

News release

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New era of low-cost Earth observation dawns as first images received from TopSat



The first high resolution images of the Earth transmitted by TopSat, the micro-satellite designed and built by a QinetiQ-led consortium of British firms, have been received at QinetiQ's West Freugh ground station. The low cost Earth observation satellite is six weeks into its mission following a successful launch from the Plesetsk cosmodrome in Northern Russia on 27 October 2005.

TopSat is a major step forward in the affordability of space missions, providing 2.8 metre resolution images at a much reduced cost compared to larger satellites.

Typically, current generation imaging satellites with comparable performance cost over five times more than TopSat. TopSat also has the best resolution per mass of any imaging satellite currently available so has a wide range of applications. These include mineral and petroleum exploration, forestry, flood monitoring and combating maritime oil pollution.

The images produced by TopSat are delivered in near-real time, enhancing its ability to support disaster relief operations in the event of landslides, earthquakes and other emergencies. Images can also be delivered to customers *in situ* via QinetiQ's fully mobile data ground station (RAPIDS).

TopSat was designed and built by a consortium of British companies led by QinetiQ, whose role includes systems design and technical authority, provision of the major payload electronics units, operations management and ground segment. Surrey Satellite Technology Ltd (SSTL) developed and manufactured the satellite platform and was responsible for the integration of the payload testing, arranging the launch at Cosmos, and commissioning the satellite platform in orbit. Rutherford Appleton Laboratory (RAL) designed and manufactured the camera and Infoterra is marketing TopSat data products.

Speaking on behalf of the consortium, Andrew Rogoyski, managing division of QinetiQ's space department said: "With improved performance and falling costs we are entering a very exciting era

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for small satellites. We genuinely believe that low cost ownership of space platforms is becoming a reality.”

The programme has been jointly funded by the British National Space Centre (BNSC) and the UK Ministry of Defence at a mission cost below £14m.

Lord Sainsbury, minister with responsibility for the BNSC and UK space policy at the Department of Trade and Industry said: “The first images received from TopSat mark the latest chapter in a genuine British success story. They represent the culmination of five years' work and are an example of what can be achieved when four British companies work together.

“The project is also a fine example of the benefit of the BNSC partnership in fostering collaboration between Government departments, to stimulate industrial capability and capacity.”

Professor Roy Anderson, chief scientific adviser to the Ministry of Defence said: “The development of TopSat is at the cutting edge of scientific innovation and reflects the UK's leading research capability in this highly competitive field. I am delighted that the MOD and the BNSC have worked together successfully to fund a project that will bring benefit to both civil and military users all over the world.”

The image:

The satellite image was acquired at 10.03am on Wednesday 7 December 2005. The morning traffic is clearly visible on the Queen Elizabeth II Bridge at the Dartford Crossing, UK. The image shows Thurrock and the Lakeside shopping centre in Essex to the north, and Greenhithe and the Bluewater shopping centre in Kent to the south. Ships are visible underway from the Thames estuary and alongside at the Tilbury docks to the east. TopSat imagery at nadir has a nominal 2.8m resolution in black and white and 5.7m in colour. These images are not full quality as they are JPEG format to allow wide distribution. **A full range of images are available from the QinetiQ press office.**

The technology:

The first of its kind in the UK, TopSat is a low cost small satellite which will provide local users *in situ* on the ground with high-resolution imagery. It consists of an advanced optical camera, which is able to collect 17 x 17 km images of the earth with a panchromatic (black and white) resolution of 2.86 metres and a multispectral (colour) resolution of 5 metres.

This optical camera is integrated with an agile micro-satellite platform to permit pitch compensation manoeuvres, allowing imaging of low illumination scenes.

TopSat can deliver imagery direct to users via a mobile ground station, from a low Earth orbit in near real-time. Data can also be downloaded to other mobile or fixed ground stations using the CCSDS communications standard within hours, increasing the versatility of the system.

In the future, a constellation of three or four TopSat satellites could image almost any point on the Earth at least once a day, subject to cloud conditions, opening up the potential for quick response imagery which is extremely cost effective to deliver.

TopSat is one of three satellite projects funded under the MOSAIC programme (the BNSC Small Satellite Programme). The programme is intended to fully exploit the UK's world leading capability in small satellites and to stimulate the development of key small satellite technologies and payloads.

