

Europeans Clash Over Space Station

The ministers who oversee the European Space Agency meet next week in Toulouse, France, to strike a bargain on their participation in the space station program. So far, an agreement has proved elusive

More than a decade has gone by, many millions of dollars have been spent, and thousands of scientists and engineers have labored on the project. But not a single piece of European hardware has yet been built for the international space station. Nor does the European Space Agency (ESA) even have approval from its 14 member states to do so, as they have not been able to decide what should be built or how to divide up the bill. Now, with just 2 years to go before the first element of the space station is launched into orbit, there's no more time for delay. "If there is no decision, we will have a big difficulty in delivering hardware on time," says Jorg Feustel-Buechl, director of ESA's human space program.

Yet that is looming as a real possibility, just a week before the government ministers who oversee ESA meet in Toulouse, France, to agree on major parts of the organization's budget for the next 5 years. ESA officials hoped that the meeting would finally see an agreement on Europe's commitment to the station. But as *Science* went to press, Italy had reneged on an earlier commitment of funds, and government negotiators were struggling to hold the program together. ESA officials fear that if a decision is not made now, the other partners in the project—the United States, Canada, Japan, and Russia—will go ahead without them. "We will really miss the train," says Feustel-Buechl.

The fate of Europe's contribution to the orbiting platform is not the only thing at stake. The space station decision is part of a larger debate over the scope of ESA and its future mix of launcher development, engineering, and science programs. Each large member state has a different idea. Germany and Italy want a vibrant space station program, as their industries would largely build the hardware, while France is eager to continue modernizing the Ariane rocket fleet, which is largely French-built. The British, meanwhile, are criticizing ESA's science program and demanding major cuts (see box)—part of a growing pressure from member states for ESA to reform its management, trim its staff, and be tougher on industry in awarding contracts.

At a meeting in Munich last month to celebrate ESA's 20th birthday, Roy Gibson, a former director general of the agency, remarked dryly: "The European spirit has become rather diluted recently." In that context, the do-or-die decision about the space station is a test of the organization's ability to reach consensus.

Big plans

There was plenty of European spirit at the beginning. When U.S. President Ronald Reagan invited Europe to participate in the space station effort in 1984, ESA managers came up with an ambitious blueprint that would make Europe a formidable space power. Its main elements were the Hermes space-

plane, a small version of the shuttle which would give Europe independent access to the station, and two Columbus laboratory modules, one permanently attached to the station and the other a human-tended free-flyer orbiting separately from the station and serviced by Hermes. Just building the hardware alone would have cost more than \$6 billion.

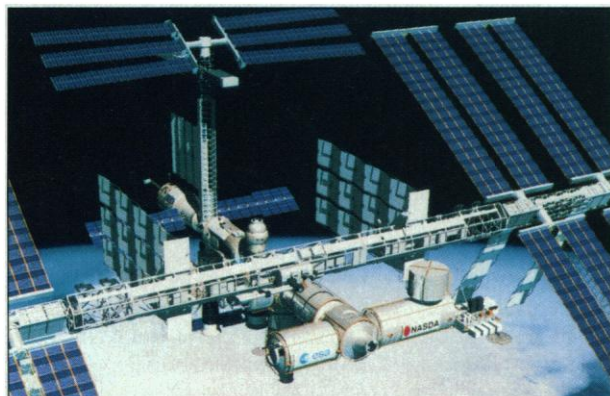
In the recession years of the early 1990s, however, European nations began to rethink their space budgets. When ministers convened at Granada in southern Spain in 1992, the knives were out: The free-flyer module and, most painfully for the French, the Hermes spaceplane were cut from the program. The plan that emerged consisted of three elements: a smaller attached Columbus module; the automatic transfer vehicle (ATV), a "space tug" which would carry payloads lofted into space by Europe's Ariane 5 rocket

to the station; and the crew return vehicle (CRV), an "escape pod" for the station crew, to be developed jointly with Russia. The ESA council, which is made up of delegations from each member country, was slated to approve this revamped plan in March. In late 1994, however, France and Germany demanded cuts on the order of \$2 billion from the total \$4.8 billion space station plan, a figure that includes both development and operations through 2003, when the station is completed. ESA's proposed solution was to drop the CRV from the program. But that proposal immediately ran into difficulties because it would have cost French jobs: French companies were pegged to take the leading role in ATV and CRV work.

The council deferred its decision until October. During the spring France proposed dropping Columbus—which would be built largely by German industry—and concentrating funds on the ATV and CRV. "The French were not turned on by Columbus," says Johan Bleeker, director of the Netherlands' National Space Research Institute. Their plan was seriously discussed, says Feustel-Buechl; in July France and Germany ordered ESA to make a detailed study of the two options. Dropping Columbus would, however, have had serious implications for space station partners outside ESA. The module would provide between 10% and 15% of the total laboratory space on the station, and half of the experiment racks in Columbus will go to U.S. researchers in exchange for the services provided by the U.S. parts of the station. U.S. and German officials say Columbus is Europe's "entrance card" into the space station project.

The council concluded in late August that dropping Columbus was not feasible, but they did abandon the CRV. "France and Germany have come to an agreement," says Bleeker. But France demanded concessions: first, that \$66 million be provided for continuing design studies on the CRV, and that Germany agree to support a program to continue development of the Ariane 5 rocket after its scheduled first launch next spring. "All things are linked," admits Feustel-Buechl. "There was an understanding between the two countries on both these elements."

Thus all seemed to be set for a decision at Toulouse—until Italy dropped a bombshell at the end of last month. Italian officials said



Hanging together. Lab modules from the United States, Europe, Japan, and Russia form the core of the planned international space station.

plane, a small version of the shuttle which would give Europe independent access to the station, and two Columbus laboratory modules, one permanently attached to the station and the other a human-tended free-flyer orbiting separately from the station and serviced by Hermes. Just building the hardware alone would have cost more than \$6 billion.

