

# Europeans Set to Join in U.S. Space Station

*Research ministers are expected to give their approval at a meeting later this month; many groups remain skeptical of the project's value*

*Paris.* At the economic summit meeting in London last summer, President Ronald Reagan and British Prime Minister Margaret Thatcher were photographed closely examining a model of the proposed U.S. space station. Reagan had previously invited Europe to participate in the design and construction of the station, and his meeting with Thatcher was part of an effort by senior U.S. officials to persuade their European counterparts of the merits of accepting the offer. The effort appears to have been successful. Later this month, research ministers from all the major European countries are expected to give their formal acceptance.

As in the United States, there is considerable skepticism in Europe about whether the space station is likely to provide immediate value for money for any of its three potential user groups—the scientific community, private industry, or the military. But two powerful factors have combined to convince the Europeans to join in.

The first is the argument, put forward by aerospace companies and the 11-member European Space Agency (ESA), that participation in the space station is a logical extension of past European projects, such as the development of Spacelab and the launcher Ariane. They also claim that it will create the infrastructure to ensure that Europe is well placed to exploit any potential space-based manufacturing opportunities.

The second factor is almost entirely political. The heads of all Western European nations are currently keen to strengthen technological links, both with each other and with the United States, and participation in the space station is seen by several of them—in particular Mrs. Thatcher and West German Chancellor Helmut Kohl—as a symbol of the unity of the Western alliance.

With both the technical and political logic pointing in the same direction, there is therefore widespread expectation in Europe that when the research ministers of the ESA member states meet in Rome at the end of January for the first space summit since 1977, they will give their approval to full European participation in the space station's Phase B design studies, due to start in April.

The European contribution will focus on extending the technology developed for Spacelab into a new module for conducting scientific experiments, Columbus, which would be integrated into the space station.

A decision to fully commit themselves to the \$2-billion participation in the subsequent construction and operation of the \$8-billion space station that has been suggested by National Aeronautics and Space Administration (NASA) administrator James Beggs, however, will take more time. Even next summer's summit in Bonn, for example, is expected merely to provide the seven heads of state with an opportunity to express their satisfaction with progress so far, and a broad agreement to pursue that collaboration.

Officials at ESA's headquarters in Paris explain that this two-stage decision process is made necessary by the many complex conditions, ranging from controls on the transfer of intellectual property to questions of access and the division of operating costs, that Europe is insisting on. If all goes well in these negotiations—as well as in the joint Phase B studies—then a formal decision to proceed with full collaboration will probably be taken some time in 1986.

There are, however, several hurdles along the way, many of which reflect the reluctance of government officials to commit themselves to major new expen-

diture during a period of general budgetary stringency. At present, for example, the main focus of attention is on West Germany, which is generally expected by its other European partners to agree to pick up 40 percent of the overall costs. The German aerospace community, as the main supporter of the Spacelab program, is keen on European collaboration in the space station, and Chancellor Kohl has publicly given the American proposals his enthusiastic support. He is also widely rumored to have promised German participation to President Reagan during the London summit. However, the Cabinet so far has refused to grant the necessary funds. This is primarily because of refusal of the powerful finance minister, Gerhardt Stoltenberg, to break the tight fiscal limits he has placed on all new spending, and of research and technology minister Heinz Riesenhuber to take the money out of his budget.

The stalemate has already lasted several months. Officials in Bonn are optimistic that a compromise will be reached before the research ministers meet in Rome, even if it is at the last moment. However, in view of strong reservations from the two main opposition parties, the Social Democrats and the Greens, this outcome cannot be guaranteed.

No such reservations have been expressed by Italy, where research minister Luigi Granelli has recently persuaded



**A symbol of Western unity?**

*Reagan and Thatcher confer at the London summit.*

Bill Fitz-Patrick, The White House

his Parliament to triple the nation's (admittedly modest) domestic space budget. Italy was Germany's principal partner for the Spacelab development, and was the first country to indicate to ESA its formal support for Columbus—offering to cover 25 percent of the total costs.

There has been equal enthusiasm from a less predictable direction, France, where the National Centre for Space Studies (CNES) announced in November that it was prepared to support Columbus as Europe's contribution to the space station program, and to cover between 15 and 18 percent of the development costs.

Several factors have influenced the French decision. One has been new-found enthusiasm for manned space activities. Until relatively recently, CNES engineers were insisting that highly automated, remotely controlled facilities were sufficient, and indeed they had been working since 1978 on their own plans for an unmanned station, known as Solaris. But French space officials appear to have changed their minds when the space shuttle demonstrated that human operators can be valuable not only for conducting materials science experiments but also for bringing publicity to a national space program.

