

Twinkle – A Commercial Space Science Satellite

Marcell TESSENYI (1,2), Giovanna TINETTI (1,2), Jonathan TENNYSON (1,2), Giorgio SAVINI (1,2), Billy EDWARDS (1), Enzo PASCALE (3), Susan JASON (4), Amar VORA (4)

(1) Blue Skies Space Ltd., United Kingdom, (2) University College London, United Kingdom, (2) Sapienza Università di Roma, Italy (3) Surrey Satellite Technology Ltd., United Kingdom

Abstract

Twinkle is a small satellite designed to carry out cutting-edge space science with a new commercial funding model. The approach pioneered by Blue Skies Space Ltd. opens access to scientific satellites to universities and research institutes worldwide

Twinkle is a cost-effective spacecraft being built on a short timescale and planned for a launch by 2021. The satellite is based on an existing platform designed by Surrey Satellite Technology Ltd. Twinkle will carry a 45cm telescope with two instruments (visible and near-IR spectrometers - between 0.4 and 4.5 μ m with resolving power up to R~250) and will follow a sun-synchronous low-Earth polar orbit. The mission implementation is based upon a delivery approach that has been successfully applied in other demanding space disciplines, with Blue Skies Space Ltd. set up to commercially manage the mission.

Twinkle is being built to carry out cutting-edge science: Twinkle will use visible and infrared spectroscopy to analyse the chemical composition and weather of exoplanets in the Milky Way, including super-Earths (rocky planets 1-10 times the mass of Earth), Neptunes, sub-Neptunes and gas giants like Jupiter. It will also be capable of follow-up photometric observations of 1000+ exoplanets. Photometric measurements taken simultaneously in the visible and the infrared bands, will allow orbital parameters of systems as well as precise measurements of transit timing variations present in multiple planetary systems to be well constrained. The exoplanet targets observed by Twinkle will be composed of known exoplanets discovered by existing and upcoming ground- and space-based surveys (e.g. K2, GAIA, Cheops, TESS). Solar system objects ideally suited for spectroscopic and photometric observations with Twinkle include asteroids and comet comae, for which the broad wavelength range allows the observation of key

hydration, organic and volatile features in their spectrum.

This presentation will provide a summary of the technical capabilities of the Twinkle Space Mission, the scientific possibilities with the satellite and a description of the funding model employed.



More information on the science possible with the Twinkle Space Mission can be found on our website: www.twinkle-spacemission.co.uk