

ISRO to develop full-fledged hyperspectral imaging satellite

A new set of future satellites called hyperspectral imaging satellites is set to add teeth to the way India is gleaned from about 600 km in space.

The Indian Space Research Organisation (ISRO) says it plans to launch a full-fledged niche Earth observation (EO) satellite — called the Hyperspectral Imaging Satellite or HySIS — using a critical chip it has developed.

There is no specific time-frame yet for its launch, an ISRO spokesman said, adding that meanwhile, the new chip, technically called an “optical imaging detector array,” that they have created for it would be tested and perfected.

“ISRO is endeavouring to enter the domain of operational hyperspectral imaging from earth orbit” with a satellite that can see in 55 spectral or colour bands from 630 km above ground,” the space organisation has said. It said it decided to develop the chip that suited Indian requirements.

Hyperspectral or hypspx imaging is said to be an EO trend that is being experimented globally. Adding a new dimension to plain-vanilla optical imagers, it can be used for a range of activities from monitoring the environment, crops, looking for oil and minerals all the way up to military surveillance — all of which need images that show a high level of differentiation of the object or scene.

About a decade ago, ISRO added another EO niche with microwave or radar imaging satellites RISAT-1 and 2 that could ‘see’ through clouds and the dark — an important feature useful for the military and security agencies.

‘Hypspx’ imaging is said to enable distinct identification of objects, materials or processes on Earth by reading the spectrum for each pixel of a scene from space.

Another official described it as “another important development by ISRO in its quest for better and diverse Earth observation technologies.”

ISRO first tried it out in an 83-kg IMS-1 experimental satellite in May 2008. The same year, a hyperspectral camera was put on Chandrayaan-1 and used to map lunar mineral resources. Very few space agencies have such a satellite; a German environmental satellite called EnMAP is due to be launched on an Indian booster in 2018.

The payloads development centre, Space Applications Centre, Ahmedabad, designed the architecture of the chip which was made at ISRO’s electronics arm, the Semi-Conductor Laboratory, Chandigarh. The result was a detector array that could read 1000 x 66 pixels.

According to an EO expert who called it the ‘CATSCAN’ equivalent of Earth from space, hypspx technology was still an evolving science. It came with many challenges and, as such, space agencies were still ironing out its issues after many years.

A study of nearly 300 people living in different parts of India found that nine single-base variants (single-nucleotide polymorphisms or SNPs) account

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