

The one potential casualty, the National Oceanic Satellite System (NOSS) — the proposed successor to the SEASAT satellite — will receive an extra \$6.4 million through the research budget of the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). NOAA has also received an additional \$1 million for manned undersea facilities, but had \$2 million for acid rain research cut from its budget.

In biomedical research, Congress has rejected proposals from both the House and the Senate for greater supervision of NIH. A bill continuing authorization for the National Cancer Institute and the National Heart, Lung and Blood Institute was passed on 5 December without either the provision for a Presidential Commission on biomedical research priorities, proposed by Senator Edward Kennedy, or controversial new authorizing legislation for the remaining nine research institutes which had been proposed by Representative Henry Waxman.

Cuts in the Defense Department's proposed research programme could set back the growth of ties between the military and universities that have been developing over the past four years, according to Pentagon officials, who warned that in particular proposed new programmes for the Department of the Army may have to be cut back.

Nor will the Defense Department be receiving the hoped-for funds to construct a new production facility for binary chemical weapons. This was deleted by members of the Senate from next year's appropriations bill, on the grounds that if the United States is to resume chemical weapons production, this should be a presidential not a congressional decision.

David Dickson

Nuclear safety

European hazards

Brussels

European nuclear power stations are not as vulnerable to operational errors as the one involved in the accident at Three Mile Island, but there is plenty of room for improvement in safety measures in nuclear power stations in the European Economic Community. This conclusion comes from a report submitted to the European Commission's Interdepartmental Coordinating Committee on Nuclear Safety (CCNS). Many of the report's proposals are disputed by the committee in an accompanying reply.

The report comes from a four-man group set up by the European Commission after the Three Mile Island incident. The members of the group were H. Dunster, Deputy Director General of the UK Health and Safety Executive, Professor Latzko of the Technische Hogeschool Delft, Professor Smidt of the Institut für Reaktor Technik der Universität Karlsruhe, and Mr

S. Villani, Director General of the community's Joint Research Centre.

Conditions similar to those which led to the Three Mile Island accident have occurred on several occasions in Europe — the report criticizes the fact that these went almost unnoticed, and calls for a data bank recording all abnormal events in European nuclear power stations.

The siting of nuclear power stations is becoming increasingly politically sensitive in Europe. The report stresses that siting has only a limited part to play in protecting the population, but that there should be a consistent approach among member states to siting nuclear plants, especially in areas close to national borders.

The group also considers that more should be done to minimize the effects of any accidents that may occur: the Commission should study the emergency procedures operating in the various member states, there should be a review of the emergency plans made by the power station operating organizations before they are licenced to operate, and more attention should be given to ways of keeping the public informed in the event of an accident.

The European Commission is criticized for not responding rapidly enough to changing nuclear research needs, for setting up cumbersome committees, and for providing those committees with inadequate technical and administrative services.

According to the Interdepartmental Coordinating Committee, many of the recommendations in the report actually tie in with actions already taken by the Commission, or actions already under consideration. But the rather half-hearted attitude towards nuclear power expressed in the report is not welcomed by the committee. The report says: "no amount of care will totally eliminate the risks of this (nuclear), or any other sort of energy . . . (but) . . . we are finally led to the belief that nuclear sources should continue to play a significant part in the supply of Europe's energy."

Jasper Becker

Fast reactors

Low morale

Staff morale may be as much a threat to the British fast reactor programme as the prospect of a public inquiry on the project. The latest sign of this is the resignation of Mr Jack Moore, coordinator of the fast reactor programme at the UK Atomic Energy Authority (UKAEA), at the end of the year. Mr Moore, who is 57, is leaving to take up a post with Motor Columbus engineering consultants in Switzerland. He said earlier this week that at UKAEA he was unlikely to see his work of the past seven years come to fruition before his retirement.

Mr Moore's resignation highlights two potential problems for the staffing policy of the fast reactor team. Although no other

senior staff are reported to be leaving, further delay in a commitment to build a fast reactor may prompt others to go. The second problem is that of the age structure of the design team. Although the UKAEA has been expanding the team by bringing in young people, previous recruitment policies have left a noticeable dearth of people in their forties. When the senior staff retire or leave, their posts will have to be filled by much younger people.

A government statement on the commercial demonstration fast reactor has been expected since the summer. Sir John Hill, chairman of the authority until the end of the year, submitted a proposal to the government a year ago. Mr Moore expects that the government will respond shortly but that it will not make a final decision at this stage. One complication is that the government has not yet responded to the French proposal that Britain should buy into commercial exploitation of Super-Phénix.

Meanwhile, the Nuclear Power Company is nearing the completion of a detailed design study, which Mr Moore claims will be superior to current French and Russian designs. The UKAEA would like to submit it to the Central Electricity Generating Board and potential reactor manufacturers so that a site could be chosen and a total project proposal put to the government.

Judy Redfern

Satellite communications

Free for all ahead?

Washington

While the future of US remote-sensing satellites remains entangled in controversy (see *Nature* 14 August), the use of telecommunications satellites is poised for a dramatic expansion.

The Federal Communications Commission (FCC) in Washington has given permission for the launching of 20 new domestic communications satellites, which are likely to increase the capacity of the present system by a factor of four by the mid-1980s.

At least one newspaper company is discussing plans for a nationwide system of locally-produced newspapers linked by satellite, while the Communications Satellite Corporation (Comsat), which owns three of the nine communications satellites at present in orbit, has proposed starting a four-satellite system beaming television programmes directly to private homes within the next few years.

FCC approval for the authorization of the new satellite launches was given unanimously, part of what commission chairman Charles Ferris described as an "open-entry policy" to provide satellite capacity to all who want it.

