

15th SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Generic Technologies for Small/Micro Platforms (6A)

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A DISTRIBUTED MULTISPECTRAL IMAGING SYSTEM FOR THE NEXT GENERATION OF
DISASTER RELIEF SPACE SYSTEMS.

Abstract

This satellite constellation provides low-cost, sustainable, modular distributed multi-spectral Earth imaging capabilities with the flexibility for rapid upgrade, reconfiguration and augmentation. It is able to inform such applications as agriculture, disaster relief, cartography, national security and Earth Sciences; meeting both humanitarian and scientific needs. It also meets system business needs by providing a highly flexible and responsive platform for permuting constellation capabilities with fast turn-around timescales for system optimisation. Larger space systems typically have their capabilities restricted to only a small number of purpose-driven satellites where the provision of rapid system adaption and future compliance comes at a significantly high price in cost, time, effort and resources. The proposed low-cost system will provide major cost savings with comparably minor reductions in performance which are readily accountable by new paradigms in space technology. The extensive use of space qualified and commercial of the shelf (COTS) components provides robust risk mitigation and a highly capable baseline design. Presented here is a miniaturised version of the existing Surrey Satellite Technology Ltd (SSTL) 100 kg platform and its complementary multispectral imager from the Disaster Monitoring Constellation. 23 m GSD imagery is provided in the near-infrared, red, green, and blue spectral bands from a sun-synchronous orbit altitude of 600 km. The attitude control system of this 20 kg class microsatellite offers off-nadir pointing for imaging resulting in a 660 km field of regard at the surface. Recent in-house developments in S-Band transmitter technology are capable of yielding data rates in excess of 3 Mbs-1 of which the platform focuses its efforts in making optimum use. This study has been performed to assess imaging of Japanese land areas and proposes the use of downlink stations in North West Australia and Guildford UK. Collaboration across a global network of ground stations is envisaged to yield system growth and economies of scale in mass delivery of low cost data products.