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FRENCH SPACE ACTIVITIES

R. Blanc

Translation of "Las actividades espaciales francesas". (Paper presented at the United Nations' Regional Seminar on Space Applications, organized in preparation for the Second United Nations' Conference on the Exploration and Utilization of Outer Space for Peaceful Purposes, Quito, Ecuador, 19-23 April 1982) (UNISPACE 82), 1982, pp 1-8.

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16. Abstract

The four main points of research and development of space programs by France are explained. The National Center of Space Studies is discussed, listing the missions of the Center and describing the activities of the staff.

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FRENCH SPACE ACTIVITIES

R. Blanc

International Affairs

As the preferred field for investigation and scientific experimentation, space now also represents a challenge of prime importance to industry. /1*

The advances made in its applications in telecommunications, earth monitoring and, soon, in the development of new materials, are spectacular.

Since it had inside its aeronautical and electronic industries the necessary talents and there was favorable climate for profitable cooperative enterprises, FRANCE entered into open competition with the two major powers of the world.

For this reason, the French Government in 1961, created the National Center of Space Studies.

Since that date, its efforts have developed in a efficient and orderly manner: thus France, in association with its European members, has acquired autonomy in its means of launching and in the construction of satellites.

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*Numbers in margin indicate foreign pagination.

Today it has a strong space industry capable of exporting its products and creating qualified and lasting employment. French space policy is now directed along four objectives:

a. To consider our position in the main areas of application (Telecommunications, television and earth monitoring) with a solid space industry and to increase our international market penetration of launchers, satellites and associated services and equipment. /2
b. To prepare itself by stressing basic technological research, and changes that may alter in important ways the design and economy of the space systems during the years 1990 - 2000.
c. To participate in the world investigations in the fields that will eventually reach new applications.
d. To dedicate ourselves to maintaining European solidarity and to tighten the bonds of cooperation with the developing nations in the fields that allow us to obtain new methods adapted to their necessary priorities.

1. Space Programs

The Space Programs put into effect by FRANCE are explained thusly. We can say that four main points of investigation and development have been realized by our country, be it with European cooperation (in the form of the European Space Agency) or in bilateral cooperation, be it in the national framework.

1.1 Scientific Research Program /3

Space methods make a new contribution to the advance of scientific knowledge not only in the environmental disciplines but equally in those areas that pertain to physics of materials and the life sciences. This study utilizes three elements:

a. The instruments or equipment for research oriented to-

wards different fields that utilize space:

Astronomy
Earth Sciences
Physical Sciences
Life Sciences

This scientific space community represents around 80 people.

b. Space vehicles like the satellites, orbital stations, interplanetary probes and vehicles in which to ship useful scientific cargo.

c. The financial means for the acquisition of useful cargoes designed and operated by the laboratories.

With respect to space vehicles, the French research teams consist of:

- Scientific satellites produced within the framework of the scientific program of the European Space Agency. The projects in development principally are: /4
- EXOSAT and HIPPARCOS - for astronomy.
- The SPACE TELESCOPE - for visible and ultraviolet astronomy in cooperation with NASA;
- I.S.P.M. for the interplanetary medium and solar physics.
- GIOTTO, for the study of Halley's Comet.
- for the first mission of the space laboratory, SPACELAB, which will be launched by the SHUTTLE (STS) in 1983 and which will perform ten (10) French experiments on physical sciences, life sciences, and also the study of the atmosphere.
- The projects placed in operation by the United States and Russia in the framework of bilateral cooperation on important missions like SKYLAB and SALYUT are:
- The ARCAD 3 Program for the study of the magnetic atmosphere.

- The VEGA Mission for the study of VENUS and the observation of Halley's Comet.
- The flight of FRANCE's first cosmonaut in 1982 in SALYUT.
- The national spacecraft program that permits research at the same time as those of the satellite programs, and in particular the study of the atmosphere and astronomy.

