France Pushes Europe Toward Manned Space Flight

It argues that its plans for a small manned "spaceplane," Hermès, are essential if Europe is to become a full space power.

Paris

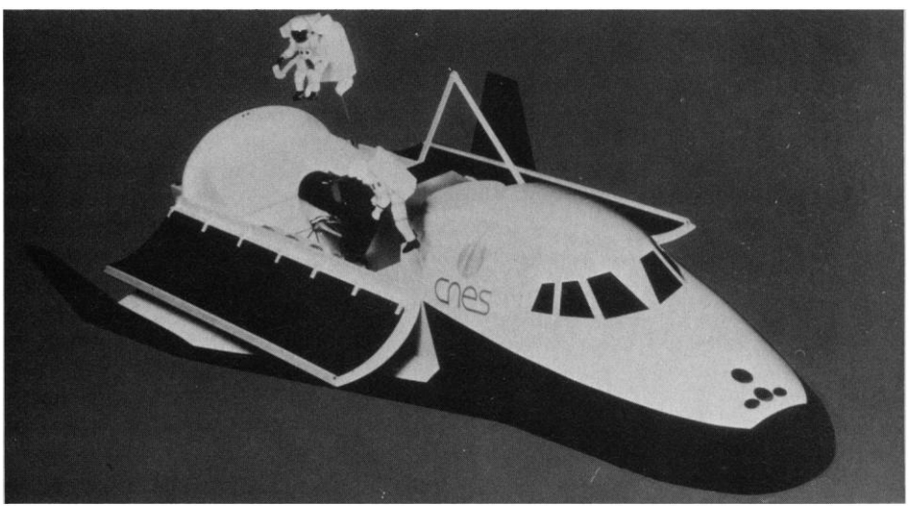
WHEN the history of European space efforts in the 1980's comes to be written, the origins of Hermès—a manned "spaceplane" designed to carry out a range of activities in low earth orbit—will inevitably become a classic case study of the differences in both philosophy and style that set France apart from its European partners.

Preliminary designs for Hermès have been worked on by France's Centre Nationale d'Etudes Spatiales (CNES, the National Center for Space Studies) since the early 1970's. The current plan is for an 18-meter, delta-winged space vehicle, carrying up to six crew and a load of up to 4.5 tonnes, which will be lifted into orbit by Ariane V, a new version of the European rocket scheduled for testing in the mid-1990's.

French space officials and politicians combine to argue that Ariane V and Hermès form an indivisible package, and that the two components are equally essential for providing Europe with an independent capability for manned operations in space. According to Frédéric d'Allest, the director of CNES, such a capability is "mandatory for a group of nations which intends to go on playing a major international role."

So far, France's main European partners have remained skeptical. Both Britain and West Germany have turned down repeated invitations to participate in Hermès. Far from being disheartened, however, French officials are applying a wide range of tactics to convince the rest of Europe to share the estimated $1.5-billion cost of Hermès. These tactics range from whipping up enthusiasm among Europe's aerospace companies to threats that, if it does not have its way, France may reconsider its support for other European projects—including Columbus, Europe's planned contribution to the U.S. space station.

It will probably get what it wants. France's determination to push Europe into supporting its own space priorities has already been demonstrated by the successful development of Ariane, which, although formally developed by the European Space Agency (ESA), was two-thirds financed by the French government. Already, both British and German officials are said to have given France informal signals that, despite continuing reservations, they are likely to sign up within the next few months if the time scale can be extended—and if France is prepared to support some of their own projects in return.



Europe's logical next step in space?

France is pushing Hermès, although its mission is not yet clear.

In appearance, Hermès looks like a miniature version of the U.S. space shuttle. However, d'Allest describes Hermès as a "spaceplane" and argues that the philosophy behind the two is not the same. "The shuttle is a multimission space vehicle that was designed to do everything; our approach is very different, since we consider specialized systems to be more efficient than multipurpose systems," he says.

Hermès, therefore, will not be able to launch satellites; that will continue to be done independently by the various members of the Ariane family. But it will be used for a variety of activities that require the presence of man. These include autonomous flights for space-based experiments lasting up to 3 months, access to satellites and other vehicles in orbits up to 800 kilometers, and in particular, ferrying crews of astronauts to and from an orbiting space station, whether American or, ultimately, European.

"Hermès will be much smaller, cheaper, and more flexible than the space shuttle," says d'Allest. "It's like using a taxicab rather than a truck."

Even without the formal approval of its European partners, France is pushing ahead with the preliminary design and costing phase, including the nomination of the main industrial contractors.

In October, France announced that it had selected the aerospace firm Avions Marcel Dassault/Bréguet Aviation as the company responsible for the structural and aerodynamic aspects of the spaceplane. Aérospatiale, the company responsible for building Ariane and several other European space vehicles, will be responsible for coordinating the project.

The allocation of industrial responsibility for the different subsystems will be decided over the next few months, with individual programs expected to be allocated to foreign firms in direct proportion to the financial contributions of their governments.

If Germany comes in, for example, German firms would probably receive a substantial part of the contracts for the fuel system components, a field in which they have made important contributions to Ariane.

Similarly, various British companies have already expressed an interest in bidding for the guidance system.

The need to establish a division of technical labor and to intitiate parallel research programs in each of the different subsystems is one reason that France is pressing its partners to decide as soon as possible whether they are prepared to support the project. It already has agreement from ten European countries to contribute toward the preparatory design and costing stage and hopes to present ESA with a well-defined project for European adoption as a new optional program at the beginning of 1987.

