After Spacelab, Europe Wants a Better Deal

It paid a high price to build Spacelab but is expected to seek a major role in NASA's proposed space station

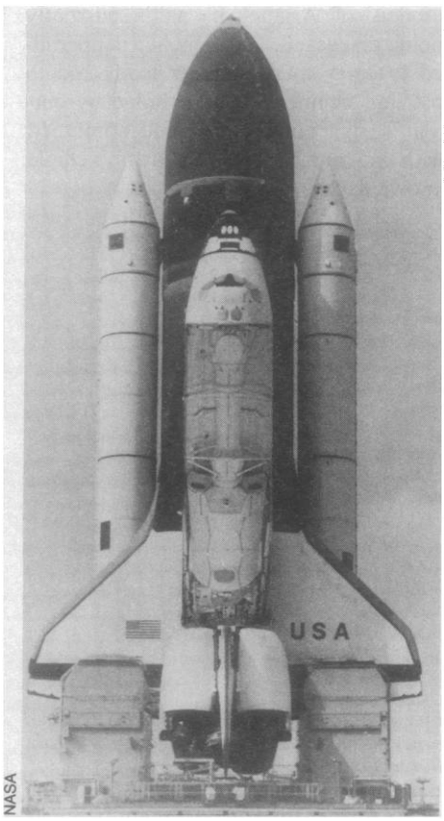
Bonn. Early next year, the governments of West Germany and Italy are planning to propose to their fellow members of the European Space Agency (ESA) that the organization should finance a new program to develop hardware for what could conceivably become a free-flying European space station. Alternatively—and perhaps more likely—the hardware could also be the major part of Europe's contribution to the space station that the U.S. National Aeronautics and Space Administration (NASA) is currently hoping it can persuade the White House and Congress to support.

The project will be named Columbus because it is planned for launch in 1992, the 500th anniversary of the discovery of America by the Genoese explorer. The core of the hardware will be a modified version of the European-built Spacelab, which was launched aboard the space shuttle on 28 November.

Although the expectation is that Columbus will be part of the U.S. space station—assuming the White House and Congress give NASA the green light—the element of uncertainty reflects some tough political bargaining that lies ahead both within Europe and between Europe and the United States. This will revolve around Europe's determination to get a better return on its money than it feels it is going to get with Spacelab, and around continued tensions within ESA over the right balance between dependence on and autonomy from NASA.

There are several similarities to the situation just over 10 years ago. Thomas Paine, who was then administrator of NASA, suggested that Europe participate in the agency's plans for the space shuttle. Several countries, with West Germany taking the lead, were enthusiastic about the proposals; others, headed primarily by France, were not.

The result was a compromise that subsequently came to shape the major technological projects of ESA when it was formed in 1975. The French received support from other countries for the development of a European launcher, Ariane, while in return West Germany took charge of the Spacelab. Both projects were more than half financed by their respective lead nations, but both were also truly European, with financial and technical contributions being distributed through the other members of ESA.



Spacelab aboard the shuttle

A $750-million gift to NASA?

With the two projects now successfully completed, ESA is looking to the future, aware that NASA's proposal to collaborate on the space station is likely to be, again, a major catalyst for its plans. This time, however, the climate of the negotiations has changed significantly. At the end of the 1960's, following the successes of Apollo and the failure of plans for a European launcher, Europe was clearly the junior partner.

"This time it will be different," says Hermann Strub, head of the directorate of aeronautics research with the German Federal Ministry of Research and Technology in Bonn. "Spacelab has given our industry the experience of managing a major project for manned space operations. In 1973, the United States did not think that Europe could do it, indeed no one believed in European technology in space. After Spacelab, NASA's technical people tell me they have the highest regard for what we can do; this time it should be a real partnership."

Part of the determination to make things different comes from lessons learned the hard way with Spacelab. Europe agreed to absorb the development costs of Spacelab—currently estimated at more than $750 million—in return for merely half of a free ride in the space shuttle and the prospect of future cooperation with NASA. The Spacelab hardware itself will become NASA's property after the first flight, and European scientists will have to pay commercial rates to use it.

But the higher-than-predicted cost of shuttle launches, delays in the initial Spacelab launch (first scheduled for 1980), the general squeeze on scientific research funds in Europe, and the continued lack of enthusiasm of European industry for the commercial prospects of materials processing in space, have each reduced demand for Spacelab to such an extent that many see it as little more than an expensive gift to NASA.

Europe's newly acquired technical expertise, however, means that its space officials feel in a strong position to negotiate much better terms for cooperation on a space station, for which it anticipates contributing at least 10 percent, and perhaps up to 30 percent, of the eventual cost. "One of our conditions is that a European contribution should be an integral part of the space station, not something which is merely an addition to it," says Herbert Curien, president of France's Centre Nationale d'Etudes Spatiales.

Another condition is that European scientists should be guaranteed adequate access to the space station. "The problem of access is very important," says Jacques Collet, head of the long-term program office in ESA's Directorate of Space Transportation Systems. "The space station is a project with an unlimited timespan; we have to be assured that we can use it whenever we want."

