth orbit. It had to include a British first stage, a French second stage, a German third stage and an Italian fairing.

The program is stopped in 1972 after 7 consecutive failures.



*Woomera launch site  
(Australia)*



5 July 1965

First launch of the two-stage Saphir rocket from Hammaguir (Algeria).

This opens the way to the launch of Diamant-A.

## “ SAPHIR ” LANCÉ AVEC SUCCÈS A HAMMAGUIR

PARIS. — Le ministère des armées annonce que le premier engin bi-étage « Saphir » a été lancé avec succès hier matin, à partir de la base de Hammaguir.

Il s'agit là d'un succès important car « Saphir » constitue les deux premiers étages de la future fusée « Diamant » à l'aide de laquelle la France

◆ SUITE DE LA 1<sup>re</sup> PAGE

dage, pilotage, rentrée, équipements, trajectographie et télémétrie) un niveau technique suffisant pour permettre la réalisation des engins opérationnels qu'ils soient civils ou militaires.

Les deux étages propulsifs de « Saphir » (« Émeraude » comme premier étage et « Topaze » en deuxième étage) constituent les deux premiers étages du lance-satellite « Diamant ».

La SEREB a déjà lancé à plusieurs reprises chacun de ces étages à partir du sol.

La série de lancements de « Saphir » qui permet de vérifier les performances du véhicule bi-étage et la séparation entre le premier et le deuxième étages constitue donc la phase finale des essais en vol préliminaires au lancement du véhicule à trois étages « Diamant ».

lancera, à la fin de cette année ou au début de l'année prochaine, son premier satellite. Le troisième étage de « Diamant » a déjà été essayé avec succès à plusieurs reprises, lors des récents essais de la fusée « Rubis », dont le deuxième étage est précisément identique au troisième étage de « Diamant ».

Ainsi, désormais, les trois étages de « Diamant » ont été lancés séparément avec succès. Il ne reste plus qu'à essayer le lancement de la fusée entière.

Le lancement de « Saphir » a été sous la maîtrise d'œuvre de la Société pour l'étude et la réalisation d'engins balistiques (SEREB) pour le compte du département engins de la délégation ministérielle pour l'armement. La réussite d'hier est importante, tant sur le plan de l'acquisition des techniciens balistiques de base que sur celui du déroulement du programme « Diamant ».

Les études balistiques de base ont pour but d'acquies dans les diverses disciplines (propulsion, structure, gui-



**26 November 1965**

First launch of Diamant-A from Hammaguir (Algerie)

Places the first French satellite, Astérix, into orbit.

<https://youtu.be/NFAIHRpSi-Q>





## Astérix

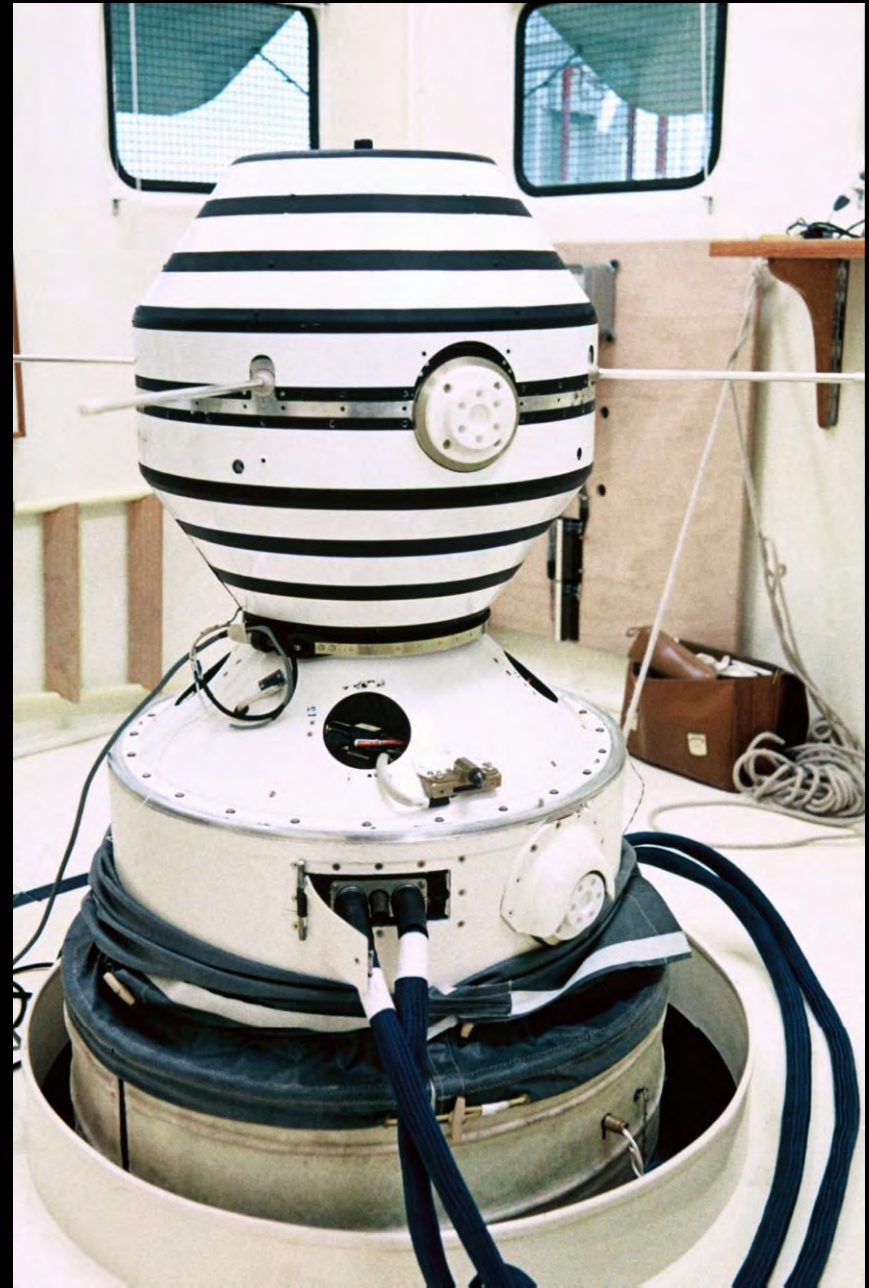
1<sup>er</sup> French satellite

54 cm tall, 40 kg

Developed by MATRA for SEREB

Carries a radar transponder and a telemetry transmitter.

Partial failure (antennas are damaged at separation).



