

# What lies behind India's planned trip to the moon?

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The Bangalore based Indian Space Research Organisation (ISRO) announced last month that it is pressing ahead with plans to send an unmanned space probe to the moon within the next five years. ISRO's lunar mission task force has sent a report to the government outlining the project and its cost, estimated at \$US82.5 million and arguing that the moon probe should proceed.

Task force head George Joseph told the Indian press: "Our studies clearly indicate that this country has the technical capability to launch this mission to place a satellite in the lunar orbit for carrying out scientific studies." He explained that a number of ground installations would need to be built in order to establish the deep space communication network needed to track, contact and control the probe.

ISRO plans to send a test orbiter to gather information about the particle and radiation environment of the moon and to carry out detailed mapping of the lunar surface. Scientists are hoping to probe previously unexplained phenomena such as the levitation of dust in the airless lunar environment and to investigate the possibility that water is present in some of the moon's craters.

Since its founding in 1969, ISRO, which has a staff of more than 12,000 scientists and engineers, has concentrated mainly on utilitarian applications such as the development and launching of satellites for weather forecasting and telecommunication. These satellites have also been used to map natural resources, for disaster warning and almost certainly for intelligence purposes.

But the proposal to send a probe to the moon is India's first venture into deep space. If ISRO succeeds, India will become only the fourth country—along with the United States, Russia and Japan—to send a spacecraft to the moon. While the Indian media has generally supported the plan, critical comments have appeared contrasting the expenditure on the space probe with the fact that nearly half of the Indian population of one billion lives below the poverty line on less than \$1 a day.

Professor H. S. Mukunda, chairman of the aerospace engineering department at the Indian Institute of Science,

bluntly declared: "It is the stupidest thing to do what others did 30 years ago. It won't bring the country any technical benefit." Instead of attempting to reinvent the wheel, he said, India should concentrate instead on building much more sophisticated, low cost satellites.

A moon probe has limited scientific value, as 97 percent of the moon's surface has already been mapped. The US stopped its moon program in mid-1972 and the Soviet Union ended its moon orbiter program in 1976. Attention focussed instead on more distant probes to other planets. In the 1990s, Japan sent its Hiten orbiter to the moon. The US followed with its Lunar Prospector, which raised the possibility that the moon may have water and other resources. The European space agency (ESA) is planning a mission with a Smart-1 probe by the end of this year to survey the moon's south pole for the first time.

What the critics fail to examine, however, are the real motivations driving ISRO's lunar project. While the scientists and engineers making the proposal may be driven by scientific curiosity, any government decision to proceed will be based on calculations of the project's benefits for big business and its potential to enhance India's military arsenal.

The government is already promoting India as a hi-tech wonder with a large pool of highly educated, but relatively cheap, scientists, engineers, computer programmers and technicians. Indian companies have cornered a significant segment of the computer software market with exports to more than 90 countries worth an estimated \$US9.5 billion so far this year. A successful moon mission would only enhance the image of the Indian technological miracle and possibly open up new economic opportunities.

When ISRO first mooted the project in 2000, its director Krishnaswamy Kasturirangan declared that a moon probe would "electrify the nation". In an interview with *India Today*, he said: "If we go ahead, it will demonstrate to the world that India is capable of taking up a complex mission that is at the cutting edge of space [research]."

There may be immediate benefits for India's own

commercial interests in the lucrative and highly competitive space industry. One symptom of the ferocity of the competition is the flurry of space-related activity in other Asian countries. The Malaysian government is moving to form a space agency and proposes to send its own astronauts into space. With 12 astronauts in training, China is gearing up to launch a manned spacecraft around 2005 and has aspirations for a moon-based space station by 2010.

ISRO has its own commercial division, Antrix, which offers technical assistance and other services to big business. Antrix has already executed several export orders for spacecraft and satellite manufacturers, mainly supplying remote sensing satellites as well as related hardware and software. The corporation offers a selection of satellites with functions ranging from telecommunication to earth observation.

By launching Korean and German satellites in May 1999, ISRO stepped up its involvement in the commercial space market, including the sale of telemetry, tracking and command services as well as consultancy, training and designing for space missions. Its products are pitched to international clients from whom the space agency gets over 75 percent of its income.

In the first half of this year, ISRO signed agreements with Indonesia and Brazil for “the peaceful use of space”. The organisation is expecting Indonesia’s space agency LAPAN to provide the land, logistics and manpower for a telemetry, tracking and command station based in Indonesia. Over the last year ISRO has also played host to other international guests including the prime minister of Thailand and the deputy prime minister of Israel.

Indian Prime Minister Atal Behari Vajpayee has closely followed India’s space program. Following the launch last October of the Polar Satellite Launch Vehicle (PSLV), which carried a number of satellites into orbit, he sent a letter full of praise to ISRO, stating: “I am very happy that India has today successfully launched the PSLV from Sriharikota, putting in orbit our TES (Technology Experiment Satellite), along with satellites of Belgium and Germany.... The TES is a technological breakthrough in optical imaging systems, which our scientists have achieved entirely indigenously.... They have indeed done the country proud.”

As well as being a useful device for stirring up Indian nationalism, Vajpayee is well aware of the military potential of the space program, which provides the technical basis for developing longer range missiles capable of carrying heavier payloads with greater accuracy. It is a means for ratcheting up the pressure on rival Pakistan as well as for bolstering the ambitions of Vajpayee’s Hindu chauvinist Bharatiya Janata Party (BJP) to make India the dominant regional power.

Vajpayee’s government insists that the country’s space program is strictly for non-military uses, but the facts speak otherwise. Referring to India’s space program, John Pike, a policy analyst with the Federation of American Scientists, commented: “I think the significance of it has much more to do with India using space for prestige purposes rather than for the science of it. It shows that they’re a big country and that they are rich enough to do things they don’t have to do. The core solid-fuel rocket motor on the PSLV would undoubtedly be the rocket motor that they would use to build an ICBM (Intercontinental Ballistic Missile).”

The PSLV is about 44 metres long, weighs some 294 tonnes and can carry a payload of up to 1.2 tonnes. As Pike noted: “A PSLV could readily deliver a nuclear warhead over continental distances, if re-engineered as a weapon system.” By making the PSLV the basis for launching a moon probe, ISRO would be able to further refine its missiles as well as the associated guidance and control systems. The expertise gained from such a project would prove invaluable, not only for building an ICBM capable of carrying nuclear warheads, but ensuring that it could be accurately targeted.

There is already a close relationship between ISRO and military research. ISRO’s forerunner, the Indian National Committee for Space Research (INCOSPAR), was established in 1962 under the control of the Department for Atomic Energy—the agency responsible for India’s nuclear weapon program. India’s ballistic missile program emerged as part of the research and development for the country’s civilian satellites.

Whether the Vajpayee government finally gives the green light for an Indian moon probe or not, one thing is certain: the decision will not be based on the scientific merits of the project or on any possible benefits for the population as a whole.



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