NASA and ESRO: A European Payload for the Space Shuttle

During the years of the space boom that culminated in the Apollo moon landings, space cooperation between the Americans and the Western Europeans was limited to a respectable but modest scientific program, with the Europeans as very junior partners. This year, however, NASA and the European Space Research Organization (ESRO) have negotiated an agreement that gives nine European nations a substantial role in the next major American manned space venture. ESRO will provide a sophisticated space laboratory (Spacelab*) for use in the projected American orbiting space shuttle now scheduled to fly by the end of this decade.

The agreement reflects a significant change in the climate of space diplomacy. On the American side, the post-Apollo period has brought financial stringencies that have made NASA scale down its ambitions and take a more hospitable attitude toward overseas collaborators with money to contribute. NASA is very anxious to preserve continuity in its manned spaceflight program. And, in its agreement with ESRO, NASA thinks it has hit paydirt in two ways. First, Spacelab will represent a European contribution to the manned space program of something like $400 million. Second, the European decision to get aboard the shuttle project is likely to stiffen the commitment of Congress to funding the expensive shuttle program on the schedule now contemplated.

For the Europeans, the agreement could help end a long, inconclusive effort to find the right formula for both national and regional space programs. The Europeans have not been too unhappy with the performance of ESRO as a research organization, but the European Launcher Development Organization (ELDO) has been a source of technological embarrassment and political friction virtually since its establishment and has been moribund for several years. European space activities have depended to a large extent on bilateral agreements between the United States and either ESRO or the various European national space agencies.

For the last several years, it has been increasingly clear that if the Europeans wished to operate a significant space program they would have to choose between two main alternatives: to undertake a major project in collaboration with the United States or to put most of their chips on development of a genuinely big-league launch vehicle.

France has consistently been the strongest advocate of an independent launch capacity for Europe. West Germany has been most interested in cooperation with the United States, preferably in one of the manned spaceflight projects. The British, in part because of a lagging economy, have looked to the practical rewards of space research —in communications or navigation, for example—but since joining the European Economic Community, they have shown themselves much more amenable to big cooperative projects.

Spacelab as Catalyst

For a variety of reasons, the opportunity to take over the Spacelab project seems to have provided the catalyst that led Britain, France, Germany, and their associates in ESRO to arrive at a complicated compromise which seems to put the European space effort on a sounder footing than at any time in the past.

The Spacelab which the Europeans have agreed to build will be carried into orbit and back in the space shuttle's payload bay. In size and appearance, the shuttle will resemble a large jet airliner (*Science*, 28 January 1972). After being launched into space, the shuttle would be capable of missions in orbit lasting a week to a month and then of making a runway landing.

The Spacelab design calls for two elements. The first is a pressurized laboratory module in which scientists and engineers (probably 2 or 3 persons) will be able to work in shirt-sleeve conditions. The second is an instrument platform or "pallet" to support telescopes and other scientific equipment. This would be exposed to the space environment.

Spacelab will use the power sources and crew facilities of the shuttle, and the design will provide for ready access from the lab to the shuttle's crew compartments. The Spacelab will also have a spacelock to permit egress for "extravehicular activities."

As for personnel on Spacelab flights, the NASA-ESRO agreement specifies that the shuttle crew will be American but that the "payload specialists"—those who operate Spacelab in orbit—will be drawn from participating ESRO countries.

The cost of Spacelab, estimated at between $300 million and $400 million, will be borne entirely by the participating European countries. Under the agreement, ESRO will provide NASA with one "copy" of Spacelab for operational use. NASA is obligated to procure additional units from ESRO and undertake not to develop hardware of its own which would duplicate the functions of Spacelab.

Although the agreement seems to have pleased the signatories when it was concluded in September, prospects that the deal would finally come off appeared far from sure (*Science*, 9 March) right up to the last moment. The agreement was a product of 4 years of often delicate negotiations between Americans and Europeans and among Europeans themselves.

The Spacelab project was only one of four major elements in a compromise reached by the Europeans that made the NASA-ESRO agreement possible. Involved were three projects, each of which had a different major ESRO member as a backer; the fourth point was agreement on the formation of a new European Space Agency (ESA) to replace ESRO and ELDO and to provide better management of cooperative projects.

The three projects were (i) Spacelab, in which Germany demonstrated its interest by agreeing to pay over 50 percent of the costs. (ii) The L3S launch vehicle, the French entry in the compromise. The L3S will be capable of placing a payload of 700 to 800 kilograms in orbit. The French national space agency will manage the project, and France will pay about 60 percent of the cost, which is expected to exceed a half billion dollars. (iii) Marots, or maritime orbiting telescope satellite, a project for which the British have agreed to pay 60 percent of the estimated $90 million cost.

* Not to be confused with Skylab, a product of the Apollo program, which is now in Earth orbit.