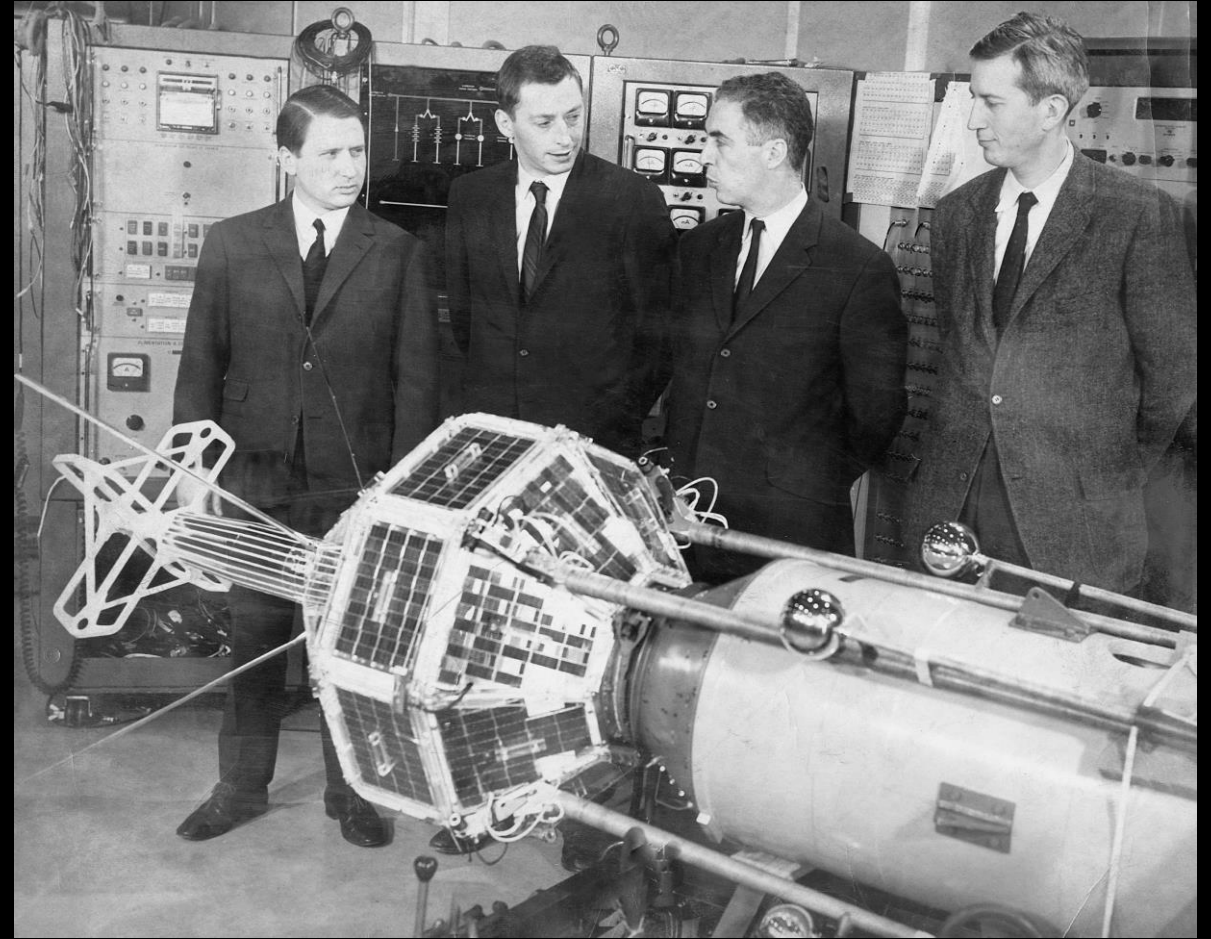


**6 December 1965**

Launch of FR1, second French satellite,  
first CNES satellite and first French  
scientific satellite.

Launched by a Scout rocket from  
Vandenberg AFB (U.S.A.)

Payload developed jointly by CNES and  
CNET to measure fields and particles.



*FR1 on its launcher ©NASA  
from left to right: Christian Fayard, Xavier Namy,  
Jean-Pierre Causse, Owen Storey*

**6 June 1967**

Signature of a convention between France and Germany to develop two experimental communication satellites, Symphonie A et B.

First European 3-axes stabilized geostationary satellites. First use of bipropellant multi-thrust apogee motors.

First development conducted by a large French-German industrial consortia.



*Symphonie during integration at MBB*

**9 April 1968**

Inauguration of the Centre Spatial Guyanais (CSG) with the launch of a Véronique sounding rocket.

<https://www.gouvernement.fr/player/video/8638>



*Launch of Véronique V61 from CSG © CNES*

**1<sup>st</sup> January 1970**

Sud-Aviation absorbs SEREB and merges with Nord-Aviation to become the “Société Nationale Industrielle Aérospatiale” (SNIAS) later known as “Aérospatiale”.

**18 December 1970**

Aérospatiale and Deutsche Airbus create “Airbus Industrie”

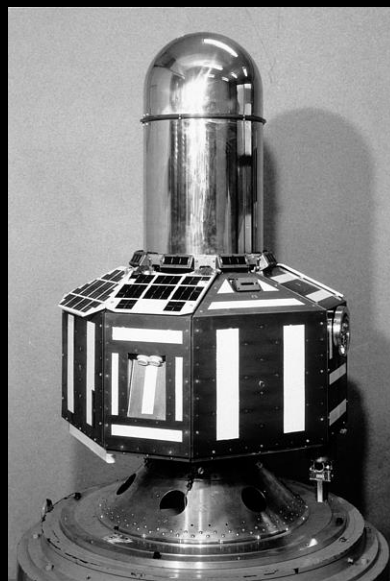




**10 March 1970**

Launch of the first Diamant rocket from CSG  
(Diamant-B1).

It carries the Dial-WIKA  
German scientific satellite.



