Times Higher Award nomination 2006 – Surrey Satellite Technology Ltd
category: outstanding contribution to innovation and technology

nominee contact: Professor Sir Martin Sweeting (M.Sweeting@sstl.co.uk)
nominated by: Dr Lloyd Wood, Cisco Systems (lwood@cisco.com)

A. Reason for nominating *(500 words)*

Surrey Satellite Technology Ltd, or SSTL, is an aerospace spin-off from the Department of Electronic Engineering at the University of Surrey. SSTL focuses on innovative, low-cost, access to space and construction of low-cost satellites and services using off-the-shelf technology. Between July 2005 and June 2006, SSTL had several significant achievements:

1. Successful construction, launch and operation of three satellites.
- Bejing-1, the latest contribution to the Disaster Monitoring Constellation of low-Earth-orbiting remote-sensing imaging satellites (launched October 2005).
- TopSat, an imaging satellite built with Qinetiq for the UK government (launched October 2005).
- GIOVE-A, the first demonstrator for the proposed European *Galileo* positioning system, whose use secured allocation of radio frequencies for the system before an imposed deadline (launched December 2005).

2. Acceptance by an International Charter for emergency relief use.
The Disaster Monitoring Constellation (DMC), an international collaboration of five countries that have purchased and operate imaging satellites designed and built by SSTL, was accepted as an integral part of the International Charter on Space and Major Disasters (19 November 2005).

The DMC has provided imaging support in response to Hurricane Katrina, the Indian Ocean tsunami, and many other fires, floods and earthquakes. The DMC has provided imagery for mapping applications used by the United Nations for camp placement of internally displaced people in Darfur, Sudan, and for tracking locust breeding grounds and estimating population sizes in Algeria. Within Europe and the United States, the broad coverage and frequent revisit of DMC allows commercial agricultural services to provide field-level crop health monitoring. DMC imagery is also used in Earth science applications, such as Indonesian peat land and Eurasian boreal forest fire monitoring. These will contribute valuable data to our understanding of global carbon dynamics.

SSTL has now spun off DMC International Imaging (DMCii) as a separate company to help manage the DMC for the "Disasters Charter" and to sell available images and unallocated sensing capacity commercially.

Manufacturing, launching and operating a number of imaging satellites requires use of a large number of disciplines, skills, and expertise in different subject matter areas. Bringing these together successfully with processes leading to a successful outcome that

requires success in each and every individual area is difficult. Taking the result further with cooperation with nonprofit organizations to establish and provide a useful service to the "Disasters Charter" is remarkable, especially for such a small company.

The application of commercial technology to provide imaging services that were previously the domain of far larger, far more expensive satellites such as Landsat is innovative.

3. Established organic growth
SSTL completed its third acquisition, and grew sufficiently to finally move off-campus to purpose-built premises on the nearby University research park.

The University of Surrey owns 85% of SSTL. SSTL employs 200 staff and in 2004 made a profit of 1.3 million pounds on a turnover of 18 million pounds. SSTL cooperates with the University's Surrey Space Centre. A number of SSTL staff have academic roles at the University while generating research papers at conferences and in journals.

B. Additional information *(370 words)*

Surrey Satellite Technology Ltd's website is at: http://www.sstl.co.uk/
To learn more about the use of the Disaster Monitoring Constellation and its capabilities, see DMC International Imaging's website: http://www.dmcii.com/

A comprehensive summary presentation on the DMC and its capabilities was given by David Hodgson to the 11th Conference on Control with Remote Sensing of Area-based Subsidies, in Kraków, Poland, on 25 November 2005, along with other presentations on aspects of the DMC.
http://agrifish.jrc.it/marspac/cwrs/meetings/2005-11_krak%F3w.htm
http://agrifish.jrc.it/marspac/cwrs/meetings/krak%F3w/T3/T3_Hodgson_DMC_presentation.pdf

DMC and the Disasters Charter
United Nations Space and Major Disasters Charter is at: http://www.disasterscharter.org/
The British National Space Centre and DMC join the International Charter 'Space and Major Disasters', European Space Agency, 16 November 2005.
http://www.esa.int/esaCP/SEMS3TTLWFE_index_0.html

DMC use in Hurricane Katrina and Tsunami relief efforts
This is detailed at http://www.dmcii.com/disasters.htm and
http://eros.usgs.gov/katrina/datasets.html.

DMC use for Darfur
Darfur Aid Workers Receiving Assistance From Orbit, Space Daily, 7 December 2004.
http://www.spacedaily.com/news/disaster-management-04zb.html

More details of the DMC

Utility

The overall usefulness of the Disaster Monitoring Constellation is discussed in:

C. Underwood, S. Machin, P. Stephens, D. Hodgson, A. da Silva Curiel and M. Sweeting, *Evaluation of the Utility of the Disaster Monitoring Constellation in Support of Earth Observation Applications*, paper IAA-B5-1501, 5th IAA Symposium on Small Satellites for Earth Observation, Berlin, Germany, 4-8 April 2005

Innovative research

GPS reflectometry is a new field attempting to monitor ocean and wind patterns using reflecting GPS signals. For example GPS reflectometry research results, see:

S. Gleason, S. Hodgart, S. Yiping, C. Gommenginger, S. Mackin, M. Adjrad and M. Unwin, *Detection and Processing of bistatically reflected GPS signals from low Earth orbit for the purpose of ocean remote sensing*, IEEE Transactions on Geoscience and Remote Sensing, Vol. 43, No. 6, pp. 1229-1241, June 2005.

For example Earth science research results see:

K. Tansey, A. Hoscilo, and S. E. Page, *New observations of Indonesian peatlands in 2005 from the DMC satellite*, Third Open Science Meeting: 'Science and Society: New Challenges and Opportunities', Yogyakarta, Indonesia, 27-29 September 2005.

Origins

SSTL's Disaster Monitoring Constellation was first proposed a decade ago in:

M. Sweeting and F. Chen, *Network of Low Cost Small Satellites for Monitoring & Mitigation of Natural Disasters,* IAF-96-C.1.09, 47th International Astronautical Congress, Beijing, 7-11 October 1996.
at: http://www.ee.surrey.ac.uk/SSC/CSER/UOSAT/papers/iaf96/disnet/disnet.html