The fate of the compromise remained in doubt almost until October because of uncertainty about an Italian contribution of $73 million which provided a kind of keystone to the financial arch. The collapsible condition of recent Italian governments has caused the wobble, but the Italians came through with their commitment and the compromise held.

The percentage of the costs of Spacelab, currently estimated at $370 million, will be absorbed by the participating ESRO members as follows:

Germany	52.55 percent
Italy	18 percent
France	10 percent
United Kingdom	6.3 percent
Belgium	4.2 percent
Spain	2.8 percent
Netherlands	2.1 percent
Denmark	1.5 percent
Switzerland	1 percent

Sweden is a member of ESRO and will participate in the L3S and Marots projects, but chose to finesse the Spacelab opportunity. The decision is attributed at least in part to the coolness between the United States and Sweden that is a legacy of the Vietnam war.

Informed observers feel that crucial elements in the ESRO package deal were German enthusiasm for cooperating with the United States in a major manned spaceflight program and British willingness to go along on European projects after joining the European Community. The key action on Spacelab probably occurred late last year when the French were still unenchanted with the idea of the Spacelab project and the Germans let it be known that they and some others were prepared to take up the NASA offer without France. The French then conceded, apparently in order to get German cooperation with the L3S. The operative understanding in ESRO has been and still is that a country can expect to be awarded contracts roughly in proportion to the funds its provides for a project.

It should be noted that in the Spacelab courtship, the Europeans have seen the United States at times as a difficult suiter. The chronology goes back to 1969 and the euphoric period just after the first manned landing on the moon. NASA officials toured Europe, and, not oblivious to the prospect of reducing costs, offered the Europeans a chance to participate in what was then an ambitious post-Apollo program. NASA was then thinking not only of the shuttle, but of a complementary space "tug" and space station. The tug would have been transported into orbit and then deployed to do odd jobs such as launching and servicing experiments in space. The space station would have been a sophisticated, permanent manned orbiting platform which would have given the United States a "presence" in space.

The history is tortuous, but some Europeans, particularly in the press and in industry, criticized the Americans for offering and then withdrawing opportunities for participation on major hardware programs. (The tug, for example, was scrubbed as a "participatory possibility" after the Europeans had spent time and money on technical studies.) The explanation from the American side, in general, was that cutbacks in the U.S. space program, the technological unsuitability of some things ESRO wanted to do, and the missing of deadlines by the Europeans caused the difficulties. From the European side, NASA was seen as having a fixation on keeping complete control of management and as adamant about keeping American dollars at home.

Despite the frictions, Spacelab is a testimonial to patience and skillful diplomacy. And the result is due not only to the big power partners. Belgian science minister Charles Hainan, for example, is credited with navigating the compromise through potentially fatal straits in the European Space Conference in August.

Internationalization, then, appears to be an important feature of NASA's new look in the post-Apollo era. With Spacelab, NASA has had a triple incentive—economic, diplomatic, and scientific. In the case of the Apollo-Soyuz Test Project, the rendezvous and docking experiment scheduled for 1975, the main reward would appear to be a demonstration of détente in space.

No one expects that the typical space crew of the near future will be a multinational mixture of Earthmen, but it is evident that events have tempered the space nationalism of the 1960's.

—JOHN WALSH

Court Restores Training Money

The U.S. government acted unlawfully when it impounded funds for biomedical research training grants, according to a 26 October ruling by the U.S. District Court for the District of Columbia. The Department of Health, Education, and Welfare has until 15 November to release about $111 million that Congress appropriated for the National Institutes of Health training grant and fellowship programs for fiscal year 1973, which ended 30 June.

The ruling, by Judge George L. Hart, Jr., came in a case brought by the Association of American Medical Colleges (AAMC) against HEW Secretary Caspar Weinberger. At the same time, Hart ruled in another AAMC suit against HEW involving impounded funds for "special projects" in medical schools, including support for increased enrollments generally and for women and disadvantaged persons in particular. In this case, Hart ordered the release of about $29 million.

These two suits are among approximately 50 that have been filed to force the government to release impounded funds. Among them was a successful suit against the Office of Education for the release of $25 million earmarked by Congress for Vietnam veterans (*Science*, 27 April). But the full impact of these suits is not yet entirely clear.

In his decision in the AAMC suit, Hart stated that the money in question had been ordered to be spent by Congress and that "the failure to obligate same by the Secretary was illegal." But his order that the money be released within 20 days has proved a source of some confusion because the government has 60 days to file an appeal. What AAMC officials want to know is this: What happens if money is actually released on 15 November and turned over for training and special projects—and then the government appeals and wins? Could schools be forced to give the money back? It is not certain; the best guess, though, is that the government would have a hard time getting it. Nor is it certain that the government will appeal—in many recent cases it has not. For the moment, all one can do is wait and see.—B.J.C.