



# Innovation

Leading the way in the UK

# Innovation

**The UK is a world leader in space technology. British companies manufacture satellites for communications, navigation and science. Others provide expertise in computers, control systems and ground support or have developed innovative ways of using satellites. The British National Space Centre (BNSC) is committed to helping UK industry exploit market opportunities to bring the benefits of space technology to UK citizens.**

## Industry

Research carried out for BNSC shows the space sector is expanding into new domestic and international markets. The latest independent survey of the UK space industry concluded that 227 companies are involved in space activities and that the sector had a total turnover of £4.8 billion in 2004–5.

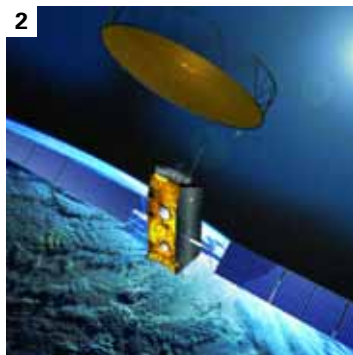
The space industry can be divided into “upstream” and “downstream”. Upstream companies provide space technology while downstream companies exploit space technology for applications such as broadcasting and communications. Downstream activities represent some 85 per cent of the overall turnover of the UK space sector.

The UK space industry employs over 16,000 people, the majority of whom are highly skilled. The upstream industry alone employs almost 5,700 people, approximately two-thirds of whom are graduates.

Most respondents in the BNSC study were optimistic about the prospects for future growth. This is backed up by evidence of British firms continuing to win major space-related contracts.



1. Inmarsat-4 launch.  
Credit: International Launch Services



2. Artist's impression of Inmarsat-4.  
Credit: Qinetiq  
Front cover image. The Bangladesh coastline seen by Envisat's MERIS.  
Credit: ESA

## Communication

The UK is a leading manufacturer of communications satellites. With increased Internet traffic and the development of broadband, multimedia, mobile and digital broadcasting technologies, the satellite communications industry is set to experience phenomenal growth in the coming years. The UK is in a strong position to capitalise on this increased demand.

The successful deployment of the world's most advanced civilian telecommunications satellites, Inmarsat 4 F1 and F2, shows what can be achieved by cooperation between Government and industry.

### Inmarsat

The world's most advanced civilian telecommunications satellite, Inmarsat4 F1, was launched in March 2005. The spacecraft provides users anywhere in the network's footprint with high-speed Internet and 3G phone connections. The service gives international travellers, including business people, disaster relief workers and journalists, access to high quality communications on the move.

The second satellite, Inmarsat-4 F2, was successfully launched in November 2005. Inmarsat-4 F1 and F2 now provide coverage across Europe, Africa, the Middle East, Asia and the Americas. It also covers the Atlantic Ocean and parts of the Pacific.

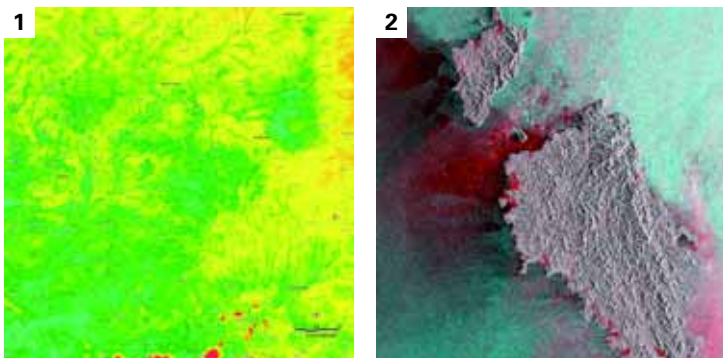
EADS Astrium, the company which won the \$770 million contract to build the three Inmarsat-4 satellites, was awarded £7 million in research and development grants from the Department of Trade and Industry (DTI) through BNSC. This helped fund pre-competitive development of the satellite's digital on-board processor. It is estimated the contract created an additional 220 jobs in the UK space industry.

### Broadening Broadband

The UK is pioneering the delivery of advanced broadband services throughout Europe. With the help of £23 million from BNSC, channelled through the European Space Agency's (ESA) Advanced Research in Telecommunications Systems (ARTES) programme, UK company Avanti Screenmedia is developing the Highly Adaptable Satellite (HYLAS).