*Dial-WIKA © CNES*

[https://videotheque.cnes.fr/index.php?urlaction=doc&id\\_doc=16451&rang=1#](https://videotheque.cnes.fr/index.php?urlaction=doc&id_doc=16451&rang=1#)



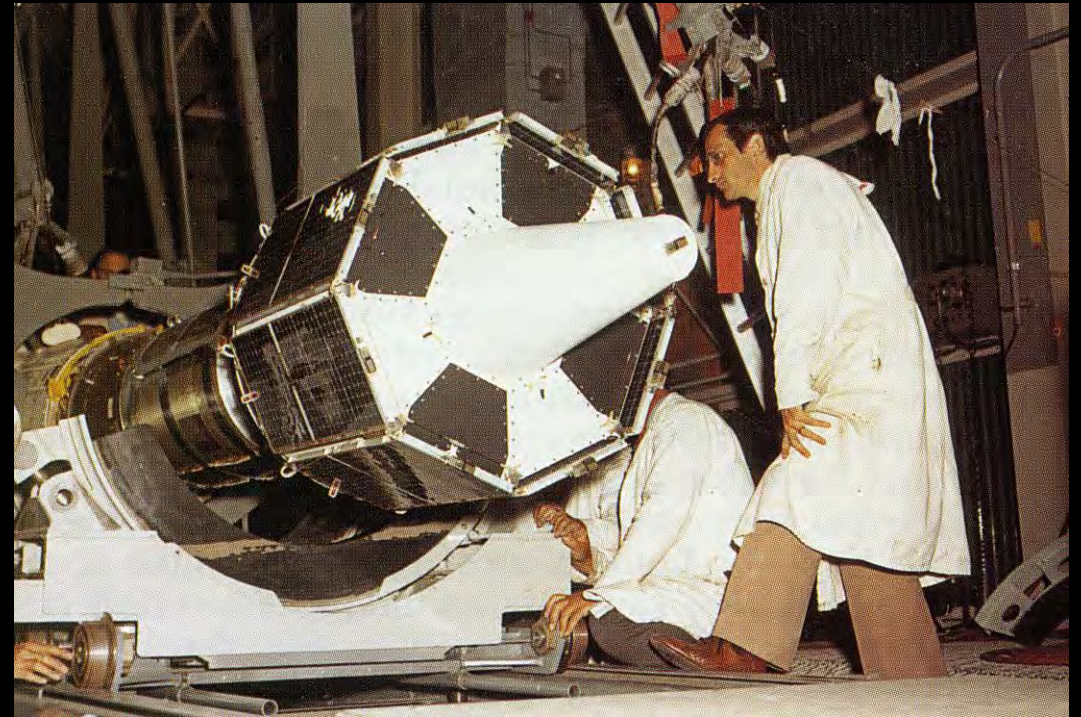
*Diamant-B1 at CSG © CNES*

**12 December 1970**

Launch of the meteorological satellite demonstrator PEOLE from CSG.

**16 August 1971**

Launch of the operational satellite EOLE from Wallops Island.



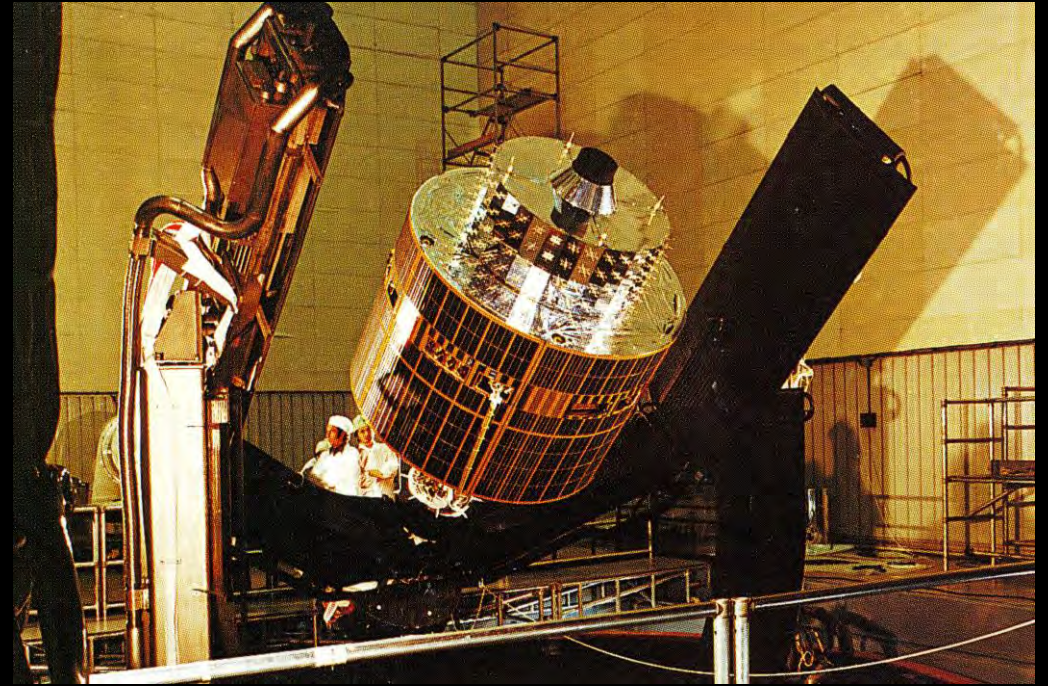
EOLE on its launcher ©NASA



**23 March 1972**

Agreement between France and ESRO on the METEOSAT program, with a 50-50 sharing of activities between CST and ESTEC.

Studies on this project started at CNES in 1968 at the initiative of Pierre Morel (now at Laboratoire de Météorologie Dynamique, LMD). The high cost of the project lead CNES to propose it to ESRO in 1971.



Meteosat during tests at CST ©CNES

## 31 July 1973

The 6<sup>th</sup> European space conference unanimously decides the creation of the European Space Agency.

Agreement between France, Germany and the United-Kingdom on 3 programs:

1. The 3<sup>rd</sup> generation “substitution” launcher (L-IIIIS) pushed by France
2. The Spacelab module for the American space shuttle pushed by Germany
3. The maritime telecommunication satellite MAROTS pushed by the United-Kingdom



*French delegation lead by the minister for industrial and scientific development  
Jean Charbonnel ©AFP*



**29 October 1973**

Official inauguration of CST by the minister for scientific and industrial development Jean Charbonnel.

Toulouse staffers voice their concerns about the future, with Headquarters and the launchers directorate remaining in Paris at a time when France's top priority is L-IIS.



<https://www.ina.fr/ina-eclair-actu/video/rbc03008873/retrospective-30-ans-du-cnes>

*CST in 1975 @CNES*

**19 December 1974**

Launch of Symphonie-A from the U.S. on a Thor Delta 2914 rocket.

In order to agree to the launch Americans requested that Symphonie not be used commercially (enforcing Intelsat non competition agreement). This is still used as an argument to support European independent access to space.

First geostationary station acquisition from CST.



*Thor Delta 2914*

**27 September 1975**

Last launch of a Diamant-B from CSG with the Aura satellite.

The Diamant program is canceled a few months later. CSG activities are suspended for 3 years, waiting for Ariane.

Government push to Europeanize CSG and its facilities.



*BP4-2 launch (one before last) ©CNES*



**17 May 1976**

CNES president, Maurice Lévy, announces a long term drop in activities at CST and the layoff of 100 persons. CST personnel goes on strike for one month.

CNES director, Michel Bignier, resigns. On 21 June Maurice Lévy cancels the layoffs.

On 1<sup>st</sup> July Hubert Curien is named president of CNES and Yves Sillard general director. Sillard revives the idea of a national Earth observation program.



