

## N O T I C E

THIS DOCUMENT HAS BEEN REPRODUCED FROM  
MICROFICHE. ALTHOUGH IT IS RECOGNIZED THAT  
CERTAIN PORTIONS ARE ILLEGIBLE, IT IS BEING RELEASED  
IN THE INTEREST OF MAKING AVAILABLE AS MUCH  
INFORMATION AS POSSIBLE

WITH THE SOLARIS PROJECT  
CNES PROPOSES TO THE EUROPEANS THE CONSTRUCTION  
OF AN ENTIRELY AUTOMATIC SPACE LABORATORY

J.-F. Augereau

Translation of "Avec le projet Solaris. Le CNES propose aux Européens de construire un laboratoire spatial entièrement automatique." In: Le Monde, January 21, 1981 (one page)



(NASA-TM-76492) WITH THE SOLARIS PROJECT  
CNES PROPOSES TO THE EUROPEANS THE  
CONSTRUCTION OF AN ENTIRELY AUTOMATIC SPACE  
LABORATORY (National Aeronautics and Space  
Administration) 5 p HC A02/MF A01 CSCL 14B G3/14

N81-20144

Unclass  
41879

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
WASHINGTON D.C. 20546 MARCH 1981

## STANDARD TITLE PAGE

1. Report No. NASA TM-76492	2. Government Accession No.	3. Recipient's Catalog No.	
4. Title and Subtitle WITH THE SOLARIS PROJECT. CNES PROPOSES TO THE EUROPEANS THE CON- STRUCTION OF AN ENTIRELY AUTOMATIC SPACE LABORATORY		5. Report Date March 1981	
		6. Performing Organization Code	
7. Author(s) J.-F. Augereau		8. Performing Organization Report No.	
		10. Work Unit No.	
9. Performing Organization Name and Address Leo Kanner Associates Redwood City, California 94063		11. Contract or Grant No. NASw-3199	
		13. Type of Report and Period Covered Translation	
12. Sponsoring Agency Name and Address National Aeronautics and Space Adminis- tration, Washington, D.C. 20546		14. Sponsoring Agency Code	
		15. Supplementary Notes Translation of "Avec le projet Solaris. Le CNES propose aux Européens de construire un laboratoire spatial entièrement automatique," In: <u>Le Monde</u> , January 21, 1981 (one page)	
16. Abstract CNES (the National Space Studies Center of France) is presenting a proposal for the Solaris project to other European nations. Emphasis is on unmanned flight in the European program, but they are not completely eliminating the possibility of manned flights. The elements of the Solaris system are discussed briefly in this article.			
17. Key Words (Selected by Author(s))		18. Distribution Statement  Unlimited-Unclassified	
19. Security Classif. (of this report)  Unclassified	20. Security Classif. (of this page)  Unclassified	21. No. of Pages  3	22.

WITH THE SOLARIS PROJECT  
CNES<sup>1</sup> PROPOSES TO THE EUROPEANS THE CONSTRUCTION  
OF AN ENTIRELY AUTOMATIC SPACE LABORATORY

J.-F. Augereau

The National Space Studies Center (CNES) is scheduled in the coming months to propose to the Europeans taking charge of a new large scale space project. This program called the Solaris which has not yet been definitely decided on is scheduled to open with an operation demonstrating the manufacture of materials (alloys, crystals, etc.) in space starting with completely automatic engines. If the Europeans are convinced, they could, by investing five to ten billion francs over several years, make the Solaris a tremendous program for the European Space Agency in the years to come. At a time when future activities are being questioned and the end of the great Ariane and Spacelab programs is in sight, the idea deserves to be examined with great care.

Like many other organizations responsible for the space policy of their country, CNES is asking itself what the space activities will be tomorrow and what part France and Europe will play in this field. In this spirit it has attempted to define the research and development programs which could be initiated in 1990-2000 without forgetting ever that "Europe cannot hope to compete with the Americans in all areas."

The budgetary limitations of Europe (a quarter of the money available to the American space agency) would not allow such competition with the Soviets either. This involves taking into account the fact that the future equipment of CNES should be used to discover ways which "considering the technical risks and the financial limits, would permit Europe to occupy a leading position in the industrial and strategic fields which are considered essential."

Solving this thorny problem for CNES means responding to the

---

<sup>1</sup>[Centre national d'études spatiales, National Space Studies Center].

fundamental question of knowing whether or not Europe should engage in a program of space flights similar to that of the United States and the Soviet Union. Certainly, Europe, if it so wishes, has the technical means available to take on such a program here in twelve to fifteen years. However, such a decision would be burdensome financially and a political consensus would have to be found for it, but CNES emphasizes that "manned flights are not indispensable for the development of commercial space applications."

This thought then produces a report on space activities in the years 1990-2000. In this text, CNES attempts to differentiate the programs which require only minor technological changes from those which require significant involvement in technological fields which are not available in Europe. While improvements in the Ariane launch vehicle made up to the Ariane-4, which can put many tons of material into low orbit belong to the first category of measures, the development of the Ariane-5 (Le Monde, December 12, 1979) comes from a concept of a second type.

Realization of this powerful launch vehicle which can, in addition to the heaviest satellites, put a spatial airfoil into orbit (Hermes) which has on board a crew of astronauts, is effective because of the engine which burns liquid hydrogen and oxygen for 60 tons of power. This is not without danger. But today, the Europeans have only actually built one six ton powered engine functioning according to this principle.

#### A program requiring time and labor

Like the Ariane-5 or the Hermes alluded to in the report from CNES the Solaris (orbital station and automated laboratory for rendezvous and space actions) is a program requiring time and labor which can only be put into operation by a group of European states. It proposes giving them a position in the fields in which they have been singularly absent: maneuvers in orbit, rendezvous and transfer of fluids between two spaceships, telemanipulations in orbit by robots and recovery of

missiles, except for the robots, everything which the United States and the Soviet Union have developed to a high degree.

For this purpose the Solaris system will comprise four elements:

A long-term automatic orbital station of about 5 tons; this automated station put into polar orbit at low altitude by an Ariane-4 type rocket engine will be equipped with attitude control, a telecommand and data processing system and an electrical power supply system with about 10 kilowatts designed to satisfy the needs of scientific experiments and equipment to be used on board.

An automatic transport vehicle which is partially recoverable like the Soviet Soyuzes makes it possible to deliver an experiment to the station and to return the materials produced to Earth. The transport capability designed for return of material is 2 tons.

A telemanipulation module acts as an interface between the vehicle and the orbital station for operations of assembly or dismantling. It does not operate exclusively on automatic.

Finally, the telecommunication relays of the satellites are similar to the American T.D.R.S.S. used during flights of the space shuttle to permit operators on the ground to remain in constant contact with the assembly system.

The project is ambitious and it can easily be seen that it can not be done just on the European scale. For this purpose, certain European organizations like the German D.E.V.L.R. have already been consulted by CNES which in spite of this involvement in the space robot approach does not totally exclude manned flights. France, it says in its report, must make the best use of cooperation with the United States and the Soviet Union in this field and keep the possibility of launching a space program of manned flights at some point. Also, it has already been agreed with the Soviet Union that a French astronaut will fly on board a Soviet spacecraft in 1982. The information received on that occasion will permit the organization to make its position more precise, undoubtedly.