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'Workhorse' of ISRO on duty with Amazonia-1

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After a long stretch of the 2020 pandemic with almost all space operations halted, ISRO opened its space calendar 2021 with the successful launch of PSLV C51(commonly referred to as 'workhorse' by ISRO scientists) carrying Amazonia-1 and 18 other satellites. This space program is a collaboration project between Brazil and India wherein the PSLV C51 of India is carrying Amazonia-1, an optical Earth observation satellite designed by the National Institute for Space Research (INPE) in Brazil. The mission is hailed as the first dedicated commercial mission of NewSpace India Limited (NSIL), a Government of India company under the Department of Space. Amazonia-1 is the first Earth observation satellite of Brazil and is a mark of the "increasing investment" that the country is making in the sector of space and technology said Brazilian President Jair Bolsonaro. This satellite launch aims to strengthen the existing structure of Earth observations by providing remote sensing data to users for monitoring deforestation in the Amazon region, to improvise the real time detection system and analyse the diversified agriculture across the Brazilian territory. This marks as a revolutionary milestone towards strengthening a robust bonding in space programmes and collaborative studies in future space program and weather missions.

Why is AMAZONIA-1 an important mission towards mankind?

More than half of the territory of Brazil is covered by only two biomes - Tropical and Cerrado Forests. Some of them are constantly under pressure for anthropogenic activities, such as logging, agriculture, pasture management, etc. One of the main environmental problems in Brazil regarding biomes is deforestation, especially in the Amazon region. To monitor this anthropogenic phenomenon the government and other agencies have made great efforts. One such initiative is DETER (Deforestation Detection in Real Time). The DETER system in operation since 2004 is a contribution of INPE to the action plan of the Brazilian Ministry of Science, Technology, Innovation and to reduce deforestation rates in the Legal Amazon. Another operational program dedicated to monitoring deforestation in the Amazon region is PRODES (Measurement of Deforestation by Remote Sensing). But what hampers the operations of DETER and PRODES is the high frequency of clouds over Amazon region which distort the resolutions of data so obtained. Thus, it is necessary to have remote sensing data at spatial and temporal resolutions compatible with these unpredictable phenomena. Agriculture is another area that requires monitoring by high intensity remote sensors. The intense and diversified agriculture gives Brazil an important role as a food supplier in the world forming an indispensable economic value of R$ 200 billion as its annual GDP. However, the main agriculture calendar of Brazil coincides with the rainy season, bringing high probability of cloud cover along with a short period of annual harvest cycle making it difficult to capture optical remote sensing data obtained from these low frequency satellites like DETER and PRODES. Therefore, to solve such issues higher temporal resolution is required for remote sensing systems to be more useful for regions like Amazon with agricultural applications. Since Brazil has a long history and commitments to preserve and keep track of its vast forested areas and large agricultural activities, there is a need for continued provision of remote sensing data. With this objective it is expected that data from Amazonia-1 may be useful for obtaining the higher resolution images even in conditions of bad weather with quick optimised application which would make obtaining data from remote regions like Amazon and monitoring agricultural activities easier. This would be not only open new horizons for Brazil but also mark a step towards mankind by aiming to preserve Amazon, the lungs of Earth.

Why did ISRO launch a Brazilian satellite?

As always India has been the seed of fruitful partnerships, and once again Amazonia-1 earmarks the infinite potential of the India-Brazil partnership to overcome the development challenges. Both countries as part of the BRICS cooperation on building a 'virtual constellation of remote sensing satellites' aim to promote Amazonia-1 as a step forward towards sharing remote sensing satellite data. As per the signed cooperative instruments and the MoU signed between India and Brazil both countries have ensured support of its satellites and use of their ground stations. In 2018, two officials from the Brazilian Space Agency (AEB)

joined an 8-week long training programme on nanosatellite building at ISRO, and in 2020, when President Bolsonaro visited India as the Republic Day guest, Mr. Bolsonaro and Mr. Modi agreed to intensify space cooperation as a priority area. In fact, Brazilian Earth stations at Alcantara and Cuiaba were also instrumental in tracking Chandrayaan-1 and 2 and Mangalyaan Mars Orbiter Mission spacecrafts of ISRO. In words of ISRO chief K Sivan "In this mission, India and ISRO, feel extremely proud, honoured and happy to launch the first satellite designed, integrated and operated by Brazil."

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