Japanese science budget

Some gains, some losses

Tokyo

BESIDES some big funding increases for a handful of key projects, there is little good news for scientists in the 1986 budgets of two of Japan's major science ministries, the Science and Technology Agency (STA) and the Ministry of International Trade and Industry (MITI).

This year, as for the past few years, the government has done everything it can to cut the size of the budget. What makes this necessary is the enormous fiscal deficit, proportionately just as big as that of the United States. And despite Japan's booming economy, the alternative of raising taxes is no more popular in Japan than in the United States. All ministries are under pressure to make cutbacks and the fact that there have been small increases for science reflects its high priority. The small gains in research and development budgets are in fact scarcely enough to cover inflation. But that has not stopped the launching of new projects and the concentration of funds in key areas.

Within STA's budget, the biggest leap of all (a 750 per cent increase) is seen for the construction of a bathyscaphe capable of diving to perhaps 6,500 m. The plan to build such a vessel — at present only France and the United States have a bathyscaphe capable of going that deep — has been around for many years. With the succesful completion in 1981 of Shinkai 2000, which can reach 2,000 m, it has become a logical step. The new vessel will allow direct observation of the deep troughs off Japan where many earthquakes originate.

Another major budget increase is for planning of a module to be attached to the US space station. The budget is still not large in real terms, however, and if the project is delayed by the United States it may not prove too unwelcome to the government. If the module is built, a major use will be the manufacture of new materials in a gravity-free environment. MITI has launched a new project on this subject with an initial budget of 200 million yen. Interest from industry is strong enough that it may find it has a commercial competitor one day: the Taisei construction company is thinking of building a gravity-free environment on Earth. The trick is to carry out the manufacturing process in a capsule in free-fall down a deep mine, or from the top of a tall building.

Another area of space research where Japan is aiming to acquire expertise is the construction of the H-II rocket. Although Japan's large launch vehicles have so far been mainly built under licence, STA's H-II is seen as competing with Ariane and the space shuttle for commercial satellite launches towards the end of the century. This year its budget has leapt by nearly 300 per cent.

Another growth area for STA is in a project to build a heavy-ion accelerator to treat cancer. Funds available for basic research grants are also up, although not by such a huge percentage, and some new funds are available for "frontier research". These confirm STA's role as a supporter of small-scale basic research — a position traditionally held by the Ministry of Education, Culture and Science — as well as a supporter of "big science", space, nuclear energy and the like.

MITI's budget shows continuing support for its large-scale projects — the Sunshine project to develop new energy sources, the Moonlight project to cut energy waste, particularly in large-scale manufacturing, and the set of industrial technology projects. A new theme to be added to the "Basic technologies for future industry project" is that for bioelectronics. Although application is a long way in the future, there has been considerable interest from several large companies, including NEC. Interest stems from twin beliefs that computer manufacturers can learn from the structue of the nervous system, which is why MITI's industrial research agency supports physiology research, and that biological systems might be worth studying as the ultimate in miniaturization.

One project that is not growing as originally planned is the Fifth Generation Computer Project. The belief seems to be that the project's limits are not being set by financial resources but by human ones — there is not enough expertise available to justify further massive spending at present.

Alun Anderson

Japan's science budget

	Yen (thousand million)	Percentage increase or decrease
Science and Technology Agency		
Research and development budget	427.8	+1.6
Special promotion funds	7.9	+8.2
Space	94.5	+3.3
Nuclear Energy	277.7	+4.2
Ocean Research	7.4	+7.3
ERATO	2.8	+4.6
Ministry of International Trade and Industry		
Research and development budget	197.0	+4.4
Agency of Industrial Science and Technology	113.4	+0.2
Basic technologies for future industries	6.5	+0.1
Large-scale industry	15.2	+3.4
Sunshine project	43.0	−1.9
Moonlight project	12.3	+10.8
Fifth-generation computer project	4.5	−6.3

Space research

Texas A & M fly space-grant kite

Washington

TEXAS A & M University, in an attempt to fill what it sees as a vacuum, is pushing for the creation of a space-grant programme, modelled on the concept of the land-grant and sea-grant programmes. If Texas A & M has its way, it will add space-grant to its land-grant and sea-grant designations.

The sea-grant programme, started in the late 1960s, is a cooperative effort between universities, industry and government to provide financial support for research and public information. The space-grant programme would extend this to include space-based research, as well as research performed on Earth to support long-term projects in space.

Frank Vandiver, president of Texas A & M, sees the space-grant programme as "a good way for government to maximize research dollars". Federal dollars should encourage participation by private industry in university projects, and the financial benefits of the collaboration should be shared by all. That, at least, is the idea.

The land-grant concept has had a profound effect on US higher education. In 1862, the Morrill Act provided federal lands to the states as an endowment for colleges teaching the mechanical and agricultural sciences. The emphasis on applied sciences was reinforced by later legislation providing for research activities and extension services for the dissemination of newly gained knowledge. The triad of teaching, research and public education forms the basis for most modern universities. The original land endowments now amount to less than $3 million in university support, but the research and extension services are supported at levels reckoned in thousands of millions of dollars.

Whether space grant is a truly practical idea is unclear. The sea-grant programme's annual appropriation, this year $37 million, is routinely eliminated from the budget by the Reagan administration, only to be restored by congressional supporters such as Senator Lowell Weicker (Republican, Connecticut). A space-grant programme would be yet another financial burden. Vandiver insists that the initial burden would be more than paid off by applications of sponsored research. He has persuaded Senator Lloyd Bensten (Democrat, Texas) to introduce legislaon establishing a space-grant programme, although the Gramm–Rudman Act (see p.254) makes new spending programmes unattractive.

Some see the space-grant idea as a ploy to increase visibility in an era of tight budgets. But Vandiver insists "it is no flight of fancy with me".

Joseph Palca