*Hubert Curien @Jean Weber  
President of CNES 1976-1984*



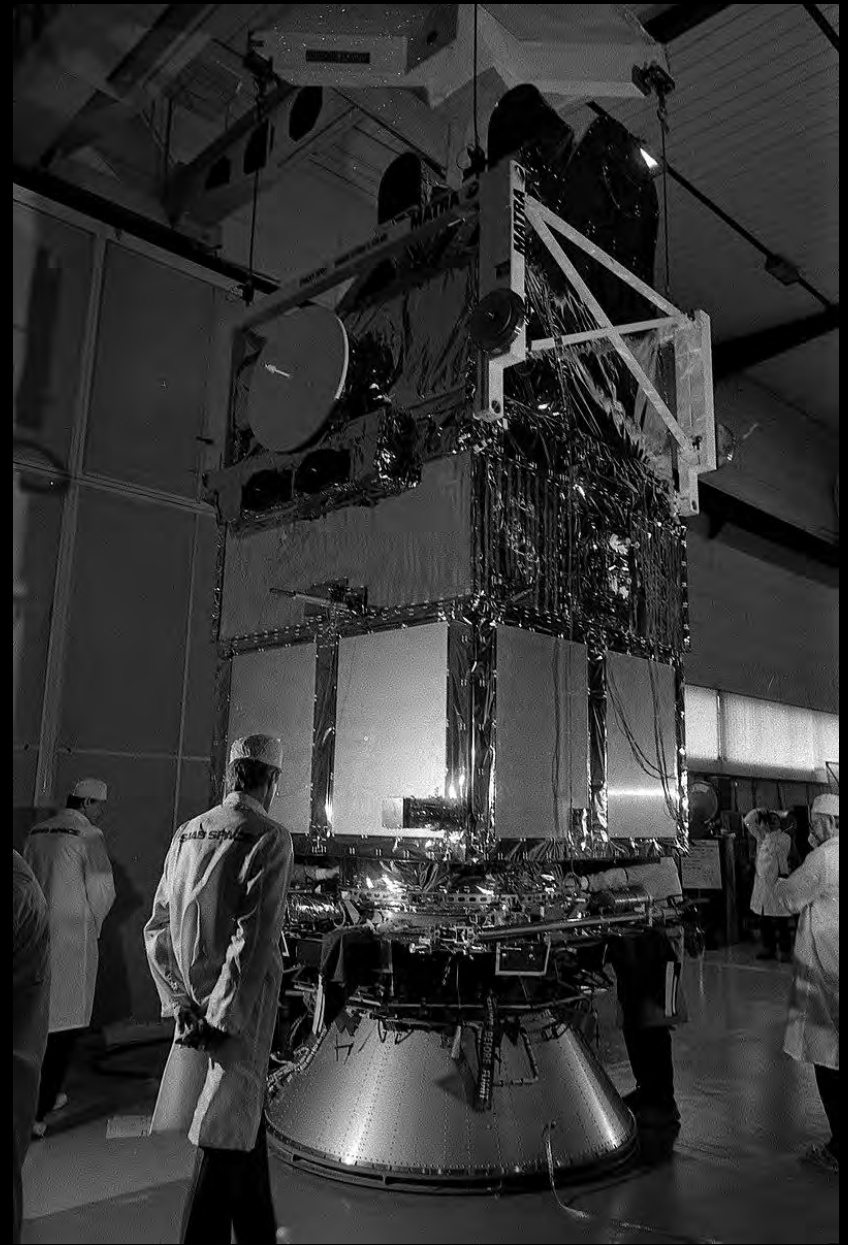
*Frédéric d'Allest, director for launchers 1976-1982  
Yves Sillard, general director 1976-1982*



**19 September 1977**

The SPOT (Système Probatoire pour l'Observation de la Terre) program is approved during an interministerial council.

The program is very innovative in many areas (satellite, payload, ground processing, data dissemination).



*SPOT-1 on 11 March 1985 ©archives de la ville de Toulouse*

**13 October 1978**

Launch of the first ARGOS payload on National Oceanic and Atmospheric Administration (NOAA)'s TIROS-N satellite.

Result of a joint agreement between CNES, NASA and NOAA signed in 1974 to develop a global world-wide localization and data collection system.

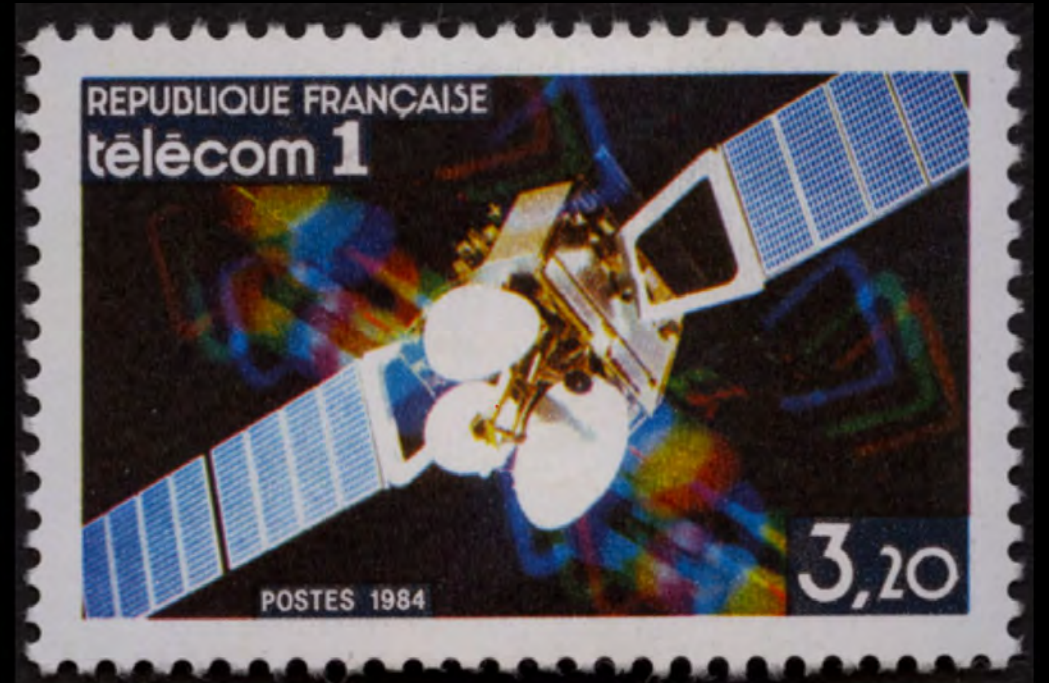


*TIROS-N ©NASA*

**20 February 1979**

The TELECOM-1 program, prepared jointly by the Direction Générale des Télécommunications and CNES, is officially approved.

