

Role and relevance of space applications in the wider economy

19 April 2012

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Chief Executive

Technology Strategy Board



Agenda

- Introduction to the Technology Strategy Board
- Our role in Space
- Space in the wider economy
- Alignment with ESA IAP
- Future activity
 - Launchpad opportunity
 - Satellite Applications Catapult Centre

The Technology Strategy Board is...

A national body supporting business innovation...

for business benefit..

for economic growth..

for quality of life..

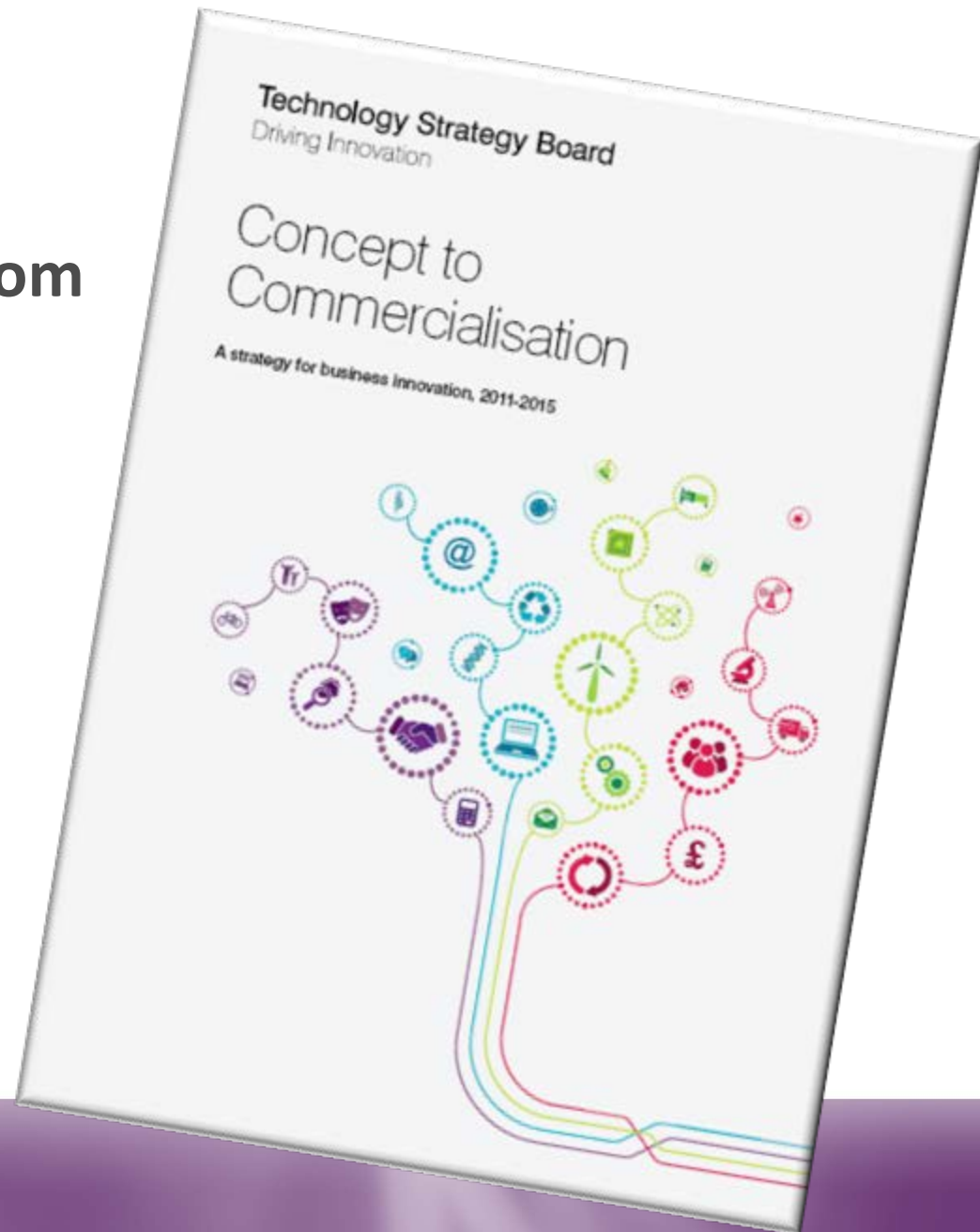
Who we are as an organisation...

