

Management and Budget and Reagan's chief of staff, Donald Regan, are said to be opposed.

Even though it is going to rely more heavily on expendable rockets, the Air Force is supporting NASA in its bid for a new orbiter. Indeed, the plan to open the Vandenberg facility in 1992 is based in part on the expectation that a fourth orbiter would be available by then.

The Air Force plan involves the following steps:

- A total of 23 modified Titan rockets will be procured over the next 5 years to launch heavy payloads. Two years ago, after a long struggle with NASA, the Air Force gained approval to buy 10 of these rockets; it is now buying an additional 13.

- At least 12 new rockets, called medium launch vehicles, will be purchased to launch navigation satellites, beginning in 1989. These rockets will be similar in capacity to the European Ariane rocket, and the Air Force order is expected to stimulate additional production of the vehicle for private commercial launches. In fact, the Air Force is requiring companies that bid for the contract to build the rocket to draw up plans to produce a variant capable of launching commercial satellites.

- The capacity of both the Kennedy Space Center in Florida and the Vandenberg base to launch the new Titan rockets will be upgraded. A total of four flights a year from Kennedy and two from Vandenberg are planned by the late 1980's.

- In future all critical payloads will be capable of being launched either on the shuttle or on unmanned rockets. Aldridge, who describes decisions in the late 1970's to rely exclusively on the shuttle as "a major mistake," says the Air Force will no longer "be dependent on a single launch vehicle."

Aldridge predicts that the Air Force will not recover completely from the shuttle disaster and the recent failures of Titan and delta rockets until the early to mid-1990's. He says that by the time the shuttle starts flying again, the Defense Department will have 21 payloads "sitting on the ground waiting to fly."

The cost will be enormous. In addition to the \$2.6 billion required for the Air Force program, NASA will require at least \$500 million to fix the problems with the shuttle—whether or not it gets approval for a replacement orbiter.

And these costs will not end once the recovery period is finished. Aldridge says that the Defense Department will require some five or six launches of the heavy-lift Titans, four of the medium launch vehicles, and two of the smaller Titan II's every year in the early 1990's. ■ COLIN NORMAN

Research Fares Well in New French Budget

Paris

France's conservative government has announced that it plans to boost spending for civilian research by 5.8% in 1987. Allowing for inflation, this is currently predicted to allow a real growth in research spending of almost 3%. The increase contrasts sharply with the 8% cut in the 1986 budget, which was imposed by the Ministry of Finances soon after the government took over from its socialist predecessor in March.

The largest increases will go to basic research funding agencies, such as the National Center for Scientific Research and the National Institute for Health and Medical Research. The operating budget for these organizations, which had been cut by 10% for 1986, will now grow by 9% next year. The result in real terms will be to bring research spending back to approximately the same level as in 1985.

The Minister for Research and Higher Education, Alain Devaquet, has also announced that he intends to create 200 new scientific posts next year in government laboratories. At the same time, however, the number of technical and administrative staff will be cut by over 500.

Smaller increases will go to the more applied research oriented agencies, such as the Atomic Energy Commission and the National Center for Space Studies. This reflects both the fact that these agencies were given smaller cuts in March, and that a major debate is taking place about the new government's attitude to its large government-sponsored technology programs in fields such as space and nuclear energy.

The biggest cuts will be experienced by two agencies that had spearheaded the socialist government's efforts to merge its social and technological policies, namely the National Agency for the Exploitation of Research, which is responsible for developing the uses of government-sponsored research, and the French Agency for Energy Conservation. The budget of each will be reduced by about one-third.

The announcement of the 1987 budget reveals that, in contrast to many other areas of public spending which are being cut back significantly—and despite complaints about a lack of coherent science policy that accompanied the earlier cuts—research has fared relatively well.

The biggest budget increases, however, have been allocated to the Ministry of Defense. In line with pre-election commitments, this is planned to increase by 7%, to a total of \$24.6 billion.

Although no detailed figures are given on the proportion to be allocated to research and development, this is expected to increase considerably faster than the civilian R&D budget, in line with the government's decision that, where possible, the additional funding should go toward the modernization of defense equipment.

Furthermore, the Minister for Defense, Andre Giraud, who was director of the Atomic Energy Commission in the 1970's and subsequently Minister for Industry under President Giscard d'Estaing, is said to have defended his demands for significant increases by using the argument that support for new military technologies will eventually spin over into the civilian sector.

Even though the French government continues to refuse an official invitation to participate in the research phase of the U.S. Strategic Defense Initiative, among the areas which Giraud has said he would like to develop are technologies that could be used to protect Western Europe against short- and medium-range Soviet missiles—one of the principal areas in which Europe is expected to contribute to the SDI program. ■

DAVID DICKSON

Saving the Whales Faces New Hazard—Research Whaling

Efforts to uphold an international moratorium on commercial whaling recently received a setback in the U.S. courts and appear to face a new challenge—whaling conducted under the aegis of research.

After the International Whaling Commission (IWC) in 1984 voted the moratorium on commercial whaling that is now in effect, three IWC member nations, Japan, Norway, and the Soviet Union, filed objections, leaving them free to continue whaling. The commission is a voluntary organization with no enforcement powers. Besides world opinion, the major stimuli to adherence to IWC decisions are the provisions in U.S. fisheries law designed to punish violators of IWC mandates.

Under one provision, the Japanese decision to continue whaling could have triggered a loss of half their fishing quota in U.S. waters in the North Pacific, worth an estimated \$500 million a year. However, a U.S.-Japan bilateral agreement was negotiated under which the Japanese could continue the hunt until 1988. Taking of both sperm whales and the smaller and more numerous minke whales was covered.

A group of conservation organizations