Notes to Editors:

QinetiQ

- QinetiQ's Space Division has led UK space technology since the late 1950s and continues to innovate. QinetiQ has over 10,000 employees and huge technical expertise across its wide range of business areas. Its space division can provide effective solutions in the fields of spacecraft technology, space systems, remote systems and satellite communications. In addition to consultancy on larger satellite programmes, the Division builds and operates smaller (100kg) satellite systems, which specialise in technology demonstrations "on-orbit". The Division also provided subsystems for the Beagle mission to Mars as well as leading the UK consortium to build the TopSat optical imaging satellite. QinetiQ has recently acquired a majority share in the Belgian small satellite manufacturer Verhaert Design and Development, now renamed Verhaert Space, to boost the company's capability to provide this type of spacecraft.
- The satellite ground station at West Freugh was built in 1991 to receive satellite radar imagery from the European Space Agency ERS-1 and ERS-2 satellites and was subsequently upgraded to receive imagery from the Canadian RADARSAT satellite in 1995. The station was further expanded in 1999 when QinetiQ's meteorological satellite reception facility at Lasham, Hampshire, was relocated to West Freugh.
- For further information see: www.qinetiq.com

Surrey Satellite Technology Limited

- SSTL is a privately owned University of Surrey company, which employs more than 200 people at Guildford, currently working on LEO, geostationary and interplanetary platforms. SSTL specialises in the design, manufacture and operation of low-cost small satellites, provided on rapid timescales, to meet Earth observation, communications and space science applications. For civil and military users. Over the past 24 years, SSTL has built and launched 25 small satellite missions into low Earth orbit for international customers, pioneering the use of commercial-off-the-shelf (COTS) technologies in advanced and highly capable satellites.
- Alongside TopSat, SSTL constructed and launched a second 166kg high-resolution Earth observation microsatellite (*BEIJING-1*) that has been designed and built by SSTL for the *Beijing Landview Mapping Information Technology Co. Ltd* (BLMIT) of China and carries a 4-metre ground resolution panchromatic camera in addition to a 32-metre resolution 3-band multispectral camera with a remarkable 600km-wide swath. SSTL has also recently delivered the 660kg GIOVE-A navigation test satellite to ESA, which is due for launch in December 2005 to provide the first Galileo timing and navigation signals from its 24,000km orbit.
- For further information see: www.sstl.co.uk

CCLRC Rutherford Appleton Laboratory

- At the forefront of UK space science research, the CCLRC Rutherford Appleton Laboratory (RAL) operates one of the largest space research laboratories in Europe. Working with universities, research institutes, industry and government agencies around the world, RAL provides leadership and management as well as satellite- and ground-based instrumentation, testing and data handling for international missions in meteorology, earth observation, atmospheric science, solar and solar-terrestrial physics, planetary science, astronomy and radio communications.

- The Space Science and Technology Department employs some 250 people and has been involved with over 150 space missions over the last 40 years. It is playing a leading role in current missions such as SMART-1, Mars Express, Rosetta, SOHO, Envisat, Meteosat, JWST, Herschel, Planck, Stereo, and Solar Dynamics Observatory.
- The Rutherford Appleton Laboratory is part of the Council for the Central Laboratory of the Research Councils, one of the UK's eight research councils and host to some of the UK largest facilities in support of UK science and engineering research.
- For further information see: www.cclrc.ac.uk

Infoterra Limited

- Infoterra Ltd. is a world leader in the provision of geographic information products and services. Its portfolio of geographic information solutions includes airborne and satellite data acquisition, geo-information creation, database management and outsourced hosting. Infoterra provides geospatial knowledge to companies worldwide to help them make informed decisions. The company has clients in communications, utilities, engineering, agriculture, defence and oil, gas & mineral exploration. Infoterra is a wholly owned subsidiary of EADS Astrium.
- For further information see: www.infoterra-global.com

British National Space Centre

- The British National Space Centre (BNSC) is a voluntary partnership of 11 Government departments and research councils with an interest in civil space. BNSC coordinates space policy across these organisations on areas including: Space science, Earth observation, Satellite communications and Satellite navigation.
- For further information see: www.bnsc.gov.uk

**For further information, please contact
David Bishop in the QinetiQ Press Office on Tel: +44 (0) 1252 39 3500
Email: djbishop@QinetiQ.com / PressOffice@QinetiQ.com**