The small satellite, planned for launch in 2008, is designed to help solve the problem of unequal access to broadband internet services in Europe. It is based around a low cost, low risk satellite targeted at areas of Western Europe that are unlikely to receive any terrestrial services within the next ten years.

HYLAS is unique in being the first satellite communications project that will bring together private venture capital to exploit the development of publicly funded technology. If HYLAS is successful, it is likely to lead to much larger missions in the future as market opportunities grow.



1. DMC image used to monitor vegetation growth in Darfur.

Credit: UNOSAT

2. Envisat image showing damage to the West coast of the Nicobar Islands caused by the 2004 tsunami.

Credit: ESA

### Topsat

TopSat was developed under the Government-funded small satellite programme, Mosaic, and launched in October 2005. Only 80cm across, the spacecraft holds an extremely powerful camera designed to provide visual images to a resolution of 2.5 metres.

QinetiQ is the prime contractor on the mission. The other three partners are Surrey Satellite Technology Ltd (SSTL), the Rutherford Appleton Laboratory and Infoterra Ltd, a subsidiary of EADS Astrium.

As the aim is to deliver high-resolution images to any area on Earth, the TopSat project includes a special lightweight portable ground station so pictures can be downloaded rapidly after imaging. This demonstrator satellite could also carry other payloads such as monitoring or communications equipment.

### DMC

Another Mosaic funded project was the Disaster Monitoring Constellation (DMC) built by UK company SSTL. Consisting of five low-cost Earth Observation microsatellites, it was established to detect and monitor natural and man-made disasters and environmental damage.

Although individual partners Algeria, China, Nigeria, Turkey and the UK own the satellites, the DMC is run by a UK-led international consortium, DMC International Imaging, to ensure activities are closely co-ordinated.

The constellation has proved its worth time and again in recent years. The satellites were used to provide images to relief organisations following the Asian tsunami in 2004 and Hurricane Katrina which hit New Orleans in 2005. They are being used by aid workers in many parts of Africa, including the Darfur region in Western Sudan.

## Generating business

The Government, through BNSC, promotes the benefits of space technology to the UK economy and society. BNSC works closely with UK Trade & Investment, the Government organisation that supports UK companies trading overseas, and with the Foreign and Commonwealth Office (FCO) in actively promoting British space interests through international exhibitions, trade delegations and ongoing publicity campaigns.

BNSC is also active in helping businesses seek funds to develop new technology and applications through ESA programmes such as ARTES, General Support Technology Programme (GSTP), and the Earth Observation Envelope Programme (EOEP).

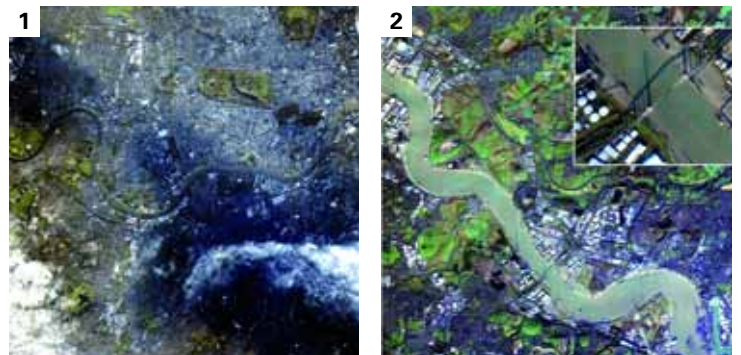
## Navigation

British industry is at the forefront of the design, construction and operation of Europe's ambitious Galileo satellite navigation system. Featuring 30 satellites and two control centres, Galileo will provide users with a guaranteed global positioning service accurate to less than one metre.

Giove-A, the first test satellite, was built in the UK by SSTL and was launched in December 2005. The satellite broadcast the very first Galileo signals, received by CCLRC's Chilbolton Observatory in Hampshire.

Galileo Industries, a consortium which includes UK-based EADS Astrium, is leading the development of Giove-B, the second test satellite. Giove-B will trial new technology, including the first Caesium atomic clock to be tested in space.

The role taken by UK industry in both the development and operational phases of the project will help to ensure the UK maintains its expertise in space technology. BNSC partners the DTI and the Department for Transport (DfT) are funding Galileo on behalf of the UK, with DfT leading on policy.

