

Astrosat a beginning, India plans long haul

Continuous Space Observation To Boost Missions With Societal Applications

Chethan Kumar & U Tejnomayam | TNN

Astrosat's estimated lifespan is only five years, but India is looking for a long - if not permanent - stay in space with its observatory. Even before the country's first telescope in the sky took off on Monday, Isro has drawn up plans for a successor.

Isro's keenness on doing continuous space-gazing is in line with its top brass's conviction that scientific missions propel other missions with commercial and societal applications. "Astrosat may live longer than five years, it is possible. But it won't last a really long time. So, there are plans for an observatory to replace it, may be a little ahead of its lifetime," Vikram Sarabhai Space Centre director K Sivan told TOI.

Another scientist, meanwhile, said future plans depend on government approval too. Astrosat, incidentally, was approved 11 years before its launch. The space agency had, amidst a lot of bouquets, has been getting some brickbats whenever it spent on scientific missions with no immediate societal application. The Rs450-crore Mars Orbiter Mission (MOM), too, got some criticism, but the project put India on the global map in space exploration.

Isro chairman A S Kiran Kumar was categorical while defending such missions. "Astrosat will give our scientific community access to data nobody else has. It is of great significance," he said. He pointed out that the agency's first ever satellite, Aryabhata, launched using a Soviet Union vehicle, was a scientific mission. "Learnings from Aryabhata contributed immensely to our future projects."

While Isro conceded that Astrosat's comparison with US' Hubble Telescope is not tenable, the satellite's project director K S Sarma said: "Our payloads do not have less science... It is just that the two are different kinds of missions," he said. The uniqueness of Astrosat is that it allows multi-wavelength and simultaneous observation of galactic and extra-galactic sources that not many other space observatories can boast of. "Observatories from Europe, Japan and the US have highly sensitive telescopes but they have a narrow wavelength," Sarma said.

Kiran Kumar said Astrosat has come at the right time. "There was a lot of excitement after Chandrayaan-I and MOM. In fact, people are using Chandrayaan data to do research. We are sure that data from MOM will yield great results," he said.

A week from now, one of Astrosat's five instruments will start gathering data. The Earth station will receive the data two days later. All the five instruments will be functional in 60 days, with the ultraviolet imaging telescope (UVIT) being the last one to be made operational.

Pics: © Suresh Kumar



OTHER TELESCOPES IN SPACE

While India takes baby steps with its first space observatory, some other astronomy missions have been expanding human knowledge on the universe



GALILEO (NASA)
Launch date **May 26, 1986**
Orbit height **222 km**
Power **1,900 watts**



HUBBLE TELESCOPE (NASA)
Launch date **April 24, 1990**
Orbit height **559 km**
Power **2,800 watts**

EXOSAT (ESA)
Launch date **May 26, 1983**
Orbit height **500 km**
Power **165 watts**



COST \$102m

COST \$2.5 bn



Launch date **September 28, 2015**
Orbit height **650 km**
Power **2,100 watts**
COST ₹175 cr



TEAM ISRO: Astrosat (left) and the team of scientists

Pvt sector made 70% of systems

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Sriharikota: With 70% of the control systems on the PSLV-C30 having come from private industries, Isro's goal of having an industry-built launch vehicle has come closer to realisation. Isro has been talking about this for more than half-a-decade now.

"At any PSLV launch now more than 150 industries contribute to the vehicle. Some of the key contributors have been L&T, Godrej among others," Vikram Sarabhai Space Centre director K Sivan said.

Isro chairman A S Kiran Kumar said: "In the next 4-5 years we will see a launch vehicle that is built by the industry. We also want them to be able to assemble it and launch."

While this is encouraging for the industry, a scientist said: "We are also looking at our industry contributing systems to foreign vehicles in the future like many of the US industries do." He said continuous co-operation with Isro would give the industry the confidence it needs and the learning to supply to the world.

However, speaking to TOI on what kind of role the industry can play in the future, senior scientist M Annadurai said: "We are very encouraged with their commitment. But one must understand that not everything will go to the private sector."

Quoting PSLV's example, he said: "This platform, for example, has put satellites in so many orbits, including launching the Mars mission. So, what Isro will want to retain with itself is this advantage." "The brain of the system will not be made by the industry, that will always remain with Isro," he said.

4 of 5 payloads indigenous

Contd from Page 1

Astrosat will study high energy processes in binary star systems containing neutron stars and black holes, estimate magnetic fields of neutron stars and study star birth regions. Isro chief A S Kiran Kumar said data gathered will be accessible to students and scientists alike.

"It took decades to develop the five payloads, four of which are indigenous," Kumar said. "Our students and scientists need no longer depend on data from other countries." Senior scientist M Annadurai told TOI that the institutions that developed the payloads, and their students will have first

access to the data through an operation centre.

Former Isro chairman K Kasturirangan, whose tenure marked the conception of Astrosat, said, "We thought we would be beaten by competition. But 11 years later, we have some of the best instruments."

PSLV-C30 lifting off at 10am from the Satish Dhawan Space Centre, Sriharikota. About 22 minutes later, Astrosat was injected into a 644.6 x 651.5 km orbit, against the planned 650km orbit, at a precise inclination of six degrees. In another three minutes, six foreign satellites were in orbit. The four US nano satellites were the last to be separated.