

sities "and therefore the chances for France".

M. Laurent Schwartz, like M. Tézénas du Montcel an old critic of the French universities, is presiding over CNEU, but had raised himself from his sick-bed to deliver his opening address last Friday. He pronounced himself "sensible to the solemnity" that the French President was giving to the installation of his committee, and promised to make of CNEU "an instrument fundamental to the success of the French universities".

According to Schwartz, French universities have been subjected until now to little real objective evaluation, either internally like the US universities, or externally, like the British. In France, there has been only piecemeal evaluation by the research councils, or by the national university promotions committee (the Conseil Scientifique des Universités). CNEU would introduce global evaluation, something "much more ambitious".

"The question is to make known to each establishment, to the minister of education and to public opinion how the universities are doing branch by branch and globally." The better a university does in its evaluation, the more autonomous it should expect to become. CNEU would not distribute money directly, as that might result, in the long term, in "equipartition".

The regulations defining CNEU give it an "entirely new" freedom of movement, said Schwartz. It will have "absolute independence". Many organizations in France are governed by strict rules penned out in minute detail. But "the decree that establishes our committee leaves us on the contrary complete freedom to evaluate as we wish". If only, dreamed Schwartz, this atmosphere of confidence and liberty could extend to other organizations — such as the universities themselves.

"We must combat taboos and corporatism", said Schwartz. "We must understand and make understood: that demands courage and objectivity. We will force ourselves to have them. The grandeur of our task is impressive but is also fascinating."

The 15 members of CNEU will not carry out all the evaluations, but will appoint outside independent experts, said Schwartz. CNEU will use international experts as much as possible "as is done throughout the world". CNEU will not evaluate individuals, but will work at the level of groups and above. It will consider both research and teaching together, "for to separate research and teaching would kill both".

"CNEU will not behave like a policeman" said Schwartz. "Evaluation is totally contrary to Napoleonic control. We shall not be checking that the universities follow all the rules. On the contrary, we shall see if the universities can innovate, if they can launch audacious projects: we shall support initiative and not conformism or retreat."

Robert Walgate

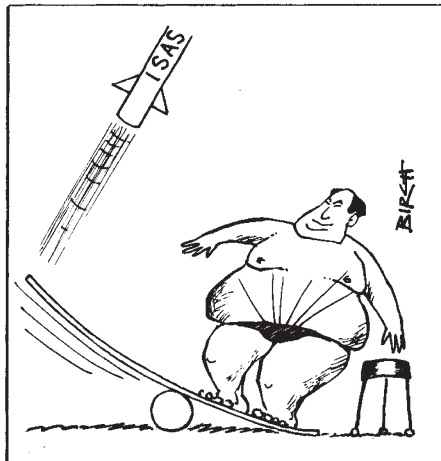
Japan in space

David keeps Goliath guessing

Tokyo

THERE seems no limit to the ambitions of Japan's Institute of Space and Astronautical Science (ISAS), the tiny academic cousin of the government-run giant National Space Development Agency (NASDA). Despite a shoestring budget and home-grown solid-fuel rocket technology, the agency is determined that Japan should be the third country to send a satellite to the Moon.

ISAS has just revealed that it is drafting a detailed programme to launch Japan's first Moon observation satellite in fiscal year 1989. Under the plan, a satellite will be placed in Earth orbit and, after a day for accurate orbital alignment, will be blasted off for the Moon by a "kick motor". On its first pass, the satellite will be slung past the lunar surface at an altitude of about 6,000 km, one month later reaching an apogee of well over 1 million



km. Thereafter, it will be catapulted back towards the Earth-Moon system and, after a second "near miss" of the Moon, will enter a highly eccentric Earth orbit stretching across the Moon's path. Two months and four Earth orbits later, the satellite will then whip off on another two-month loop around the Moon, or so the theory goes, but according to ISAS's "gunnery lieutenant" Hiroki Matsuo, professor of orbital dynamics, much more detailed calculations will be required before he can predict exactly where Japan's first Moon shot will end up.

Given ISAS's resources, it is a wonder that this organization can even contemplate a lunar mission. Japan is unique in having two space organizations, each equipped with its own satellites, rockets and launch sites. The larger NASDA, affiliated to the Science and Technology Agency, is in charge of the development of applications satellites and their launch vehicles, while ISAS, affiliated to the Ministry of Education, Culture and Science and operating on a fraction of NASDA's budget, carries out research and development of scientific satellites and launch vehicles. NASDA uses

liquid fuel rocket technology developed almost entirely under US licence but ISAS has its own "home-made" solid fuel launchers.

In the 1960s, when ISAS was part of Tokyo University rather than a national institute, the Japanese government asked the institute to limit the size of its rockets, to avoid competition with NASDA and to prevent the academic organization getting too big for its boots or so it said. By the early 1970s, ISAS had already reached the 1.41-m limit on the tail diameter of its rockets, since when its MU-series rockets have been getting taller and taller but no wider, at least at the base. With the Moon shot, however, ISAS is reaching the limits of ingenuity in what it can do with its present launchers.

To kick the lunar probe out of Earth orbit and off to the Moon, ISAS plans to add a 500-kg fourth stage to the MU-3SII used in the successful launching of the Halley's comet test satellite, *Sakigake* (see *Nature* 17 January, p.175). Add to this the 170-180 kg weight of the satellite and the payload capabilities of MU-3SII will be stretched to the full, whence ISAS's cunning plan makes gravity do most of the work. Launch dates and total budgets for the programme have not yet been agreed but ¥160 million (\$0.6 million) has been approved for systems design in the current fiscal year.

Unlike previous programmes, the lunar programme, codenamed MUSES (MU Space Engineering Satellite), is aimed largely at engineering studies of control of the speed and orbit of the satellite and, according to Professor Matsuo, no scientific instruments will be carried on the first satellite, MUSES-A. However, a possible successor, MUSES-B, may carry a scientific package to be dropped to the lunar surface.

But the big question in the minds of the institute's members is what more can be done with present launch facilities. Among the projects under consideration are a solar physics project for observations of solar flares that would, ideally, be carried out at the next solar maximum in 1991, but which would clash with a plan, in conjunction with the US National Aeronautics and Space Administration, to launch a satellite from the space shuttle which would follow a similar profile to MUSES-A. So the solar physics project will probably be scheduled for 1992.

Also under consideration is a project to examine diffuse X rays following on the successful series of X-ray satellites, while the institute also has more grandiose ambitions to send satellites to the planets which would be beyond the capabilities of MU-3SII. Using NASDA launchers would help, but NASDA has its hands full while ISAS cherishes its independence.

David Swinbanks