Collet says ESA accepts that not all work carried out on the space station could be completely open, particularly

since some of it would be done on behalf of private companies who would want to maintain commercial secrecy. But, he adds, there would be major problems if, for example, European scientists were told that a secret mission was being carried out for the Defense Department, and that they would be prohibited from using the space station for a period of several months.

The general feeling inside ESA is that, even if the negotiations are tough—the U.S. State Department, for example, has already expressed reservations about sharing space technology with Europe (*Science*, 15 July, p. 247)—satisfactory agreement can be reached. In laying down criteria for ESA's own long-term planning last December, for example, its member states agreed, as Collet puts it, that "there should be a continuation of manned space activities based on substantial cooperation with the United States."

Three potential areas in which Europe could contribute to NASA's space station are under study: elements derived directly from Spacelab, such as platforms derived from the Spacelab pallets for experiments or derivatives of the instrument pointing system; elements derived from an automated free-flying platform called Eureca (European Retrievable Carrier), which is currently under development; and contributions to the space station infrastructure, such as equipment for automated rendezvous and docking.

If the White House gives the go-ahead, then ESA is keen to participate fully in the so-called phase B of the space station studies which NASA would like to start in October 1984, with the idea of finalizing a design over the following 2 years. But pressure to speed things up is coming from member countries faced with the prospect of disbanding the technical teams built up around Spacelab unless they can be found further work. This, in particular, is one of the main impulses behind the proposal from West Germany and Italy for the Columbus project, studies for which have so far been entirely funded out of the national space budgets of the two countries, but which the rest of ESA will soon be asked to support.

As currently conceived, Columbus would itself be a modular structure, making it possible to integrate elements of space technology already completed or under construction—such as Spacelab and Eureca—with new components, such as a service module designed to provide infrastructure support and limited orbit-maneuvering capability to the other elements. Like Spacelab, its function would be conceived of in terms of eventual commercial applications.

Furthermore, bearing in mind that ESA is, at least formally, committed to exploring ways of carrying out orbital operations by means of an in-orbit infrastructure developed independently of NASA, Columbus is also being conceived in a way that it could eventually be launched and serviced from future models of Ariane—if, as is currently being discussed, the launcher is upgraded to carry much heavier loads and to provide manned flights exluded by current design parameters—and combined with a small return-to-earth vehicle known as Hermes.

As in the United States, feelings within the European space community about committing substantial funds to a manned space station, whether or not in collaboration with NASA, remain highly ambivalent. Many space scientists, for example, fear that it could add further pressures on the budget for basic space research. "There will be strong pressure from the scientific community not to cooperate [in a space station]; they think that a free-flying satellite is a more efficient way of carrying out research," says Cornelius de Jager of the Space Research Laboratory at Utrecht, a member of the European Science Foundation's space science committee.

The Bettman Archive

Five hundred years after Columbus reached America, his namesake may leave the Earth. But will it be a lone voyage?

Gottfried Greger, head of the space technology group in Strub's directorate in Bonn, acknowledges that these criticisms are often made, even in Germany, but argues that, at both national and international levels, if money is found for a space station it will not come from the space science budget. "If we did not make these investments, it would be wrong for the scientific community to think that they would get the money" he says. Germany has long been pushing for an increased science budget within ESA.

Indeed, some even suggest that European space science could benefit directly if NASA goes ahead. "In such circumstances, so much of the American resources will go into this project that they may wish to trim their scientific programs, leaving gaps that will provide good opportunities to be plugged from the outside," says Harry Atkinson, director of science with Britain's Science and Engineering Research Council.

Not all scientists are convinced, however, given the general low funding of space science in Europe, which is currently about one-fifth the level in NASA. Nor is European industry any more enthusiastic about the commercial prospects. A survey carried out earlier this year by the German Federal Ministry of Research and Technology revealed little current interest in the opportunities offered by the space station, a skepticism that has in some quarters been fanned by the failure of Spacelab to meet some of its earlier expectations.

But again, as in the United States, it appears that broader political and strategic considerations are likely to play a major part in the final decision. Within ESA, for example, France is keen to generate support from other European countries for the development of a new cryogenic engine that could be used to increase the capacity of Ariane from 4,000 to 15,000 tonnes; in return for this support, it is expected to endorse ESA funding for Columbus (to which its own contribution might be about 20 percent) as part of a broad "European package" with something in it for everyone.

Furthermore, even many of those in Europe who are skeptical of the space station as a project are still keen that, if collaboration with NASA is to take place, this should be done multilaterally through the agency rather than bilaterally. And it is also being stressed in Europe that full cooperation between all major Western advanced nations—Japan and Canada have also been invited to participate—on a technological project of this nature would have broader political implications.

"Space is something that people are proud of; it's not attacked in the same way that other technologies are attacked," says Strub. "Cooperation of all Western countries would be very helpful in bringing everyone together." Given the tensions that have recently been raised in Europe by another U.S. aerospace technology, the cruise missile, such arguments are expected to play an important part in decisions on both sides of the Atlantic.—**DAVID DICKSON**