French enthusiasm for the space station has also been reinforced by President François Mitterrand's declaration in a speech in The Hague last spring that it could eventually lead to the creation of an independent European space station that could be used for military purposes. This would itself be a worthy project through which Europe could increase the effectiveness of its own defense, Mitterrand said.

The single most important factor in the French decision, however, is a deal between France and West Germany over a proposal to develop a cryogenic engine for a new generation of Ariane launchers. France is keen to push ahead with the engine as rapidly as possible and has already received verbal assurance of West German backing for the proposal at the Rome meeting in return for France's support for Columbus.

Perhaps the biggest turnaround has been made by the United Kingdom. Prior to the London summit, British officials had been generally skeptical about the U.S. proposals for a space station; NASA administrator Beggs had received a somewhat frosty reception when he visited the Department of Trade and Industry to discuss them last spring. Much of this skepticism has been dissipated, partly, it is said, as a result of the success of President Reagan in selling

the idea to Mrs. Thatcher during the London summit. Reagan's pitch was preceded by several briefing reports prepared for Thatcher by British government officials. "The last time that a brief went to the Prime Minister on space must have been in the early 1970's," says Roy Gibson, a former director of ESA who was responsible for negotiating the Spacelab deal with NASA, and has now been taken on as a consultant on Britain's involvement in the space station by the Department of Trade and Industry.

An indicator of Britain's new enthusiasm is that, while it only covered 4 percent of the costs of Spacelab, cabinet ministers have already agreed that Britain should contribute 15 percent of the costs of Columbus.

The British government is also expected to submit to the Rome meeting a proposal from British Aerospace for an unmanned orbiting platform that would operate from the space station. NASA has already indicated that it would be

---

**"The decision in most European countries is going to be wholly political."**

---

prepared to accept this as part of the overall European involvement.

So the political omens for Rome look good. However, reservations continue to linger, and not merely among government finance departments. Many European space scientists, for example, having seen their experiments priced out of the market by the high cost of Spacelab launches, fear that the experience will be repeated on a larger scale with the space station.

For example, the space science committee of the European Science Foundation passed a resolution in June stating that although participation in the space station could give "new momentum to European technology," it "cannot be justified on the basis of scientific needs." The committee also expressed concern that participation "may lead to undue emphasis on the technological aspects of the European program," leaving its more scientific aspects underfunded. However, Jacques Collet, head of long-term planning for ESA, says that despite the initial "rather negative" attitude of the members of a science working group set up by the agency towards the potential uses of the space station, "it has

been very interesting to see the way they have progressively thought of more things to do, and are now turning to a fairly positive attitude."

Industry has been even more of a problem, says Collet, "because there are no figures to tell people." Planning documents prepared by ESA speak of the many technological opportunities that the space station's microgravity facilities will have to offer, such as the production of ultrapure semiconductors and protein crystals, and of the consequent prospects for "synergies" with space industrialization. So far, however, little of this enthusiasm has rubbed off on European companies. A survey carried out last year by technical consultants PA Technology on behalf of Britain's Department of Trade and Industry revealed a marked lack of interest in the commercial possibilities of the space station, at least in terms of any willingness to invest in the field, even where the long-term prospects were acknowledged.

Less ambiguous, but more difficult politically, are the potential military uses of the space station. ESA tends to play these down, stressing that its charter specifies that it can only work on civilian projects (even if the technology that emerges from these projects may later be used by member countries for defense purposes). Certainly there is little enthusiasm at present for a manned space station among Europe's armed forces, many of whom argue, like the scientists, that unmanned facilities are more cost-effective. Yet, as Mitterrand's speech in The Hague suggested, if the technology for a manned space station is developed in Europe, then there will certainly be uses that the military can make of it.

The political implications of this cut two ways. Some argue that if the militarization of space is already happening in the United States and the Soviet Union, then Europe's involvement in the U.S. space station can be justified as the first step toward an independent capability in space weaponry. British Conservative member of Parliament James Hill, for example, a prominent member of the science, technology, and aerospace committee of the Paris-based Western European Union, argues that "at the end of the day, the space station will have military uses, whatever anyone says. I see no reason why we should shy away from the question." However, the Social Democrats and Greens in West Germany have both emphasized that their opposition to West German involvement in the space station is based on a combination of its costs and its potential military uses.

Other uncertainties remain. Some fear, for example, that France's decision to include the development of a small manned space vehicle, Hermes, in the proposed programs it is submitting to the Rome meeting (*Science*, 7 December, p. 1175) threatens to disrupt the delicately balanced package that is currently being stitched together for the minister's approval. The package would give each of the three major ESA members lead responsibility for a separate project (France for the Ariane program, West Germany with Italy for Columbus, and Britain for the unmanned platform).