Simultaneously CNES board of advisors for space applications is suppressed, its mandate is transferred to the board of administrators.



*Stamp Télécom-1 01/09/1984 ©La Poste*

**24 December 1979**

Successful launch of the first Ariane rocket  
from CSG.

<https://www.ina.fr/ina-eclairage-actu/video/caa7902053401/lancement-ariane>



*Ariane L01*

*©ESA/CNES/Arianespace – service optique*



**24 June – 2 July 1982**

Jean-Loup Chrétien, first French cosmonaut, flies on Salyut-7.

Result of a fruitful cooperation between France and the U.S.S.R. in space activities started in 1966.

He flies again on MIR in 1988 and performs the first EVA by a French astronaut.



*Jean-Loup Chrétien (red)  
in SALYUT-7 ©CNES/intercosmos*



*Jean-Loup Chrétien during EVA ©CNES*

## 7 February 1984

The French space plane program HERMES is approved. HERMES is destined to be launched on Ariane 5 to carry European astronauts in orbit.

The program is moved to ESA and officially adopted in November 1987. It will be ultimately canceled in 1992.



*Aerospatiale's version of the Hermes space plane*

**4 August 1984**

Launch of the first Ariane-3 rocket from CSG. It carries TELECOM-1A and ECS-2.

Ariane-3 is an evolution of Ariane-1 with a larger 3<sup>rd</sup> stage and strap-on solid rocket booster.



*Ariane-3 (V10)*

*©ESA/CNES/Arianespace – service optique*



## 11 & 15 June 1985

The soviet probes VEGA-1 and 2 deliver French balloons into the atmosphere of Venus.

Both balloon transmit data for 46 hours. They are tracked by an international network of radiotelescopes coordinated from CST.



*Venus balloon on display at the  
Smithsonian Air & Space museum  
©Geoffray A. Landis, 2011*



**17–24 June 1985**

Patrick Baudry flies on space shuttle  
Discovery (STS-51-G) as payload  
specialist.



*Patrick Baudry ©NASA*

**28 January 1986**

Space shuttle Challenger explodes shortly after launch.

Ends the use of the shuttle to launch satellites, leaves the U.S. without launch options.

Negative impact on HERMES with reinforced security requirements.



*Space shuttle Challenger explosion after 73 s*

© NASA

**22 February 1986**

Launch of the last Ariane 1 (V16) with SPOT-1.

SPOT-2 and 3, identical twins, are launched by Ariane 4 on 22 January 1990 and 26 September 1993 respectively.



*Lancement de SPOT-1 sur Ariane 1 ©CNES/ESA*



**15 June 1988**

First launch of Ariane-4 (V22), a more powerful and more flexible launcher than previous versions.

With two liquid and two solid boosters, it injects two large satellites into geostationary transfer orbit, METEOSAT-3 for EUMETSAT and PAS-1 for PanAmSat.



*First Ariane 4 launch V22 ©CNES/ESA*



**1st December 1989**

Launch of the soviet GRANAT astronomy satellite carrying the 3.5 meter tall / 1-ton SIGMA telescope built by CNES, CERN and CEA.

SIGMA maps low energy gamma-ray emissions from the center of our galaxy during 8 years.

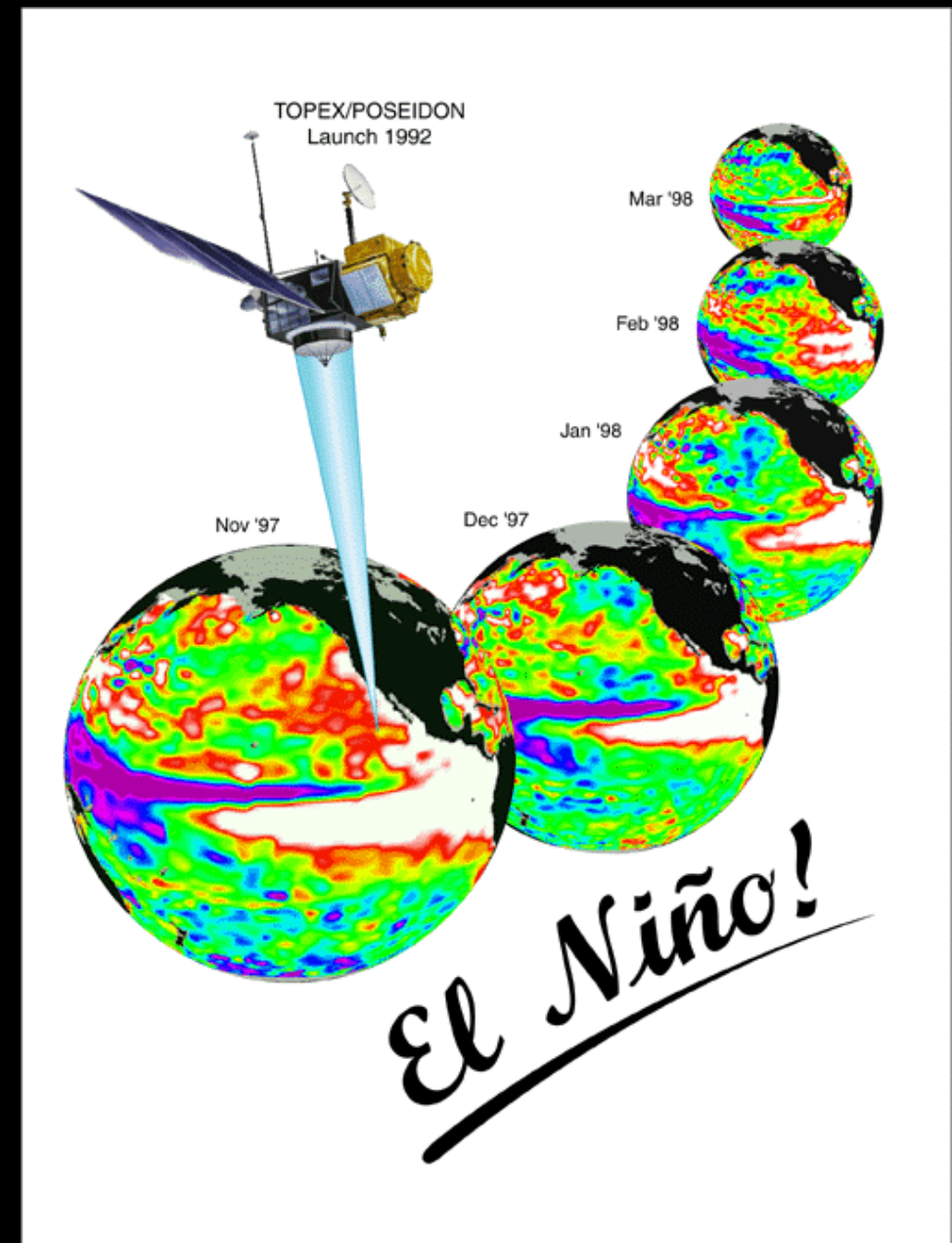


*SIGMA telescope ©CNES*

**10 August 1992**

Launch of TOPEX/Poseidon on an Ariane 42P rocket from CSG.

