

# US leans on Russia to drop rocket agreement

■ US fears technology could be used as weapon  
 ■ Indian officials decry "brazen interference"

## New Delhi

PRESSURE from the United States has led Russia to pull back from its agreement to help India to build a rocket to launch communications satellites. The decision could delay or weaken India's effort to carry out independent research in space.

Russian officials have said that the United States has threatened privately to impose trade sanctions if an agreement signed in January 1991 between Glavkosmos, the then Soviet space agency, and the Indian Space Research Organization (ISRO) is not cancelled. The \$80-million contract would have supplied India with a liquid-fuel rocket engine and related technology for the second stage of a geostationary launch vehicle. The rocket is scheduled for launch in 1995.

The dispute involves a policy adopted in 1987 by the industrialized nations to limit the proliferation of missiles capable of delivering nuclear weapons. Although its guidelines state that they "are not designed to impede national space programmes", the technology covered by the Russian-Indian agreement falls within the list of prohibited items. The Soviet Union agreed in 1990 to abide by the terms of the agreement, called the Missile Technology Control Regime (MTCR).

Although the US State Department would not confirm or deny reports that it had threatened to impose trade sanctions if the Russians tried to carry out the contract, a department official said last week that the US government "is opposed to the transfer of such subsystems, and the fact that they are intended to be used for peaceful purposes is not relevant". Indian authorities point out that it takes 90 days to fuel the Russian rocket engine, precluding its use as a military weapon, but the US official says that "any liquid fuel rocket stage that is capable of being used as a space vehicle falls under US export control laws, which are consistent with the MTCR guidelines".

The feud has left Indian officials in a quandary. Work on the design of the launch vehicle was stopped last year on the assumption that the Russian engine would be used. All other stages of the vehicle have been designed and tested, and ISRO says that the programme will be delayed for several years if India has

to develop the engine on its own. ISRO rejected an offer two years ago by Arianespace of France because its price — \$230 million — was thought to be too high.

The Indian prime minister, P.V. Narasimha Rao, said last week that the Russians had not scrapped the deal but were only suggesting "a pause" while they sought further assurance that India would not use the technology to make

## DEEP-SEA DRILLING

# Japan floats big drilling plans

## Tokyo

JAPAN sees deep-sea drilling as its next chance to launch a big international science project. The Science and Technology Agency held a symposium in Tokyo last week to promote its plan to build a huge high-technology deep-sea drilling ship that will dwarf *JOIDES Resolution*, the US ship currently used in the international Ocean Drilling Program (ODP).

The agency's plan calls for a ship of 15,000 tons (gross) — nearly twice the size of *JOIDES Resolution* — to be built by 1998 at a cost of \$300-400 million. In an improvement on the *JOIDES Resolution*, the new ship would be equipped with a riser pipe up to 4 km in length encasing the drill pipe to allow flushing of the drill hole with mud without contaminating the core samples. The agency also plans to develop temperature-resistant drill bits to allow drilling in hot rocks — for example, mid-ocean ridge crests — at temperatures up to 350-400 °C, twice the present limit.

The drilling programme is scheduled to end in 2003 but is expected to be extended to 1998 because of a favourable review by the US National Academy of Sciences and promises of further support from participating nations. But the future of the programme beyond 2003 is uncertain. And so the Japanese ship if built will come at a perfect time, says D. James Baker, president of Joint Oceanographic Institutions Inc., the prime contractor of ODP, who gave a presentation at the Tokyo symposium. Nevertheless, US researchers are anxious that any Japanese vessel should be focused on science, rather than drilling technology. Officials at the US National Science Foundation are concerned that Japan's quest for energy independence may turn the ship into

missiles. The chairman of ISRO, U.R. Rao, returned from Moscow saying that there were no "insurmountable difficulties" in adopting a new contract that would not violate the non-proliferation guidelines but he declined to describe the changes being sought by Russian officials.

The problem came to light two weeks ago when Vitaly Sevastyanov, a cosmonaut and member of the Russian Committee for Foreign Affairs, was quoted by the Russian media as saying that the United States was trying "to drive Russia out of high-technology markets". The reports caused an uproar within the Indian parliament, with opposition members castigating the United States for "brazen interference" in the internal affairs of the two countries.

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a testbed for oil exploration technology, at the cost of some of its scientific capabilities. There are no current plans for a US replacement vessel, and a proposed Russian ship is still in question given the economic situation.

Originally, the Japanese planned to create a parallel international drilling programme. But now the proposed Japanese drilling ship may be used in a reformed programme that may also include a drilling ship which France plans to build, Baker says. Until now, the United States has been the prime funder of the ocean drilling programme, contributing 50 per cent of the \$40-million annual running costs and 50 per cent of the programme's researchers. But Japan and France may take on leading roles if their plans are realized.

The Japanese programme would be run by the Japan Marine Science and Technology Centre, which the Science and Technology Agency hopes to convert into an international "centre of excellence" with the help of the drilling programme.

But plans by another part of the Science and Technology Agency to launch a huge oceanographic vessel may conflict with the drilling project. The agency's atomic energy bureau hopes to convert the ill-fated nuclear-powered ship *Mutsu* into a giant oceanographic vessel by ripping out the nuclear reactor and replacing it with a diesel engine (*Nature* 353, 594; 17 October, 1991). *Mutsu* has spent most of the past 23 years in dock after developing a radiation leak on its maiden voyage. Conversion could cost as much as ¥20,000-million (\$150-million) and the finance ministry may well balk at funding two giant oceanographic vessels.

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