- An arm's length executive body guided by business-led Governing Board
- Sponsored by the Department for Business, Innovation and Skills (BIS)
- We work across government departments and often in partnership with the research councils
- Focused on **business innovation** and the **application** of technology
- Staff of around 140 based in Swindon

Our Strategy

Support for companies from

Concept to
Commercialisation



In just 4 years..

- Over 2000 CR&D projects launched
 - Most are Business led
- 4000 business partnerships and almost all the UK's universities
- Together with partners and business, over £2bn invested in UK innovation
- Developed new ways of reaching out to SMEs
 - Launchpad, Feasibility Studies, Grant for R&D programme (SMART)
- Catapult Centres programme

The Toolset

Range of Tools with different objectives / characteristics

Smart

SBRI Government challenges.
Ideas from business.
Innovative solutions.

Collaborative R&D

_connect

Knowledge
Transfer
Partnerships



eurostars™

Knowledge
Transfer
Networks

CLEAN AND COOL
MISSION 2012
24 - 31 March

CATAPULT®

Launchpad

Why is Space important and unique as a driver of innovation and growth?

- Satellite systems have global reach
 - Communications
 - Broadcasting
 - Positioning
 - Observation
- Space technology has to meet many challenges
 - A hostile environment
 - High reliability
 - Autonomous operation
 - Analysis of large data sets
 - Small, low power, low mass equipment

What is our role?



- **‘The Technology Strategy Board works closely with the UK Space Agency to enable the development, commercialisation and exploitation of space technologies’**
- We have :
 - A formal service level agreement with the UK Space Agency
 - A partnership with the European Space Agency and responsibility for part of the UK Subscription to ESA



Our role - working with the UK Space Agency



- Delivery partner of the UK Space Agency for telecommunications and navigation programmes
- Promoting business opportunities for the UK Space industry across other growth sectors
- Providing Technology Demonstration opportunities
- Knowledge Transfer to drive growth
- Open Innovation to accelerate commercialisation of R & D activity

Space is a growth area

- Global market forecast to be worth £400 billion by 2030
- UK industry aims to capture 10% of market
- ‘applications and services using Space data will be one of the most important elements for delivering growth’