Beginning of a long and very fruitful cooperation between CNES and JPL in oceanography using satellite altimetry.



*El Niño 97 seen by TOPEX/Poseidon ©NASA*

**27 July 1992**

Michel Tognini flies on MIR (ANTARES mission)

**1st July 1993**

Jean-Pierre Haigneré flies on MIR (ALTAIR mission).

Creation of CADMOS, an operational facility within the Toulouse Space Center, to assist astronauts on MIR, and later on the ISS, to accomplish experiments in microgravity.



*Michel Tognini on MIR ©CNES/NPO Energia*



*Jean-Pierre Haigneré on MIR  
©CNES/Haigneré Jean-Pierre*

## 4 June 1996

First launch of Ariane 5 carrying the four CLUSTER satellites. The rocket self-destructs after 36.7 s.

This failure has a major impact on CNES and the European launch industry.

<https://www.ina.fr/ina-eclairage-actu/4-juin-1996-la-premiere-ariane-v-explose-en-vol>



*Explosion of Ariane 501 (excerpt from the launch video)*



**20 June 1996**

Jean-Jacques Favier flies on space shuttle Columbia as payload specialist in the Spacelab module (mission STS-78).



*Jean-Jacques Favier in Spacelab ©NASA*

**17 August 1996**

Claudie Haigneré, first French woman astronaut, flies on station MIR (CASSIOPEE mission).



*Claudie Haigneré on MIR ©RKK*

**30 October 1997**

Launch of the second Ariane 5 with a technological payload.



*Ariane-5 L502 (V101)*

*©ESA/CNES/Arianespace – service optique*

**9-12 March 1998**

Science prospective seminar in  
Arcachon.

Many science mission proposal from this  
seminar will fly on the microsatellite bus  
MYRIADE.

The scientific community strong support  
to in-situ exploration will translate into  
major contributions to MSL, Mars 2020,  
InSight, EXOMARS.





## 1998

At the request of the minister of research Claude Allègre, CNES starts work on PREMIER, a mission designed to demonstrate key technologies for Mars sample return as well as deliver four ground stations to the surface of Mars (NetLanders).

A very fruitful collaboration is established with JPL on aerocapture technologies.

Due to a lack of funding, the orbiter is abandoned in 2002, NetLanders the following year.



*NetLander landing sequence  
©CNES/Ducros David*



**23 March 1998**

Launch of SPOT-4, improved version of SPOT-1 with notably a mid-infrared observing band.

SPOT-4 was designed in synergy with Helios-1A and -1B, military Earth observation satellites launched respectively 7 July 1995 et 3 December 1999.

SPOT-4 carries in addition the wide field of view imager *Végétation*.



*SPOT-4 at CSG ©CNES/CSG service optique 1998*

**7 December 2001**

Launch of the French-American Jason-1 oceanography satellite. Jason-1 continues the mission of TOPEX/Poseidon, from the same orbit, but with a much smaller satellite.

Jason-1 is the first use of the PROTEUS bus developed jointly by CNES and ALCATEL.



*Satellite Jason-1  
©CNES/Collot Philippe*

**18 December 2001**

CNES celebrates its 40 years anniversary with a colloquium at La Sorbonne where president Jacques Chirac and prime minister Lionel Jospin four ministers and two European commission members deliver speeches.



*Main amphitheater of La Sorbonne*



**3 May 2002**

Launch of SPOT-5, an improved version of SPOT-4 with twice the ground resolution.

SPOT-5 is developed jointly with Helios-2A and -2B, two military Earth observation satellites launched respectively on 18 December 2004 and 18 December 2009.



*SPOT-5 at CSG*

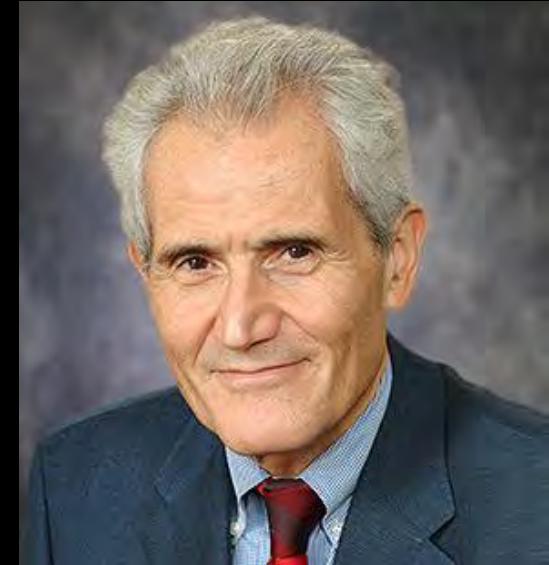
*©CNES/ESA/Arianespace/CSG service optique 2002*



## 19 September 2002

Gérard Brachet, director general of CNES, resigns. Funding is insufficient to conduct ongoing programs and the ambitious Mars project and bring Soyuz in Kourou but conflicts between the director general and the president prevent any decision.

Tensions are high. Ministers for research (C. Haigneré) and defense (M. Alliot-Marie) ask R. Bonnet for an assessment of CNES practices and C. Fournier and E. Sartorius for an evaluation of CNES project portfolio.



*Alain Bensoussan, CNES President 1996-2003*



*Gérard Brachet, CNES Director General 1997-2002*

## 11 December 2002

The first launch of Ariane 5 ECA, a new more powerful version of Ariane 5, ends in failure. Hot Bird7 and the experimental telecommunication satellite STENTOR are lost.

STENTOR was a joint development of CNES, ACATEL and MATRA Marconi Space destined to demonstrate new technologies in orbit. Despite the loss of the satellite, the program is a success thanks to the many technological breakthroughs that it initiated.



*Launch of Ariane 5 V157*

*©ESA/CNES/Arianespace/CSG service optique 2002*

## February 2003

Bonnet, Fournier and Sartorius present the results of their investigations. Alain Bensoussan resigns.

Yannick d'Escatha is named president director general of CNES.

He initiates a major reorganization, freezes a few projects and reinforces financial oversight.



