

Open row about joint space project

European space agency plans protest

Washington

Western European nations have agreed to organize a top-level protest to the US State Department at the proposal of the National Aeronautics and Space Administration (NASA) to withdraw its spacecraft from the International Solar Polar Mission.

The mission, under which two spacecraft would be flown simultaneously over opposite poles of the Sun, is being organized jointly by NASA and the European Space Agency. Originally each agency was to have supplied one of the spacecraft, the two being launched from the space shuttle in 1985. NASA has now decided to absorb some of the massive cuts in its space science programme required by the Reagan Administration by terminating the work on its own spacecraft. It would still provide support facilities for the European spacecraft if the European Space Agency decided to press on alone.

The European agency issued a strongly-worded statement last week saying that it considered NASA's actions to be a unilateral infringement of the memorandum of understanding signed between the two countries, and warning that it could have severe consequences for future cooperation in space research between Europe and the United States. Now several countries, including France, West Germany, Italy and the United Kingdom, have agreed to make a joint protest to the State Department, hoping that NASA can be persuaded to change its mind. Without the participation of the US spacecraft, which would have provided the first opportunity to study a star at close hand, the value of the mission will be severely limited.

Within NASA, however, officials have little hope that the proposed cuts will be reversed, since next to the space shuttle programme NASA's top priority has been to keep intact its two main space science projects, the space telescope and the Galileo mission to Jupiter.

NASA officials have stressed the importance they attach to maintaining links with European colleagues, as both acting deputy director Anthony Calio and the director of the Goddard Space Flight Center, Dr A. Thomas Young, pointed out when Mrs Margaret Thatcher visited the centre during her visit to Washington last week.

However, NASA has had to take some hard decisions itself, and apparently decided that the cancellation of its share in the solar mission was the least of several evils. On the other hand, the deferral of the

gamma-ray observatory and of the Venus Orbiting Imaging Radar have been demanded by the White House.

NASA has now been asked by the Office of Management and Budget (OMB) to make even more cuts in its next year's budget, following the discovery that the size of the required federal budget cut had been underestimated. Although it is not known where these most recent cuts will fall, one rumour is that funding for astrophysics experiments on the second Spacelab will be withdrawn, a decision which would particularly hit British scientists.

When rumours began to circulate in Washington last month that OMB was proposing to scrap Galileo, West Germany — which is developing several of the instruments to be flown on both the orbiter and the probe and is contributing about \$50 million to the cost of the mission — protested strongly to Secretary of State Alexander Haig. Mr Haig's subsequent intervention with OMB is said to have contributed significantly to the decision not to terminate the project.

No mention was made at that time of a possible threat to the solar polar mission. NASA was given its total required budget cut but left to decide where the cuts would fall. Cancelling the solar polar mission spacecraft would save between \$250 and \$300 million total costs over the next eight or nine years.

Gloom at prospect of cancellation

Officials at the European Space Agency (ESA) are too upset by the decision by the National Aeronautics and Space Administration (NASA) to ditch its solar-polar spacecraft to talk about contingency plans, preferring to await the results of diplomatic efforts to get the decision reversed before 10 March when the federal budget goes to Congress and after which changes cannot be made. Nevertheless it is almost certain that, if it has to, ESA will go it alone, having already invested too much in the mission to abandon it.

The European Space Agency council meets this Thursday (5 March) to decide on its reaction to the US moves. There is still a chance that some of the US instrumentation could be transferred to the European craft, although European experiments on the US craft would be given higher priority. The agency could equally well decide that, without full US participation, the mission is not worth pursuing, a decision which would severely disrupt its space science budget.