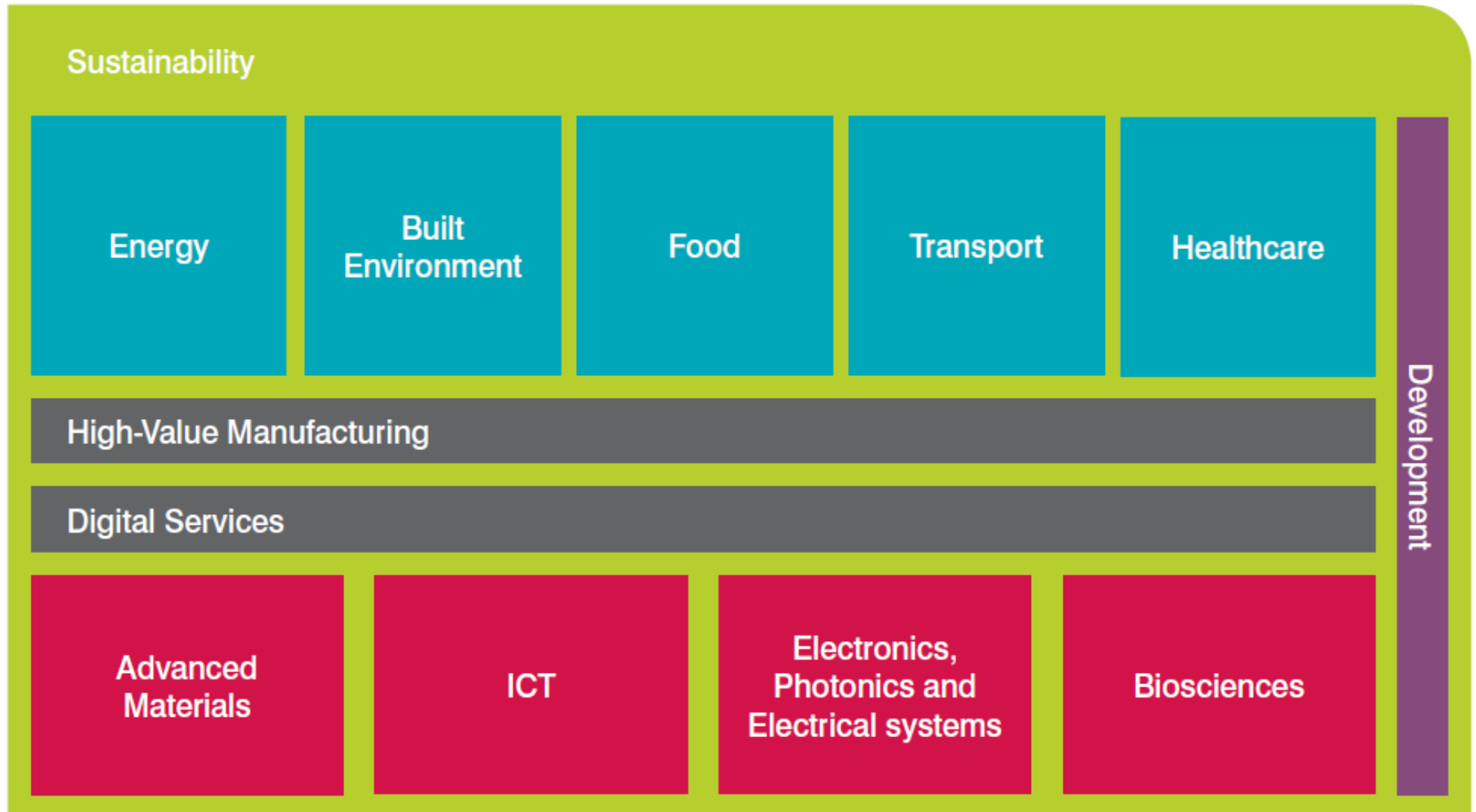


1. The high growth of the space industry over the past decade is well known (9-10% per annum).
2. Most of the growth has come from the downstream sector (i.e. services rather than satellites and launchers) – but sustaining that growth at 10% p.a. is challenging:
 - Direct to Home TV has been the main driver (65% of the total) but is showing signs of saturation (latest optimistic report suggests 5.6% growth p.a. over next 5 years), so new markets will have to be opened up and new applications developed;
 - Other big opportunities are in broadband Satcoms and location-based services based on Satellite Navigation (but Europe lags behind the USA and Japan in this field);
 - Earth Observation shows promise for services to consumer and business markets but revenues are tiny compared to Satellite Communications (2% versus >75% of downstream revenues).
3. Securing continued high growth therefore depends upon new markets and more powerful, integrated solutions.

Promising Space applications

- Distance learning and telemedicine
- E-commerce
- Entertainment
- Location-based consumer services
- Traffic management
- Precision farming and natural resources management
- Urban planning
- Disaster prevention and management
- Meteorology and climate change

Promising Space applications – across all our theme areas



The Economic Case for Integrated Applications



1. ESA has analysed the potential economic impact of IAP, using case studies of three target sectors that offer major growth potential:
 - Offshore renewable energy (UK = 40% of European market, with capital spend averaging >€13Bn/year to 2030, plus €4.7Bn/year on operations);
 - Forest carbon trading (€133m in 2010 & growing 10%/year but forecast to grow to €29Bn by 2030 if Reduced Emissions from Deforestation & Degradation (REDD) becomes part of regulated carbon reduction schemes);
 - Insurance and reinsurance (insured losses from disasters has doubled in past ten years from €18Bn to €35Bn, with a prime IAP target being to reduce the current €2.5Bn costs in European loss adjustment activities).
3. Many other sectors also offer major potential, which space applications are either already starting to address, or which should be addressed in future.