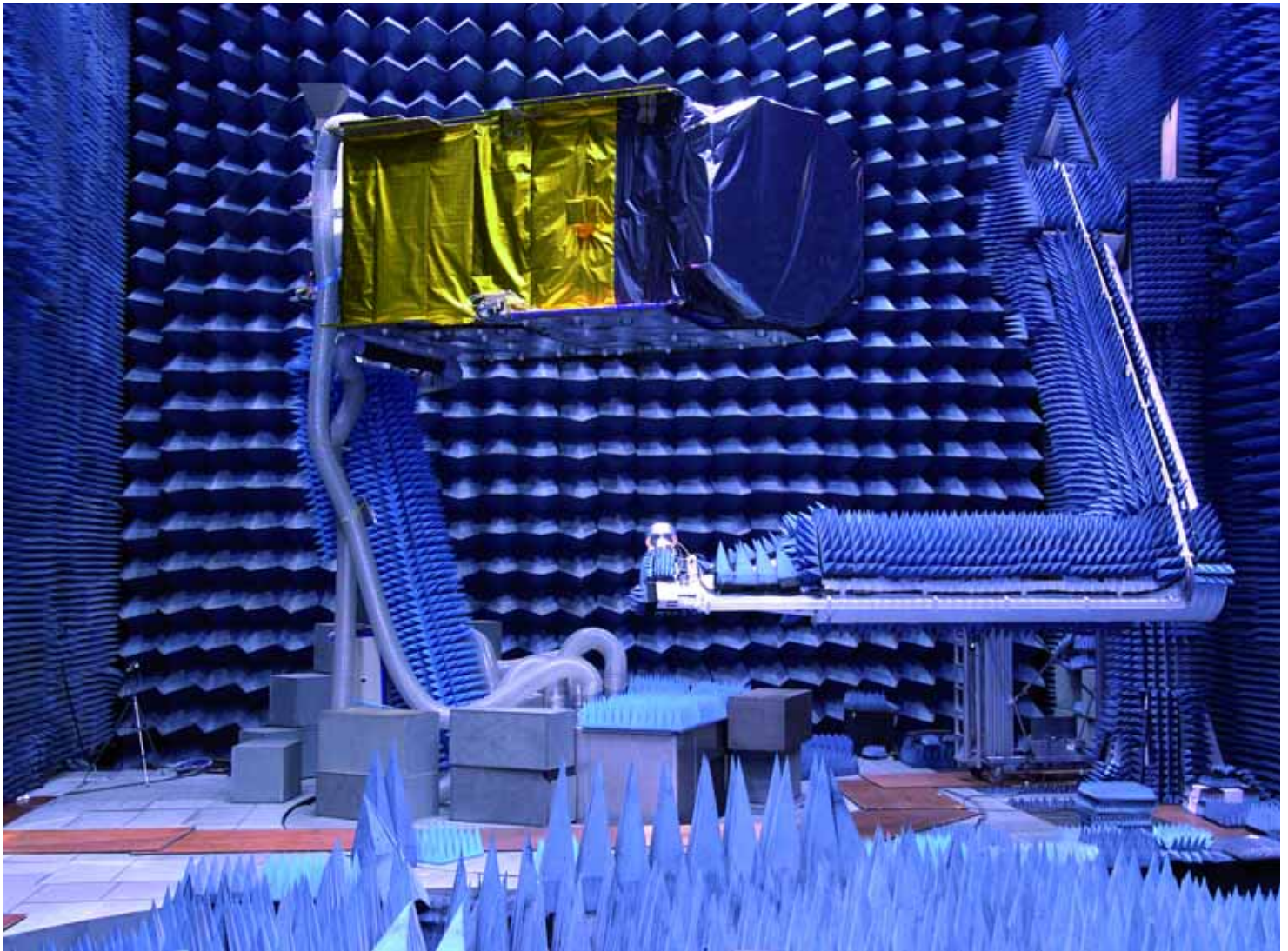


1. TopSat image of Central London.

Credit: QinetiQ

2. TopSat image of the Dartford bridge over the River Thames.

Credit: QinetiQ



Inmarsat-4 undergoing radio frequency testing at EADS Astrium's anechoic chamber in Toulouse, France.  
Credit: Inmarsat

## More Information

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