

A darker shade of green

Tokyo

RESEARCH on the global environment and space feature prominently in budget requests for 1991 to be submitted on 31 August by Japan's Science and Technology Agency (STA) and the Ministry of International Trade and Industry (MITI). The requests, for overall increases of 6 per cent (STA) and 4 per cent (MITI), are thought likely to be reduced only slightly in negotiations with the Ministry of Finance before going for Diet approval early next year. The really critical negotiations are already over, taking place each year just before the request goes to the Ministry of Finance.

Both MITI and STA have plumped for large increases for research on the global environment. MITI requests ¥7,153 million (\$48 million), more than 17 per cent up on this year. A large part of the budget will go towards development of "environment friendly" technology, such as CFC substitutes, biodegradable plastics, and technology to absorb and utilize carbon dioxide. These projects will at first be carried out in MITI laboratories and private industry. But most of them will be transferred to a new institute, the Research Institute of Innovative Technology for the Earth, which is expected to open in 1992 in the new Kansai science city between Kyoto, Nara and Osaka.

Kyoto prefectural government has provided free land for the institute and will also level the site, which is in a steep valley next to MITI's new Ion Engineering Center (see *Nature* 346, 210; 1990), free of charge. And Ikuo Tomita, director for global environmental technology in MITI's Agency of Industrial Science and Technology (AIST) expects the local government and private industry to contribute an additional ¥8,000 million or so towards construction and operation of the institute.

MITI continues to increase its budgets for development of energy-saving technology and alternative energy sources under the 'Moonlight' and 'Sunshine' projects. But the ministry has decided to decrease dramatically the budget for coal liquefaction and gasification from ¥24,901 million this fiscal year to ¥16,296 million because the technology will not help reduce carbon dioxide emissions. As

a result, the overall budget for Sunshine drops by nearly 24 per cent.

STA makes an ambitious request of ¥10,532 million (\$70 million), over double the budget for this year, for its 'green planet project' which aims at better predictions of global warming. More than half of the budget (¥5,449 million) goes towards development of the ozone-sensing Advanced Earth Observing Satellite (ADEOS), due to be launched in 1995.

Also included in the request is ¥354 million for a supercomputer to model climate change. According to an STA official, the agency will select a Cray (the Japanese government has been heavily criticized by the United States for its failure to buy US-made supercomputers).

ADEOS is provided for by one part of an 11 per cent increase for space projects. Most of the rest of the extra money goes to Japan's much-increased contribution to the US space station. The agency requests ¥18,000 million, nearly double the budget

JAPANESE SCIENCE BUDGET REQUESTS

Ministry of International Trade and Industry (MITI)			(% change from 1990)
		¥000 million	
Total R & D budget	260.1		+ 4.0
Japan Key Technology Centre	32.2		+23.9
Basic technologies for future industries	8.0		+ 6.7
Large-scale industrial projects	14.6		+ 3.5
Sunshine project	30.1		-23.8
Moonlight project	12.3		+ 5.7
Unmanned space platform	5.7		+ 7.5
Fifth-generation computer	7.3		+ 4.3
Sixth-generation computer	0.1		-
Global environment	7.2		+17.4
IMS	0.1		+36.4
<i>Science and Technology Agency (STA)</i>			
Total R & D budget	524.6		+ 6.0
Special promotion funds	10.6		+ 3.9
Space	132.3		+10.8
Nuclear energy	305.3		+ 3.0
SOR (SPRING-8)	4.9		+75.0
Ocean research	10.7		+ 8.1
ERATO	5.8		+12.8
Human Frontier Science Programme	4.1*		+28.2
Green Planet Project	10.5		+ 123.7
Sakigake Research 21	0.6		-

* Includes ¥1,665 million from MITI budget

for this year. The project will continue to be a large drain on STA's budget over the coming decade.

MITI also continues to pour quite a large budget (¥5,700 million) into development of an unmanned space platform in collaboration with STA and the Ministry of Education, Science and Culture (MESC). The platform is scheduled for launch in early 1994 (provided there are no more hitches with the H-II rocket).

Ocean research also benefits from concern about the Earth with an increase of over eight per cent under STA's budget, although the increase is considerably less than STA's Ocean Development Division hoped for. Most of the extra money will go to research on the deep sea and to investigation of the role of the ocean in climate

change.

STA's budget for the world's largest synchrotron, SPring-8, continues to grow and the project will consume about ¥100,000 million by the time of its completion in 1998. The prototype fast-breeder reactor Monju also gulps down a huge budget (¥47,100 million) as its expected completion in 1992 approaches. And the ill-fated nuclear ship *Mutsu* which is due to be scrapped next year after spending only a few months at sea (and 22 years in port), gets ¥3,855 million. Most of the money will probably go to decommissioning costs.

MITI and STA continue to expand their budgets for the Human Frontier Science Program which supports international research on the brain and molecular biology. With the increased budget, the Frontiers foundation in Strasbourg will be able to award at least 30 three-year grants every year worth on average about ¥38 million (\$250,000) a year, even if contributions from the other summit nations (Canada, Britain, France, United States, Italy and West Germany) and the European Communities (EC) remain small.

A surprising development is a decision by STA to increase its budget for research on the human genome by over 60 per cent to ¥1,000 million (\$7 million). Earlier this year, STA officials said they did not intend to expand the agency's genome budget. But even with the increase, Japan's contribution to genome research remains tiny compared with that of the United States. MITI officials are considering ways of establishing their own genome project but it is likely to be at least a year before there is any chance that it can be launched.

STA's budget for ERATO continues to grow, with four new projects scheduled to start next year. And the agency will launch a new programme next year, Sakigake Research 21, modelled along the lines of ERATO but intended to support individual researchers rather than teams. The aim is to provide three-year contracts each worth on average about ¥20 million (\$135,000) a year to about 45 researchers from universities, government laboratories, and industry, probably in bioscience, materials science and electronics.

MITI requests ¥110 million to prepare a follow-up to the fifth generation computer project which ends next fiscal year. The new project will probably involve the development of neurocomputers and optical computers. MITI's budget also includes a similar amount (¥150 million) for the Intelligent Manufacturing System (IMS) project which the ministry hopes to launch in collaboration with the United States, Europe, Australia, and possibly Canada. Officials of the US Department of Commerce, the EC, and Japan will discuss IMS at a meeting in Tokyo next month.

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