NSTP Space for Growth £8.5m



**28 fast track projects
announced in February.
22 companies of which 14 are
SMEs.**

**4 flagship projects
announced in April.
21 companies of which 7
are SMEs.**

Collaborative R & D challenge competitions – opportunities for Space companies

Technology Strategy Board
Driving Innovation

£4m
(£0.5m for Space)



Water security

COMPETITION FOR FEASIBILITY
AND COLLABORATIVE R&D FUNDING
MARCH 2012



EPSRC
Pioneering research
and skills

Closes 2nd May

Technology Strategy Board
Driving Innovation

£10.5m



Marine energy:
Supporting array technologies

COMPETITION FOR COLLABORATIVE R&D FUNDING
MARCH 2012



Closed 17th April

Technology Strategy Board
Driving Innovation

Galileo Public Regulated Service (PRS) – UK PRS Demonstrator Programme - £800k

"To provide a pre-operational PRS phase to stimulate, support and coordinate Member States' operations of PRS and their interface to the Galileo Security Monitoring Centre (GSMC) and enable them to progressively exercise and optimise their implementation of PRS."

Opens 28th April

Registration closes 30th May

Competition closes 27th June



Convergence in a Digital Landscape - £1.8m

Technology Strategy Board
Driving Innovation



Convergence in a
digital landscape
COMPETITION FOR FEASIBILITY FUNDING

CHALLENGE 1 APRIL 2012
CHALLENGE 2 JULY 2012
CHALLENGE 3 OCTOBER 2012

**Feasibility projects for
small and micro
companies**

Opens 23rd April

**Briefing event for the
three-part programme.
London 2nd May**

How can we connect communities and visitors along the Wales Coast Path? - £125k

The latest GeoVation Challenge aims to look at how people who live and work along, or visit the 870 mile (1,400 km) coastal path can utilise innovative digital technology to benefit from this 'world first' opportunity.

Closes 2nd May



Llywodraeth Cymru
Welsh Government



Government challenges.
Ideas from business.
Innovative solutions.

Future opportunity under discussion with ESA – use Launchpad process for the Harwell Space Cluster

- Launchpad is all about driving economic growth through stimulating developing clusters of businesses
- we will provide research & development grant funding to stimulate specific innovative projects;
- our grant funding and new finance raised to match this funding for the projects will stimulate the development of individual businesses;
- bringing together these businesses with other parts of the 'innovation ecosystem' (including business support mechanisms such as investor networks, mentors, business coaches, designers, IP specialists, expert advisors) will help to stimulate the overall growth of the cluster.

Closing the gap between concept and commercialisation



Offshore Renewable Energy Catapult

- **Offshore wind**
 - Transferring knowledge from established offshore engineering and linking to other UK strengths
- **Marine Power**
 - Covering Tidal and Wave
 - Will grow in importance as sector evolves
- **Infrastructure** 'to shoreline' and underpinning technologies
 - *Announced May 2011*
 - *Operational summer 2012*



Connected Digital Economy

Likely Strategic Themes

- Digital Media / Content value chains
- Pervasive Digital Services
- Linking the physical and the digital