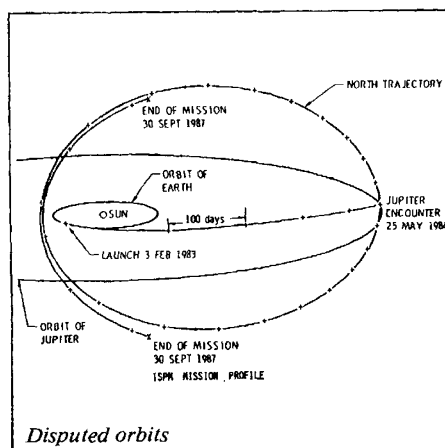
NASA's final proposals are expected to be announced next week, when Mr Reagan gives Congress a detailed list of his proposed budget reductions. There will undoubtedly be some opposition in Congress if the mission remains among the proposed cuts. Senator Jack Schmitt, an ex-astronaut and now chairman of the science and space subcommittee of the Senate Commerce Committee, said last week that he was very concerned that the decision could jeopardize future cooperation, particularly at a time when Europe seemed to be moving ahead of the United States in some areas of space technology.

But, as a loyal supporter of Mr Reagan, Mr Schmitt said he also acknowledged that there was a need to make substantial cuts in federal spending to restimulate the economy — and that space science, together with other research areas, would have to accept its fair share. **David Dickson**

The International Solar Polar Mission was originally conceived as a two-spacecraft mission that would observe dynamic and variable phenomena at high solar latitudes. The spacecrafts' journey round Jupiter would also provide the first opportunity for spatially and temporally resolved measurements of Jupiter's magnetosphere. Some of the experiments to be flown on the two spacecraft would be identical but others would complement each other.

A decision to abandon the NASA spacecraft would mean that spatial and temporal resolution could be achieved less adequately only by comparison with simultaneous observations from the Earth. In all probability, it would also mean that the NASA spacecraft's ability to make optical measurements of the Sun's surface — unlike the ESA spacecraft, it has a pointing device — would be lost.

Each spacecraft is to house some of the other partner's experiments. It is thought unlikely, because of commitments already made, that the experiments to be flown on the ESA spacecraft could be changed at this late stage. Fortunately NASA has said that it will continue support of its experiments to be flown on ESA's craft. That, however, begs questions of the



future of European experiments for the NASA vehicle. According to ESA, work on those experiments is already well advanced and substantial sums of money, which will have been spent in vain if NASA's decision stands, have already been committed. The total cost to completion of the two spacecraft is an estimated \$140 million, \$100 million of which is already accounted for.

Judy Redfean

European fusion

JET's ambition

JET, the joint European tokamak nuclear fusion experiment, may cost another 400 million European units of account (EUA) (£216 million) if first the JET Council — which oversees the project — and then the European Commission agree. The money would be spent over five years, beginning in 1982, and would extend JET to its full design performance, including bulk ignition of a deuterium-tritium plasma. "If they want the results, they'll have to pay" said Dr Hans-Otto Wüster, director of JET, of the European governments last week.

The original cost of basic JET was 185 million EUA at January 1977 prices. Inflation in Britain, coupled with the strength of the pound sterling and a serious underestimate of the cost of diagnostic equipment, has pushed that basic price to something nearer 300 million EUA; but even so the proposed extension would more than double the total cost. Dr Wüster, however, points out that the extra cost is only twice the annual budget of the CERN laboratory in Geneva.

The rush to extend JET is occasioned by two factors. First, machines like JET seem to have a better chance of reaching ignition, the nuclear burning of the plasma, than when they were designed in the early 1970s. Second, the European Council of Ministers has asked for a proposal for fusion research in Europe for the next five-year period, 1982–86, by 1 July this year.

Competition with the United States is also in mind. Princeton's Tokamak Fusion Test Reactor is due to begin experiments in 1982, and the somewhat larger JET in early

1983. Princeton is being pushed hard by the US Department of Energy to try ignition early. If all went well, JET's initial non-nuclear plasma experiments would then look pretty tame. On the other hand, if either laboratory is too hasty in introducing radioactive tritium, repeating early experiments will be very difficult, requiring remote handling and radiation protection.

