

**An International Disaster Monitoring Constellation with Daily Revisit Employing  
Advanced Low-Cost Earth Observation Microsatellites**

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**ABSTRACT:**

In a similar way that the PC has changed the face of computing and brought undreamed of capabilities into the hands of the individual, so the same advances in microelectronics have revolutionised access to space for remote sensing applications. The Disaster Monitoring Constellation (DMC) takes advantage of inexpensive yet highly sophisticated and capable microsatellites to provide 36-metre GSD, 3-band multispectral imaging with a 600km swath width providing daily revisit worldwide - even at the equator. The DMC comprises five 100kg microsatellites launched together into a 686km sun-synchronous orbit and is being implemented through a novel international partnership between Algeria, China, Nigeria, Thailand and the UK - lead by SSTL at the Surrey Space Centre. The spacecraft are currently under construction in the UK and Thailand and scheduled for launch in October 2002 after which EO data of declared disaster areas will be available freely to disaster monitoring, assessment and mitigation agencies whilst the remaining image data will be available commercially from the DMC consortium. The paper first describes the state-of-the-art in optical Earth Observation from small satellites (5-500 kg) and is illustrated by examples of image data from the UoSAT-12 minisatellite and the Tsinghua-1 and TiungSat-1 microsatellites and then details the configuration, capabilities and planned operation of the microsatellites in the Disaster Monitoring Constellation (DMC).

Following on this first DMC, Surrey expects to issue calls for international participation in follow-on small satellite constellations every two years - focusing on, for instance: Earthquake prediction; infra-red EO; light-SAR remote sensing; ocean wave height monitoring and high resolution optical missions. Surrey are currently working on the RapidEye constellation of 4 EO minisatellites to provide 6.5m GSD 6-band multispectral imagery with high temporal resolution and the 2.5-metre GSD panchromatic TOPSAT imaging microsatellite for the UK MoD.

The Surrey Space Centre has pioneered and launched 20 small but highly capable microsatellites over the last 21 years, dramatically reducing the cost and timescales of sophisticated space missions to provide communications and Earth observation at a fraction of the conventional cost. Uniquely, Surrey has shared this experience with 12 emerging space nations to provide independent and affordable access to space and remote sensing applications through advanced micro and minisatellites.