1.2 The Basic Technological Research Program

This program emphasizes important efforts to reach the following objectives:

- Of being able to maintain in the next 20 (twenty) years, international rivalry and competition.
- To assure French and European industrial autonomy.
- To prepare future space systems. /5

This program covers the combination of space technologies such as the satellites, the launchers (development of a new motor using cryotechniques HMGO) and orbital operations.

1.3 Programs for the Development of Launchers and Satellites

- The termination of the ARIANE Program and the completion at the same time of the development of the ARIANE 2 and 3 Programs and of the preparation of the second launch team in French Guyana.
- The placing into operation of the European telecommunications program like ECS and MARCS and of our national program like TELECOM 1.
- The completion of the first satellite in the earth monitoring program SPOT.

The success of the European satellite KETEOSAT.

- The French-German Program for direct television TDF1-TVSAT.
- The initial successes of the French and European industry in the satellite telecommunications market are other proofs of the capability of FRANCE and EUROPE to manufacture, launch and exploit space systems autonomously.

Today we try to increase our experience, and because of this the space effort will have to take into consideration during the coming years:

- The development of the launcher ARIANE 4, that in 1986 will place into geostationary orbit, useful cargoes of 4 tons.
- The placing in operational service of the French systems TELECOM 1, SPOT and TDF1.

For SPOT, a decision was taken to initiate an organization called SPOT IMAGE that will be charged with the commercialization of the satellite pictures.

The second satellite has also been decided on to insure operational service. /6

- A promotional effort will be made on a world-wide level by means of cooperation and consultation with other countries, concerning the space products obtained.
- The implementation or the study of complementary missions like:
- The ERSI Satellite for the detection of the A.E. Eu. for ocean studies that will, by 1987, produce pictures without being concerned with the effect of clouds.
- The Star Satellite allowing the transmission on demand of information from a low orbit satellite (first studies in 1982 and 1983).

1.4 Studies and Pre-projects of Future Systems

In this field, the studies are oriented toward two principal areas of research:

- The completion of a launcher by the years 1990 - 2000, permitting around 6 tons to reach space orbit and 15 tons in low equatorial orbit.
- The completion of an orbital intervention system for advanced observation missions of earth, the manufacture of materials and for the construction of large orbital structures.

2. The National Center of Space Studies

CNES has as its essential missions:
- To provide assistance to government services for the development of French space politics. /7
- To complete and put into effect the steps that permit said politics.
- To create the means for scientific and commercial utilization of space technology.

To complete these missions CNES has had from its creation an annual budget at its disposal which reaches some 3100 million francs for the year 1982.

In 1982 CNES counts on a staff of 2000 persons. (See slide number 2). On the other hand, the preparation and initiating of the programs have required the organization of:
- teams of investigators divided into eleven scientific laboratories who prepare space research experiments, (800 persons).
- industrial teams with a total of approximately 7000 persons which are responsible for the development, manufacturing and supervision of all industry work.
- The Center for Testing and Space Environment, the most important in Europe, situated in TOLOSA, where necessary tests for the verification of the proper functioning of the satellites in space, can be performed. The most important equipment that

said Center for Testing has at its disposal is the space simulator, which allows the performance of a combination of tests on vacuum and solar radiation (see slide number 3).

The Guyana Space Center, the launching center situated in French GUYANA, enjoys a specially advantageous position to make space station launchings (see slide number 4). This Center has been used many times to make numerous launchings and, of course, was the site where 8 DIAMANT was launched, as well as more than 300 Sandas rockets and the launcher ARIANE, all since 24/12/79.

This Center of operations for the orbiting station and for the maintenance of orbiting satellites is situated in TOULOUSE and tied into a network of stations TTC.

In synopsis and for a rapid review, I would like to state that FRANCE, in spite of the fact that it does not have available all the resources that the larger nations have, has made advances in all scientific or commercial fields relative to the use of space.

She is prepared to tighten the bonds of cooperation with those nations that want to use tne peaceful applications of space to meet their required priorities.