Important plasma physics problems remain to be solved. Present optimism arises because two predicted limits on plasma containment have not been observed in existing small tokamaks. "Trapped particle instabilities" were expected to set in at temperatures above 30 million K, but the smaller Princeton tokamak has reached 70 million K without seeing them. And the ratio of plasma pressure to magnetic pressure was thought to be limited to about 1 per cent, but values of 8–9 per cent have been reached. While experimentally encouraging, these results are theoretically puzzling, so the JET and Tokamak Fusion Test Reactor regions may still hold surprises.

Dr Wüster is therefore cautious, offering 3–4 years of plasma at JET before attempting ignition around 1987. But the bulk of the spending on "extended performance" would have to be undertaken in 1982–86. In January, the JET Council gave Wüster a 400 million EUA guideline for the extended performance, and asked him to say what he could do with that. If, this month, his proposals are adopted, it will be for the European Commission to consider whether to include it as part of the 1982–86 research programme.

Conflicts between the interests of the national laboratories and money-hungry JET seem likely to be resolved at JET Council level; but the commission must also test the interest of governments, for which reason it has set up a new committee — the Consultative Committee for Fusion Programmes — which will be dominated by the representatives of government departments from whose coffers the money must ultimately be found.

The commission has also established an expert panel, the European Fusion Review Panel, to make recommendations for a long-term programme, beyond the present generation of machines. This panel will also report to the commission before July, in time to influence the final commission proposal.

One question to be dealt with is whether Europe is wise to commit itself so heavily to one design of fusion device, the tokamak. In the United States, there is also substantial work on the potentially simpler magnetic mirror confinement and inertial confinement. Wüster says that it makes sense to push ahead with the device that will most quickly yield ignition, so as to win practical experience of the problems of operating fusion reactors of all types. We shall see whether the European Fusion Review Panel agrees with him.

Robert Walgate

United States budget

More cuts

Washington

True to its political convictions, when full details of its proposed budget cuts are announced next week, the Reagan Administration is expected to eliminate virtually all the federally sponsored programmes initiated by President Carter to stimulate innovation in private industry.

President Carter's initiatives were the result of a broad-ranging, eighteen-month study largely instigated by the Office of Science and Technology Policy. Recommendations were made by eight independent advisory committees, and submitted to the White House with proposals from individual federal agencies.

From these, a package of 32 proposals was eventually accepted and announced by Mr Carter in November 1979. Although criticized at the time for not going far enough, it was generally agreed that the proposals made up a modest set of experimental and exploratory approaches aimed at bringing industry, government and the universities closer together.

The interventionist approach which the new programmes embodied, however, has found little sympathy with the new Administration, which sees its principal strategy for stimulating innovation as improving the financial incentives for investment, not direct federal participation.

The Administration will therefore be expected to drop support for any future co-operative generic technology centres, even though specific legislation setting up these centres was approved by Congress last year, and \$5 million allocated to their support (*Nature* 286, 195; 1980). From the three centres initially proposed, only one, in Detroit, is likely to survive as plans were agreed before the election, although even this is uncertain since it will depend on the centre's ability to raise matching funds from industry.

Other projects previously under development in the Commerce Department and now expected to be phased out include proposals to establish state-based Corporations for Innovation Development to help entrepreneurs gain access to investment capital, and the new Office of Technology Strategy and Evaluation.

It is also rumoured that the new Administration may not seek a successor to Dr Baruch, who as Assistant Secretary for Productivity Technology and Innovation was responsible for science and technology programmes within the department. This would be opposed by Congress, which spent much time last year discussing the Carter Administration's initiatives, and supported their general thrust.

Another of Mr Carter's initiatives which will be overruled is the Co-operative Automotive Research Project (CARP), originally proposed by Transportation Secretary Mr Brock Adams as a means of

JET upgraded

The extension of JET to full design performance would involve increased magnetic confinement fields, additional heating of the plasma, facilities for storing and handling tritium, and remote handling equipment for experiments. Specifically, the peak toroidal field coil power would be increased from 250 MW to 380 MW; total magnetic field at plasma centre 27.7 kG to 34.5 kG; plasma current from 3.8 MA to 4.8 MA; and additional heating power from 4–10 MW to 25 MW.

Robert Walgate