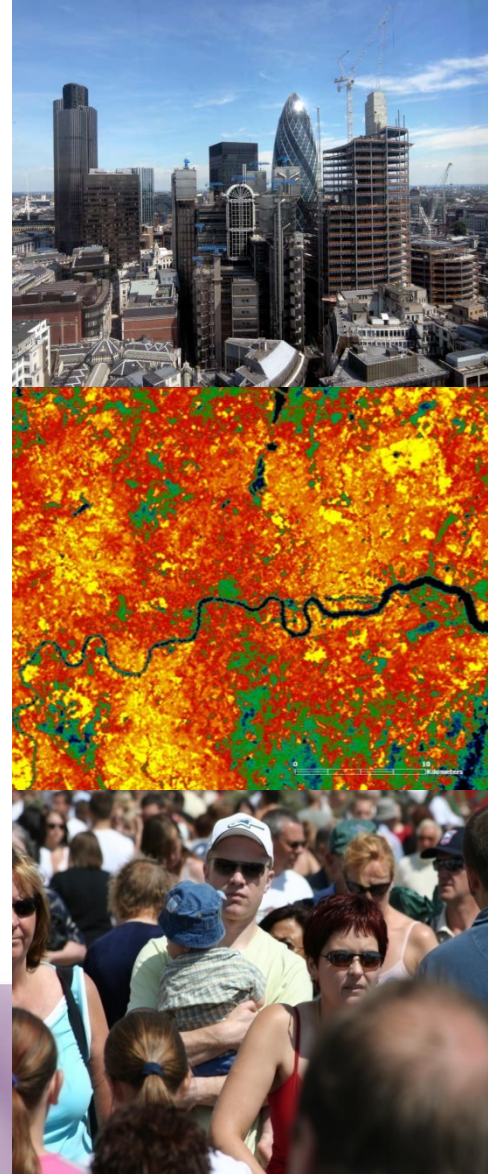


Transport Systems

Developing and delivering solutions to improve the efficiency and cost effectiveness of moving people and goods.

Likely Strategic Themes

- **Modal Integration and Convergence**
- **System Performance and Reliability**
- **New Business Models**
- **Real-time Information**

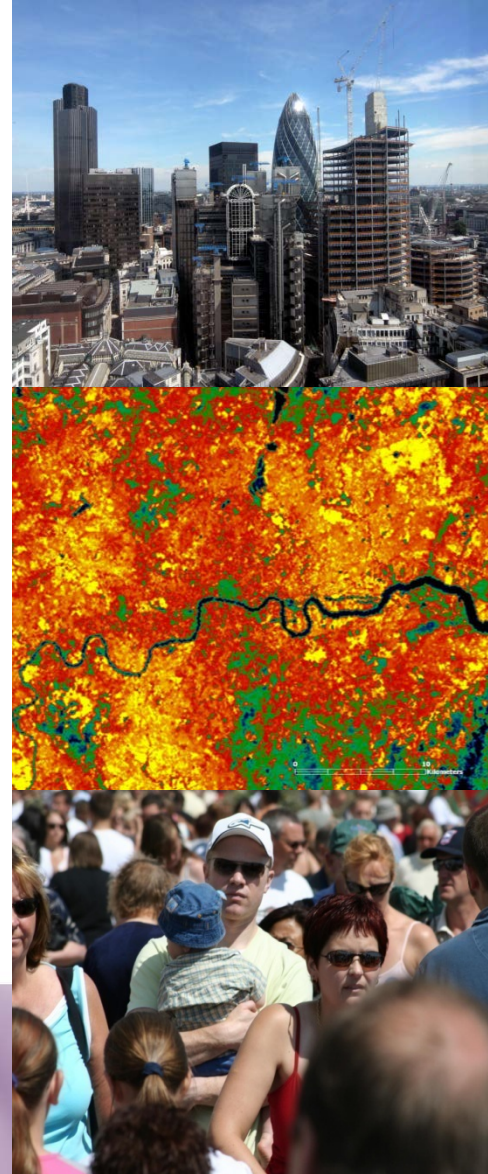


Future Cities

Helping business provide integrated city-wide services to support a thriving economy, reduced environmental footprint and excellent quality of life.

Likely Strategic Themes

- **Demonstrators managed through a city observatory.**
- **Creating integrated solutions from silos.**
- **Increasing city density without congestion.**
- **Transition to a low carbon economy.**



A new focus



A Satellite Applications Catapult will ;

- Provide the end to end infrastructure required to link innovative ideas from existing players and new collaborators from outside the Space sector
- Prototype and demonstrate new applications
 - e.g. Mobile communications, Maritime safety, Air Traffic Management, Climate and Environmental Services, Natural resource management

Why did Satellite Applications get selected?

