

## No strategy for Space Station

Washington

RECENT criticism of the National Aeronautics and Space Administration (NASA) for its lack of long-term strategy continued this week with the publication of a report, by a committee of the National Research Council (NRC), on the Space Station programme. Although the report commends NASA's plan for the initial phase of the project as an appropriate first step, it finds the proposed second phase poorly thought out, and that deployment using the space shuttle, in its presently anticipated design, has serious limitations.

Phase I of the space station is a long boom, with laboratory and habitation modules in the centre and solar arrays at each end. It will provide a 'microgravity' laboratory for materials science and biology experiments, and the NRC committee pronounced it a reasonable way of achieving its intended aims. But Phase II, which adds a servicing facility and side booms to accommodate scientific instruments, does not "reflect the right priorities for space station evolution". Its equatorial orbit makes the space station a poor platform for Earth observation, and for astronomy free-flying spacecraft are preferable. The servicing facility will be useful for a new generation of large orbiting structures, but insufficient for making the space station into a stepping-stone for manned lunar or planetary missions.

A more immediate worry is simply getting the space station aloft. The shuttle will, according to NASA, put the first payloads into an orbit about 150 miles high, where atmospheric drag will bring an unpowered vehicle down in only 20 days. Any failure of the reboost system during assembly would be catastrophic. Possible remedies are reduction in weight of the first payloads or, in the longer term, use of a more powerful shuttle or a new heavy-lift vehicle.

The report finds NASA's accounting of the test and safety procedures inadequate, and that extra costs of up to \$4,700 million could arise in the provision of prototype and backup hardware.

The committee stresses that recent experience has taught that space programmes cannot be done 'on the cheap'; testing should not be skimmed, and other space science activities should not be straitjacketed to conform to the limitations of the space station programme. Throughout the report is an underlying theme that NASA lacks a coherent strategy, and the committee recommends that before going too far with this, or any other big project, there should be a clarification of the long-term goals of the US space programme. **David Lindley**

## UK remote sensing programme latest victim of cutbacks

London

AMID rumours that the British government may be preparing to soften its stance on the question of space funding, scientists from the Natural Environment Research Council (NERC) in London last week to publicise the potential applications of the emerging technology of remote sensing — the use of satellites to observe the Earth from space. Such possible applications, says NERC, range from the prediction of drought and the control of locusts to vegetation and urbanization monitoring.

For the British National Space Centre (BNSC), which coordinates civil space research in Britain, remote sensing is a priority. Of BNSC's £80 million contribution to the European Space Agency, ESA, £22 million goes on remote sensing. A further £14 million is spent domestically, mostly on the Royal Aircraft Establishment (RAE) at Farnborough, since 1980 the home of the national remote sensing centre.

In mid-1990, ESA is due to launch its first remote-sensing satellite, ERS-1, which will have a projected lifespan of three years, after which a successor, ERS-2, will replace it. To use the information supplied by the ERS satellites, an ERS data centre is to be set up at the RAE. When the government announced in July that there would be no new money for the national space plan (see *Nature* 328, 467; 1987), a decision that prompted the resignation of BNSC's director-general, Roy Gibson (see *Nature* 328, 565; 1987), one aspect that was largely overlooked during the ensuing debate was the future of the ERS data centre.

The research teams charged with identifying the sorts of systems needed fully to exploit the ERS data originally calculated that £17 million of government funds (ESA is to supply £3 million) would be required before the launch of ERS-1. It seems that BNSC can now afford to provide only £4 million annually for the next five years, allowing a total of only £8 million for the pre-launch facilities. This reduced rate of funding has forced RAE to reconsider its priorities. Many data products with potential commercial applications will have to be shelved.

Part of the centre will comprise a processing and archiving facility, primarily for ESA's use. The Department of Trade and Industry, BNSC's parent body, has in the past made it clear that it would like to see such a facility made available to UK users. Without the extra money, priority will be given to ESA.

Because the money for the data centre will not be forthcoming until next April,

the teams of scientists responsible for laying the groundwork, employed by RAE on a contract basis, are in danger of breaking up. The product support team's present contract expires in October. If it cannot be renewed until April, it is likely that several of the team members will be redeployed, possibly irretrievably.

The space community in Britain has not yet given up hope. Last month the government gave BNSC an extra £4 million, having a month earlier said that no new money was available. There is a feeling that the government may further relent after next month's meeting of the newly formed Advisory Council for Science and Technology. **Simon Hadlington**

## Deep-ocean disposal plans jettisoned

London

MEMBER governments of the Paris-based Nuclear Energy Agency (NEA) have discontinued a five-year research programme aimed at proving the feasibility of disposing of high-level radioactive wastes in deep-ocean sediments and even crystal rocks. The governments, all members of the Organization for Economic Cooperation and Development (OECD), of which NEA is an off-shoot, say that deep-ocean disposal is too far in the future for further research to be justified.

Jean-Pierre Olivier, head of waste disposal at OECD, says that much of the work of NEA's Seabed Working Group is "very exciting", but is now pessimistic about continued research because of "difficulties on a political level". Among the schemes investigated are sinking projectiles laden with waste into ocean sediments and the deeper burial of wastes in boreholes.

Reactions are typified by those of the British government, where high-level wastes are soon to be vitrified and stored at land sites for 50 years. The chief inspector of radiation pollution, Dr Frank Feates, at the Department of the Environment, asks whether more research is needed "when the reports will sit on the shelf for 50 years".

The ending of the programme has nevertheless catalysed a financial crisis at British oceanographic laboratories. The Institute of Oceanographic Sciences, which earned £1.6 million a year from the deep-ocean programme, is unclear whether it should have anticipated the ending of this contract last March (see *Nature* 326, 96; 1987), but the Department of the Environment believes it more likely that the news did not get through clearly enough when budgets were being drawn up.

Kathy Johnston