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U.K. Concerns Send Jitters Through ESA Space Science

The European Space Agency's (ESA's) science program is on the crest of a wave. Over the past 20 years it has launched around 17 missions without a single failure and currently has three missions—a total of six spacecraft—simultaneously being prepared for launch over the next few months. But the ESA science wave could be about to break on an immovable rock: the United Kingdom.

Next week, government ministers from ESA's 14 member nations will meet in Toulouse, France, to decide on the agency's budget for several programs, including science, over the next 5 years. ESA science program director Roger Bonnet is not asking for any extra money, just the same budget, about \$450 million per year, adjusted for inflation—roughly 4% annually. Most national delegations, in the run-up to the Toulouse meeting, seem quite content with this deal, although Germany wants a frozen budget without increases for inflation.

Not the United Kingdom. Citing its own budget problems and arguing that ESA needs to boost efficiency, it has stubbornly insisted that the program should be cut each year by 5%, for a total cut of 25% by 2000. "This would be the most dramatic decrease we could imagine. ... The program would be ruined," says Bonnet.

U.K. officials say they are in a bind. "Our lack of funding is acute," said Ken Pounds, chief executive of the U.K. Particle Physics and Astronomy Research Council (PPARC), at ESA's 20th birthday meeting in Munich, Germany, last month. The problem is that PPARC's budget is fixed, so if international program budgets continue to rise with inflation, it will have to cut domestic research—including funding for scientific instruments to fly on ESA missions. "The U.K. government is down on big science, and the squeeze has hit," says David Southwood of London's Imperial College, who is currently chair of ESA's influential Science Program Committee.

Indeed, signs of the squeeze were already evident last year, when PPARC was forced to pull out of supplying instruments for Integral, ESA's planned orbiting gamma-ray observatory—a mission British researchers helped to design. The move angered ESA partners and disappointed some British researchers. "It's like being a member of a golf club but not being able to afford

the green fees," says space scientist Mike Cruise of the University of Birmingham.

But Pounds argues that ESA could blunt the impact of any cuts by becoming more efficient. "It is vital for ESA to carry out its ambitious program, but like NASA [the U.S. National Aeronautics and Space Administration], it must find a cheaper way to carry out missions," says Pounds. He isn't the first to say so. Under pressure from its member states, ESA managers last fall invited the firms Andersen Consulting and Price Waterhouse to look at its management and accounting methods. The Andersen report, presented to ESA in the spring, criticized ESA's complex bureaucracy, the lack of competition in its procurement policy, and the huge infrastructure set up to handle an extensive human space flight program—a program that has been scaled back dramatically (see main text). Among its 14 recommendations: a 20% staff cut.

Southwood defends ESA's tendency to play it safe, and hence expensive, when designing spacecraft. "ESA missions have worked, and they serve a large community—success is more expensive. If you buy a car once every 20 years, what sort do you buy?" But Birmingham's Cruise concluded there is room for improvement after conducting an independent analysis of a proposed ESA mission called STEP, designed to test whether gravitational mass is identical to inertial mass. "I have a fair degree of confidence that you could take 10% from projects and ESA would still be OK. I'm not so sure about a 25% cut," he says.

As ESA's science program is mandatory for member countries, the budget decision at Toulouse has to be unanimous, and national officials interviewed by *Science* seem divided over what will happen. Some think delegates will compromise on Germany's zero-inflation option. Others favor an ESA proposal which would temporarily reduce the budget by up to 7.5% over the next 3 years. Whatever happens, most agree that the United Kingdom will have to moderate its stance. "The convoy can't wait for the slowest member," says Southwood. But when it moves science may not be riding as high as in the past.

—D.C.



Hot seat. ESA Director General Jean-Marie Luton faces opposition from Britain.

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they could not meet their \$400 million share of station costs. Italy's space agency, ASI, has been in a state of administrative chaos for some years and is heavily committed to a wide range of projects, including an independent contribution to the space station of a pressurized logistics module that would sit in the shuttle hold to carry supplies. Last month ASI declared that it wanted to pay just \$133 million in cash with an additional "in-kind" payment of extra work by Italian industry.

That arrangement would give Italian companies a far greater share of the work than Italy's financial contribution entitles it to—an arrangement unlikely to be palatable to other ESA partners. And Italy's cash shortfall, coupled with the reluctance of several smaller contributors to the space station program to meet their obligations, leaves the

total sum declared so far several hundred million dollars short of the \$1.86 billion space station budget proposed by ESA for the 5 years 1996 to 2000.

This budget confusion is making ESA's international partners twitchy, and station opponents in the United States like Representative Tim Roemer (D-IN) argue that Italy's proposal shows the program is falling apart. U.S. station supporters are upbeat publicly, but privately they are unhappy with Europe's jittery stance. White House officials in recent months have been urging European politicians to get on board quickly.

Ministers and government officials are now locked in negotiations to find a solution. But if a deal cannot be made, members of national delegations hint that France may cancel the meeting—or dissatisfied delega-

tions simply may not turn up, a situation that ESA dreads. "Opportunities will fade away. This is an important meeting for us," says Feustel-Buechl.

Given their huge investment in money and political chits, however, sources on both sides of the Atlantic say it is unlikely that European politicians will walk away from the space station effort. Such a move would infuriate their aerospace industries, damage European relations with the United States and Japan, and mark a clear retreat on a high-profile, high-technology program. And with the pressure on, the ministers may have run out of time-outs.

—Daniel Clery

With additional reporting by Robert Koenig in Berlin and Andrew Lawler in Washington.