There is also a certain suspicion of NASA's motives in inviting foreign participation in the space station. Questions are being asked about whether NASA's enthusiasm for international endorsement of the space station may be as much motivated by a desire to protect it from domestic budget cuts by stressing treaty commitments as any genuine interest in cooperation.

ESA administrators also stress that any agreement with NASA must contain guarantees of Europe's freedom of action. They point with concern, for example, to the testimony of one NASA official, speaking last March to the Senate subcommittee on science, technology, and space, that "cooperative programs frequently link foreign space objectives to our own," with the result that they "have the effect of supporting our goals and may divert foreign resources from competing programs."

These suspicions are likely to lead to some tough bargaining in the months ahead over the terms and conditions of European participation, and unlike the situation with Spacelab 10 years ago, Europe is now negotiating from a position of relative strength. However, two factors in the discussions so far reflect a growing convergence of thinking between Europe and the United States. One is what ESA's Collet describes as an "act of faith" that manned space stations are the right way to go for Europe as well as the United States. The other is the fact that, as Gibson puts it, "the decision in most European countries is going to be wholly political."

Europe's space officials hope that a combination of the two will persuade ministers at the Rome meeting to dig deep enough in their pockets (the overall package they will discuss will require a 50 percent increase in the ESA budget by 1990) to signal that they are ready to think about space in a new way, not as a collection of individual projects but as an integrated technological enterprise.

—DAVID DICKSON

## Virgin Rain Forest Reprieved

Tropical biologists are jubilant over a \$1-million grant from the MacArthur Foundation that should enable a key tract of virgin rain forest to be preserved in Costa Rica. A 19,000-acre strip that rises from sea level to almost 10,000 feet up the slope of an extinct volcano, the tract contains an extraordinary diversity of wildlife. It is also believed to be the last strip of uninterrupted forest in Central America covering such a wide range of elevations.

Preservation of this strip is considered especially important because it links an existing national park at the top of the volcano with a tropical research station and biological preserve, known as La Selva, at sea level. It provides a route for the migration of birds and mammals, which move up and down the slope to take advantage of different flowering and fruiting seasons. Deforestation of the slope would not only cut off this migration but it would also irrevocably alter drainage patterns, which in turn would endanger the lower forest at La Selva.

John E. Corbally, the MacArthur Foundation's president, noted in a statement that the La Selva research station is considered "essential to the work of North American biologists." Most U.S. tropical biologists have trained or conducted research in the preserve, for example. "Because of the unique location of this land, between the sea and the top of the mountains, this particular site is one of the most productive and valuable biological research and conservation areas in the world," he said.

Three years ago, biologists launched a successful appeal for funds to purchase a buffer zone around the La Selva preserve to help protect it from human encroachment (*Science*, 4 December 1981, p. 1106). At the same time, the Costa Rican government designated the strip of forest between La Selva and a 25 square mile park at the top of the volcano, known as the Parque Nacional Braulio Carrillo, a protected zone.

Those who own the land in the protected zone have, however, put pressure on the government either to buy them out and turn the strip into a national park, or lift the restrictions. The purchase price is about \$2 million, a sum that the government could not find without draining resources from other conservation efforts. (Costa Rica has an outstanding record in conservation; in the past 10 years, it has set up a system of parks and reserves covering 8 percent of the country.)

The MacArthur Foundation has come to the rescue thanks largely to Murray Gell-Mann, of the California Institute of Technology, who won the Nobel Prize for theoretical work in particle physics. Gell-Mann, who says he was interested in the study of nature long before he was interested in physics, is chairman of the foundation's committee on world environment and resources. He heard about the efforts to preserve the tract of land and brought the matter to the attention of his committee, which voted unanimously to put up \$1 million toward the purchase price.

The grant has gone to the Nature Conservancy, an environmental organization based in Washington, D.C., which is a member of a consortium of groups that have agreed to raise the balance of the funds. The consortium, which consists of the World Wildlife Fund, the Organization for Tropical Studies—a collection of universities and research institutes in the United States and Costa Rica that operates the La Selva research station—the National Parks Foundation of Costa Rica, and the Costa Rican National Parks Service, also hopes to raise \$800,000 for an endowment fund to manage the preserve. The entire area will eventually be turned over to the Costa Rican government.

In addition to linking La Selva with the Braulio Carrillo park, the strip of forest is an ecologically rich area in its own right. A recent 2-week scientific expedition to the tract found that it contains an estimated 650 species of trees and 400 species of birds. Expedition members discovered at least 28 new plant species, and turned up 12 species that were previously not known to exist in Costa Rica. There was also evidence that several species of large mammals inhabit the area, including jaguars, monkeys, and tapir.

—COLIN NORMAN