A separate report prepared by commission staff, for example, has recommended that direct-broadcast satellite television services should be subject to the minimum of regulation, in

the light of competitive pressures from conventional television stations and cable television networks.

The commission is also expected to publish for comment a proposal for squeezing more domestic satellites into geosynchronous orbits, perhaps by reducing the separation of higher-frequency satellites from four to three degrees of longitude.

Such a change, says FCC, would allow the launch of an additional six satellites which had been promised to the commission, but which could not be authorized because of the shortage of available slots.

The launch of the 20 new satellites is likely to result in an increase from 160 to 612 in the number of satellite communications channels available by 1985. Each channel can transmit 1,000 telephone channels or a single television channel.

The new satellites will also create the first major challenge to the giant American Telephone and Telegraph Company (AT&T) in the field of long-distance communication. Two competing companies — General Telephone and Electronics Corporation and the Continental Telephone Corporation — are building their own satellites. AT&T, General Telephone, Southern Pacific Communications Corporation and Hughes Communications will each be constructing their systems for the first time, each having been given permission to build three satellites and launch two.

Local newspaper production could be revolutionized by plans that the Gannett Company is said to be developing for a national newspaper produced in Washington, but beamed to the presses of some of Gannett's 82 local newspapers.

Satellite transmission is already used by the *Wall Street Journal* to print seven editions simultaneously throughout the country. Although no official confirmation has been given of Gannett's plans, it is reported that the initial investment would be about \$100 million; some commentators have pointed out that setting up a single newspaper distributed throughout the country would provide Gannett with the opportunity to become a major voice in national affairs.

Comsat's plans for a satellite-based television network are included in a set of comments which the company has submitted to FCC as part of its preparations for the Region 2 Administrative Radio Conference of the International Telecommunications Union, due to be held in the summer of 1983.

Four satellites would be used to cover the United States, each covering a different time zone, with the most westerly satellite also broadcasting to Hawaii and Alaska. The service would be operated by Satellite Television Corporation, a newly-created subsidiary of Comsat. The market for direct-broadcast satellites is expected to be tested with the modification of two existing spacecraft designs. **David Dickson**

Ariane development

More trouble

Ground tests of the principal rocket motors of Ariane, putative launch vehicle of the European Space Agency (ESA), have shown brand-new oscillations in the burn — and set the test programme back by a second three months.

Ariane's first test launch in late 1979 reached the planned trajectory, but the second — in May 1980 — ended moments after lift-off with a high frequency oscillation and loss of pressure in one of the first stage engines. A look back at the data for the first launch showed the same oscillation, but at low amplitude; and a re-run of the data accumulated during ground tests showed the same fault.

In October this year, ESA announced that the oscillations (at 2,300 Hz) could be cured by improving tolerances in the manufacture of the injectors, devices like a watering-can rose that mix the fuel and oxidant. This hypothesis will be tested at the end of this month, when new high precision injectors are tried for the first time. Meanwhile a new oscillation has appeared — at 2,700 Hz — and this sets in even with injectors that previously showed no sign of the vibration. While the 2,300 Hz problem "can be regarded as rectified" says ESA hopefully, the 2,700 Hz oscillation "is the subject of thorough investigation and action which still needs some time to complete".

Burn oscillations (called "buzz" or "screaming") are the *bête noire* of liquid fuel engine design and can destroy the engine if they reach high amplitude. One solution is completely to redesign the injector; another is to set Helmholtz resonators, tuned to the critical frequency, into the side of the combustion chamber in such a way as to absorb the oscillation energy.

Solutions such as this, however, verge on complete redesign of the engine — but this may be necessary in the end. The engines were originally designed for the French sounding rocket Diamant (in which similar instabilities were met and solved), but they

were stretched to the limit to meet Ariane's specification of 61 tonnes-weight thrust. The next series of engines, for a bigger Ariane, is based on a different design.

So it is seriously being questioned whether Ariane can meet its first commercial commitments: to launch the French MARECS B and SERIO 2 marine communications and meteorological satellites (which would go up together) and Intelsat V F6. These satellites, and the ESA X-ray astronomy satellite EXOSAT, were originally due for launch in 1981.

For the moment, ESA hopes to have the third test launch in June 1981, and the fourth in the autumn, beginning the commercial series later in the year. If, however, as some fear, the Ariane engines are inherently "marginal", redesign and retesting could take at least a year, and lucrative launch contracts might be lost to American competition. The lead that Ariane appeared to be establishing over the space shuttle — beset by its own problems but now believed to be running smoothly — is narrowing fast. **Robert Walgate**

Halley missions

NASA to go?

Washington

Can the new US Administration be embarrassed into mounting a mission to Halley's comet when it passes through the Solar System in 1986? The proposal has already been passed to president-elect Ronald Reagan from scientists in his home state of California. They point out that the European Space Agency, the Soviet Union and Japan all have plans for separate Halley missions — and that for the United States not also to go would be a major blow to national prestige.

Revised plans for a Halley fly-by were developed earlier this year at the Jet Propulsion Laboratory (JPL) in Pasadena, run for the National Aeronautics and Space Administration (NASA) by the California Institute of Technology (Caltech). Following last year's rejection by the White House of a request for funds to develop an ion-drive — for which money

Beyond Saturn

Saturn, as seen by Voyager 1 on 16 November, four days after the encounter. Some of the dark spoke-like ring features (*Nature* 4 December) are seen as bright patches due to scattering of sunlight from particles within them. Voyager 1 will be monitored to as great a distance as possible in an attempt to detect the boundary between interplanetary and interstellar space, where the "solar wind" becomes undetectable. Voyager 2 will reach Saturn on 25 August 1981, Uranus in 1986 and Neptune in 1989.