This endorsement is not automatically guaranteed. The commitments received so far refer primarily to the funding of the $2-million design stage; major expenditure would only begin in 1989–1990. And although France has promised to cover 50 percent of the overall bill, getting its European partners to pay the rest will mean persuading them to increase their joint expenditures on space research by a further 15 to 20 percent over the next decade on top of the 75 percent increase already agreed to at the beginning of last year.

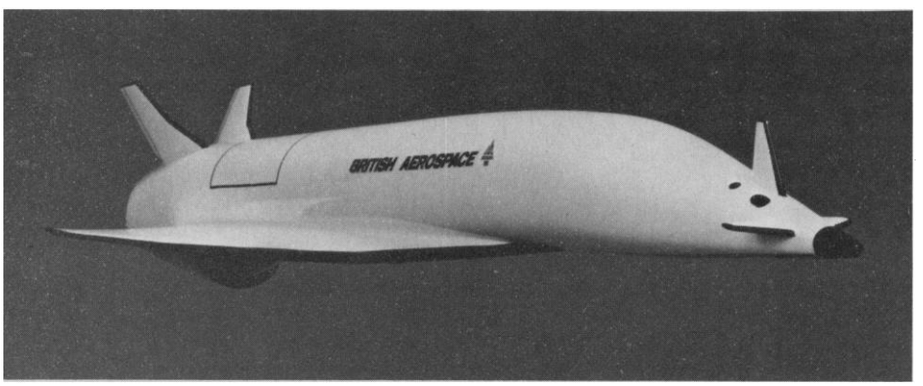
As far as France is concerned, there are a number of factors that make Hermès the next logical step in its own space program, over and beyond the explicit uses which are being argued for it. First, it would be one of the principal justifications for Ariane V which might otherwise, according to some observers in Europe, be difficult to justify on strict cost-benefit grounds.

Second, there has been the lesson absorbed from U.S. experience that, despite the extra costs, manned space programs are more successful than unmanned projects in sustaining broad public support for space efforts.

Third, the technical challenges presented by Hermès—for example, the heat shield that will be made up of large molded sheets of silicon carbide and not single tiles, as on the space shuttle—are seen by both government and industry officials as an important stimulus to research in new materials with a range of potential industrial and commercial spin-offs.

Finally, there is the military dimension, rarely raised explicitly in public, but under which—at least according to President François Mitterrand—Hermès forms an integral part of European aspirations to play a military role in space. This factor reflects French eagerness that Europe should operate its own space station with clearly defined military objectives, independent access to which could only be achieved by Hermès.

Seen from these various perspectives, the political logic leading to France's current enthusiasm for Hermès is understandable. At the same time, however, two factors make France keen for broader European support: the overall costs of the program, and the fact that although France is strong in some areas of the necessary technology, it is weak in others.



Britain's HOTOL

Unlike Hermès, it would be able to place satellites in high orbits.

Hubert Curien, France's minister of research and technology (and a former president of both CNES and ESA), also invokes broader arguments. Hermès, he says, is the next in line in a succession of major technological projects to which Europe has recently agreed as a means of boosting its advanced technological research. "The French market is too narrow for this type of activity," he says.

Furthermore, the present government's ideas are widely shared by leading members of the conservative opposition, who are likely to find themselves in power after next March's general elections.

Neither Britain nor West Germany plan their space policies in quite such visionary terms. And both have their own technological priorities. Space officials in London, for example, are currently studying proposals from British Aerospace for an unmanned reusable spacecraft known as HOTOL (horizontal takeoff and landing). This would, unlike Hermès, be able to place satellites into high orbits, but its proposed air-breathing engines, as well as the requirements for new materials, would need research programs stretching into the next century.

British officials see the Ariane V/Hermès combination as, at most, an intermediate stepping stone to HOTOL (already dubbed by some as Ariane VI), and are skeptical about its cost-effectiveness. However, given that the program is likely to go ahead whatever Britain decides—and that there could be contracts for British companies—French officials say they have been given signs that London is likely to agree to cover "3, 4, or perhaps even 5 percent of the costs."

The major question mark is over Germany. When it agreed to provide money for Columbus at the beginning of the year—a project which will build directly on Germany's experience with Spacelab—the cabinet in Bonn stated explicitly that it was not prepared to support Hermès as well (*Science*, 1 February 1985, p. 499). Despite pleas from Paris, this position has been repeated several times over the past year, most recently in October.

More recently, however, several major German aerospace and electronics companies, in particular Messerschmitt-Bölkow-Blohm (MBB), Dornier, and Siemens, have publicly expressed their interest in participating, seeing the project as a way of advancing a range of technological skills.

German Chancellor Helmut Kohl is said to have promised President Mitterrand at a recent meeting that the cabinet will reexamine its position in the next few months. And officials in the Federal Ministry of Technology and Research (BMFT) are suggesting that Bonn might agree to cover up to 30 percent of the costs of Hermès, in return for a 2-year delay in the program—and wholehearted French support for German participation in the space station.

Formally, of course, nothing has yet been decided. But French officials say they can accept some delay—"putting the first launch back 1 or 2 years would not be dramatic," says d'Allest—and remain confident that the political logic at the European level points in the same direction as Paris is already facing.

"Some people say to us that Hermès is too simple, that we should be doing something more ambitious," says d'Allest, referring to proposals such as HOTOL. "These are nice dreams of engineers; but our judgment in France is that they are not realistic for the next 15 to 20 years. Technological projects run only by technological people are very dangerous. We cannot afford another Concorde. You need a political vision and realistic projects," he adds. ■

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