

# Manned Spaceflight Plans For India To The ISS And Beyond

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India is at a crossroads in its national space development program, having to decide if it will invest more of its small budget on manned space flight - which could be very lucrative, long-term, but which depends on certain conditions beyond its present control- or on continued robotic and scientific missions designed to benefit national development goals.

Indian Space Research Organisation's Chairman, G Madhavan Nair, recently announced that his country will decide in a year's time on whether to develop a manned space mission.

"We have to first decide how far such a manned mission is beneficial and whether we can afford to remain without it. Only a national debate can throw up answers for a consensus to go for a manned mission," he said. Such a program is expected to cost up to Rs 15,000 to 20,000 crore.

"We need to develop a lot of new technologies to build a life-supporting system, a space capsule with safety features to survive, and a recovery operation to complete the mission. If it is decided, then we do not want to lag behind in our preparations," Nair said, adding it will take at least seven to eight years for the agency to prepare for the mission.

An un-manned mission, by comparison, would cost around Rs 3000 crore, "therefore, it has to be debated and decided whether it is worthwhile to go on with a manned mission, when the same can be achieved by robotic instruments," he added.

India sent its first astronaut, Rakesh Sharma (the 138th astronaut to go into space), aboard the Soviet spacecraft Salyut 7 in April 1984, while another astronaut, the Indian-American Kalpana Chawla (who flew into space on board the Challenger twice), was killed along with six others in the Columbia shuttle disaster in February on February 1, 2003.

The United States offered to include an Indian astronaut in future manned-space missions during Prime Minister Manmohan Singh's visit to Washington, in July 2005, but haven't made any further commitments yet.

"ISRO is still reviewing the possibility of sending an Indian astronaut in the US-backed International Space Mission. But so far no such proposal has been drafted", Mr Nair also said recently.

If an Indian citizen were to visit the ISS, alleged areas of study would include protein synthesis, aerobic cell cultivation and efficacy of yogic exercises under micro gravity.

Since the Soviets orbited Rakesh Sharma in 1984, India has refocussed its space activities on finding ways to use space technology for the direct benefit of India's national development goals. As India becomes a greater player in the global economy, though, ISRO's policy is changing - with the Chandrayaan 1 moon probe a sign, perhaps, that India is aiming at becoming a full-fledged space power with civilian, commercial, military, and even human space capabilities.

The key to helping India build its human spaceflight program is the United States' role in the ISS partnership. As an apparent new long-term strategic and economic partner of the US, it's in America's national interest to see India develop some of its space activities in close cooperation with the US.

President Bush has committed the US to finishing the ISS assembly process by around 2010, which it will then use for human spaceflight research, until about 2015, after which, it plans to stop funding ISS operations and concentrate on the human exploration of the Moon and Mars.

There are no official US plans for the ISS after this date but it seems unlikely that America's partners would abandon the complex. It is probable that, within the next few years, negotiations will begin covering the long-term future of the ISS, whereby the US might consider handing over to India some of its ownership rights in the ISS. If this happens, one could expect future ISS crews to include at least one Indian astronaut.

After 2015 the ISS partnership will have to evolve into something quite different from what it is today. The US will fade into the background while the Russians, Japanese and Europeans will share the leading roles. India - and perhaps China - will have the chance to fill the void left by the Americans.

India would earn its stake in the ISS by developing and building an automated logistics spacecraft, like Russia's Progress or Europe's Automated Transfer Vehicle (ATV).

The Geostationary Launch Vehicle (GSLV) that ISRO has already successfully used three times can put at least two or three tons into low Earth orbit (LEO). From its launch site on the Bay of Bengal, it could reach the ISS with a reasonable load of fuel, water, or other supplies. This India Space Logistics Vehicle (ISLV) could be designed by India's own space industry, with minimal help from the US or Russia, and prove to be far more cost effective than existing craft.

India may even want to design the ISLV so that it could evolve to deliver cargo anywhere within cislunar space, including, eventually, the surface

of the Moon. A low-cost, Earth-to-Moon supply carrier, launched by a future version of the GSLV, might be a valuable business niche for India's future, giving the country a strong claim for participation in the Vision for Space Exploration.

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