Searching for exoplanets? Hire a satellite

By Dinesh C Sharma

Jaipur, March 9 (India Science Wire): The amazing discovery of earth-like rocky planetary system in the habitable zone has spurred great interest in exoplanet search among astronomers from all over the world. Now a commercial firm is getting ready to offer its services to scientific groups with what could be the first astronomy satellite in private sector dedicated to exoplanet search.

India has launched its own astronomy satellite, Astrosat, in September 2015, while the American space agency has a fleet of space telescopes. There are many countries which do not have similar access to satellite data and find it difficult to get time on satellites of big space agencies. Twinkle, an astronomy satellite being developed by the UK-based Blue Skies Space Limited, a spin off company of the University College London (UCL), is trying to bridge this gap.

From an orbit 700 km above the earth, Twinkle will observe over 100 planets orbiting distant stars. When an exoplanet passes in front of any star it is orbiting, small amount of starlight is filtered through the planet's atmosphere consisting of clouds and molecules. The instruments onboard the satellite will detect this light from the background starlight and split it into a spectrum. Since different types of molecules absorb light at specific wavelengths, instruments can make out a pattern of spikes in the spectrum. Analysis of this and other data such as temperature and energy density can help astronomers reconstruct characteristics of an exoplanet. Twinkle's instrument will analyse light in the visible and near-infrared wavelengths.

The satellite is slated for launch sometime in 2019. "Typically, it takes 15 to 20 years for an astronomy mission to be developed. We are trying to do this in 3 years," said Dr Marcell Tessenyi, CEO of Blue Skies Space Ltd, on the sidelines of the annual meeting of the Astronomical Society of India in Jaipur. "The satellite will be available for scientists from across the globe who want to do experiments in astronomy. They can essentially buy time on telescope. We are actually trying a new model in astronomy."

Twinkle will use a satellite platform that has been built for earth observation. "It is a reasonably big satellite, about 350 kilos and not a cubesat. Its primary mirror is about 50 cm that allows very good science. It is not as good as a massive telescope in a very stable orbit but will be located in a low earth orbit. We believe that we can do about 50 to 70 percent of science of big satellites but at 10 percent of the cost of big satellites," Tessenyi added.

In order to cut down costs and development time, the company is going to use tried-and-tested and commercially available technologies and subsystems. Surrey Satellite Technology Ltd (SSTL) will construct the spacecraft using the SSTL-300 platform it has developed for earth imaging satellites. SSTL is also compatible with a range of launchers. The company is looking at various options for launch including from India. "ISRO's Polar Satellite Launch Vehicle (PSLV) is an attractive option," said Tessenyi. (India Science Wire)