*Yannick d'Escatha*

*©CNES/REA/Marin Ludovic, 2011*

**29 June 2004**

Launch of the DEMETER microsatellite on a Russian Dnepr converted missile to study the Earth electromagnetic environment.

DEMETER is the first satellite to use the microsatellite bus MYRIADE designed and built by CNES.



*Demeter on the Dnepr payload adapter  
©CNES/Journo Nathalie 2004*



**18 December 2004**

Launch of the PARASOL microsatellite.

PARASOL is the second satellite to use the microsatellite bus MYRIADE. PARASOL is developed in record time (18 months).



*Parasol during tests  
©CNES/Dumas Patrick*

**28 April 2006**

Launch of the joint NASA-CNES satellite CALIPSO on a Delta II rocket from Vandenberg AFB. CALIPSO monitors aerosols and clouds within the Earth observation A-train.

CALIPSO is the second satellite to use the PROTEUS bus. NASA provides the payload, a high precision lidar. CNES operates Calipso.



*Calipso at Vandenberg AFB ©NASA*



**19 October 2006**

Launch of the first of the three low Earth orbit meteorological satellites MetOp. The other two launch in 2012 et 2018.

MetOp carries the infrared atmospheric sounder IASI designed by CNES and developed by ALCATEL.

IASI is at the time the most precise infrared instrument in orbit.



*MetOp during tests in ESTEC  
©ESA/G. Porter*

**27 December 2006**

Launch of the astronomy satellite COROT.  
COROT is the first satellite dedicated to the  
observation of exoplanets.

COROT is the third satellite to use the  
PROTEUS bus.



*COROT during integration at CST  
©CNES/Jalby Pierre 2005*



## 9 March 2008

Launch of the 1<sup>st</sup> Automated Transfer Vehicle European cargo to resupply the ISS (ATV Jules verne). 4 others will fly between 2011 and 2014.

ATV is managed by ESA but operations are conducted by a joint ESA / CNES / industry team from CST.

ATV Jules Verne docks with the ISS on 3 April. It is intentionally destroyed during reentry on 29 September.



*Dedocking of ATV seen from the CST control room  
©CNES/Girard Sébastien*

**20 June 2008**

Launch of Jason-2/Ocean Surface Topography Mission on a Delta II from Vandenberg AFB.

Jason-2/OSTM continues the sea surface height monitoring mission from TOPEX/Poseidon and Jason-1 with the added objective to provide near real-time operational oceanography data to support meteorology. NOAA and EUMETSAT operate the mission.



*Jason-2 during tests*

*©CNES/TAS/Obrenovitch Yoann 2007*

**2 November 2009**

Launch of the Earth observation satellite SMOS dedicated to the study of salinity and soil humidity.

SMOS is an ESA mission for which CNES provides a PROTEUS bus and manages operations while Spain provides the interferometric radiometer payload.



*SMOS during tests  
©ESA/Corvaja Stéphane*

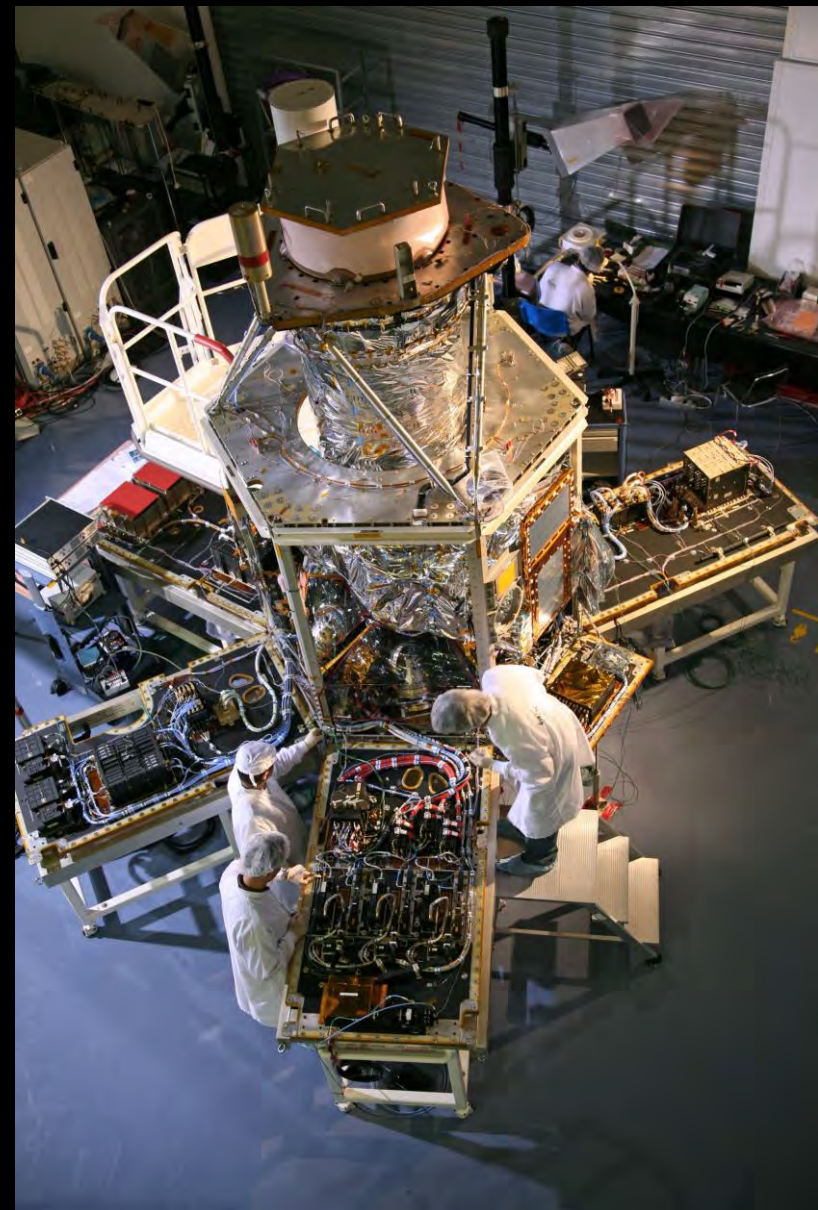


**17 December 2011**

Launch of the first high resolution and high agility Earth observation satellite Pléiades-1A.

Pléiades is built for CNES by Airbus Defense and Space.

Pléiades-1B launches one year later on 2 December 2012.



*Satellite Pléiades en intégration chez Astrium  
©CNES/Jalby Pierre 2008*



**12 October 2011**

Launch of the French-Indian satellite MEGHA-TROPIQUES to study the water cycle and the atmosphere in the inter-tropical region.

ISRO provides the satellite bus, the launch vehicle and one instrument, CNES provides two microwave radiometers, Madras and Saphir.



*Saphir under tests  
©CNES/Piraud Hervé 2009*

## 22 November 2011

As part of the celebration of the 50th anniversary of CNES, the president of the French republic, Nicolas Sarkozy, comes to the Centre Spatial de Toulouse to deliver a speech on the importance of space, attended by more than 3000 staff and invitees.



*President Sarkozy at the CST  
©CNES/REA/Marin Ludovic, 2011*

**25 February 2013**

Launch of the French-Indian oceanography satellite AltiKa-SARAL on an Indian PSLV.

The satellite bus is a new development by ISRO. It carries a French Ka band altimeter developed for CNES by Thales Alenia Space.



*Altimètre AltiKa en intégration  
©CNES/Jalby Pierre 2010*



**6 February 2014**

Launch of the French-Italian secure telecommunications satellite ATHENA-FIDUS, to support the French and Italian armed forces.

Thales Alenia Space built the satellite.



*Athena-Fidus at CSG*

*©CNES/ESA/Arianespace/Optique Vidéo CSG 2014*

**12 November 2014**

The French-German lander PHILAE is dropped on the surface of comet 67P Tchourioumov Guérassimenko by the ESA probe ROSETTA.

Even though the lander does not perform as planned, the mission brings back very valuable science data.



**25 April 2016**

Launch of MICROSCOPE, a satellite dedicated to the test of the equivalence principle.

MICROSCOPE carries a very sophisticated differential accelerometer built by ONERA.



*Le satellite MICROSCOPE en intégration au CST  
©CNES/Girard Sébastien 2015*



**26 November 2018**

NASA's InSight lander lands on Mars.

The SEIS seismometer provided by CNES is deployed next to the lander shortly thereafter. The seismometer records marsquakes for the first time, providing an invaluable insight into the internal structure of Mars.

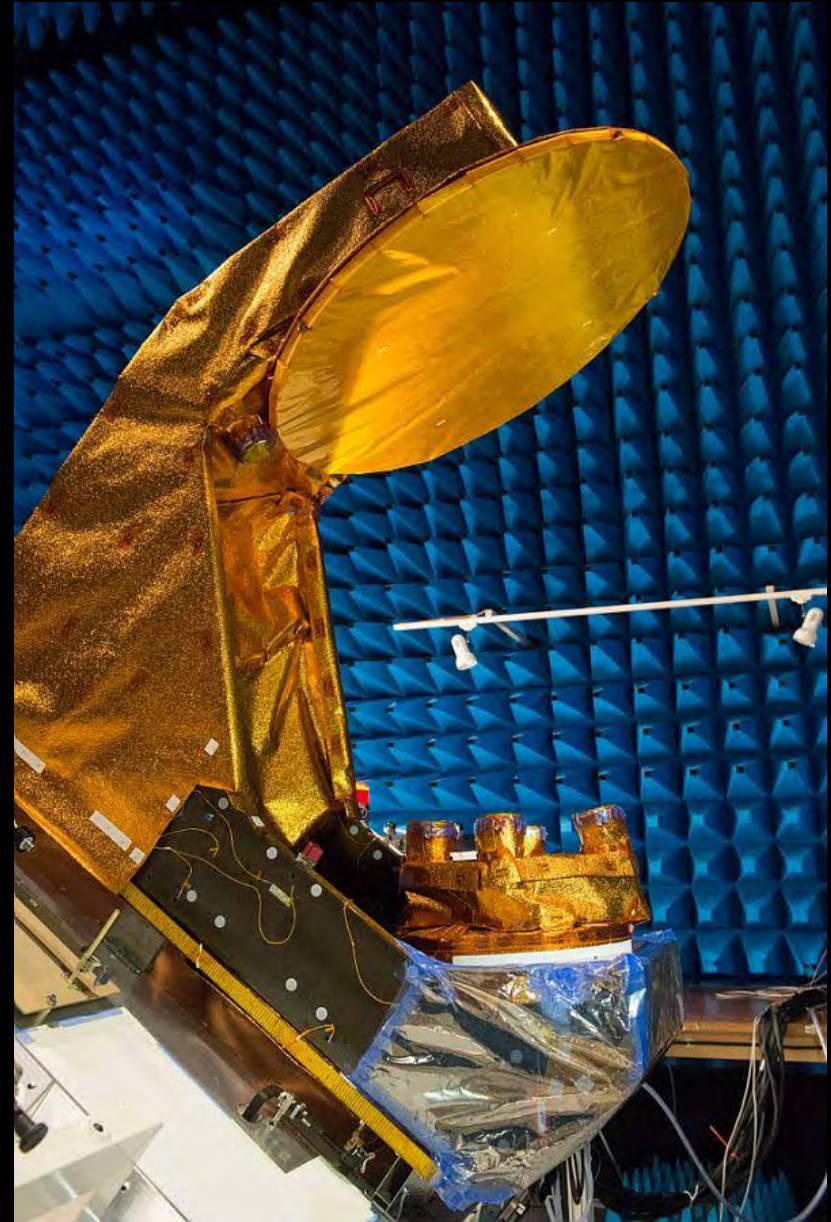


*SEIS seismometer deployed on Mars  
with its shield overhead ©NASA/JPL Caltech 2019*

**29 October 2018**

Launch of the Chinese-French Oceanic Satellite CFOSAT on a Chinese Long March 2C rocket.

The Chinese Space Agency CNSA provides the bus, the launch and a wind scatterometer. CNES provides a Ku band wave radar (SWIM) developed by Thales Alenia Space.



*SWIM during tests*

*©CNES/Grimault Emmanuel 2017*



**19 December 2018**

Launch of the first of the CSO very high resolution military Earth observation satellites.

CSO-2 is launched 2 years later on 29 December 2020.



*Soyuz launch from CSG*

*©CNES/ESA/Arianespace/CSG service optique 2018*



**16 December 2022**

Launch of the joint NASA-CNES Surface Water and Ocean Topography (SWOT) satellite on a Falcon 9 rocket from Vandenberg AFB. SWOT observes the fine details of oceans' surface topography and measure the height of all water bodies.

NASA provides the imaging radar payload and launch, CNES the satellite bus and a radar altimeter (both procured from Thales Alenia Space), with contributions from the Canadian and UK space agencies. CNES operates SWOT.



*SWOT integration in a Thales Alenia Space clean room in Cannes © Thales Alenia Space*

A century of French space missions was made possible by generations of highly motivated brilliant engineers and technicians at CNES, in the French industry and in laboratories.

The love of technological challenges and the envy to always to better have been the forces behind these projects but it is the careful oversight of even the smallest details and the permanent quest for quality which have lead to success.

Thank you to all of those who contributed to this wonderful adventure and good luck to those who are taking over!