- Large global market
- ‘Spillover’ to other growth markets
- Possible to create ‘critical mass’
- Ongoing R&D funding – TSB, UKSA, ESA, EU
- Right time – Catapult can accelerate growth
- Evidence of good UK wide collaboration
- Sustainability mindset
- Impact on economic growth/Gross Value Add

The Catapult will be industry led

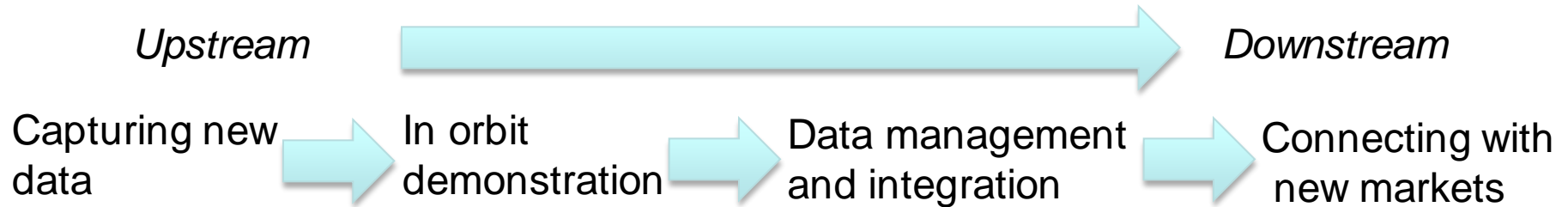
... by a group of the UK's leading Space companies



Working with the International Space Innovation Centre



Satellite Applications Catapult Centre will provide end-to-end capability



Satellite
technology

Satellite
Operations

Data
Downlink &
Processing

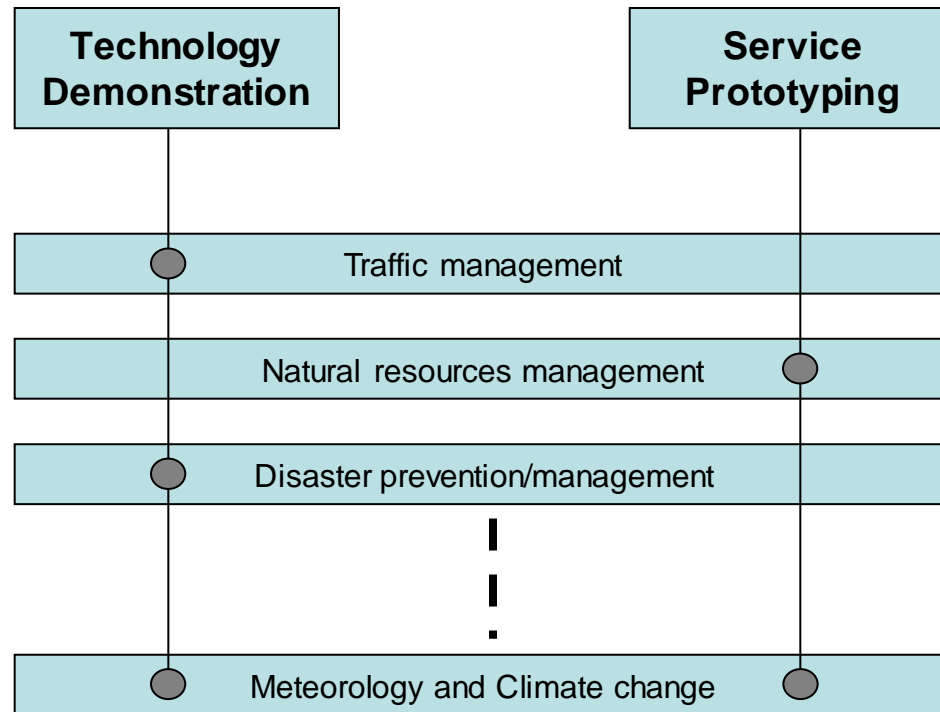
Data
Exploitation &
Application

and focused on the following outcomes

- Identifying key growth **markets** for UK Space industry across the economy
- Creating a **UK focus** for Satellite applications research
- Stimulating industry and academic **cooperation** across sectors
- Providing access to **data handling facilities** and **in-orbit test beds**
- Accelerating **commercialisation** of satellite technology and applications
- Supporting innovation by major industrial players and **SMEs**

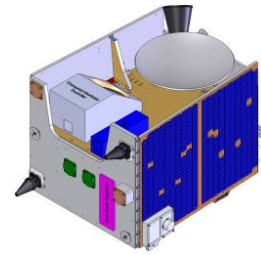
It will develop distinctive capabilities

in the key
growth
markets...

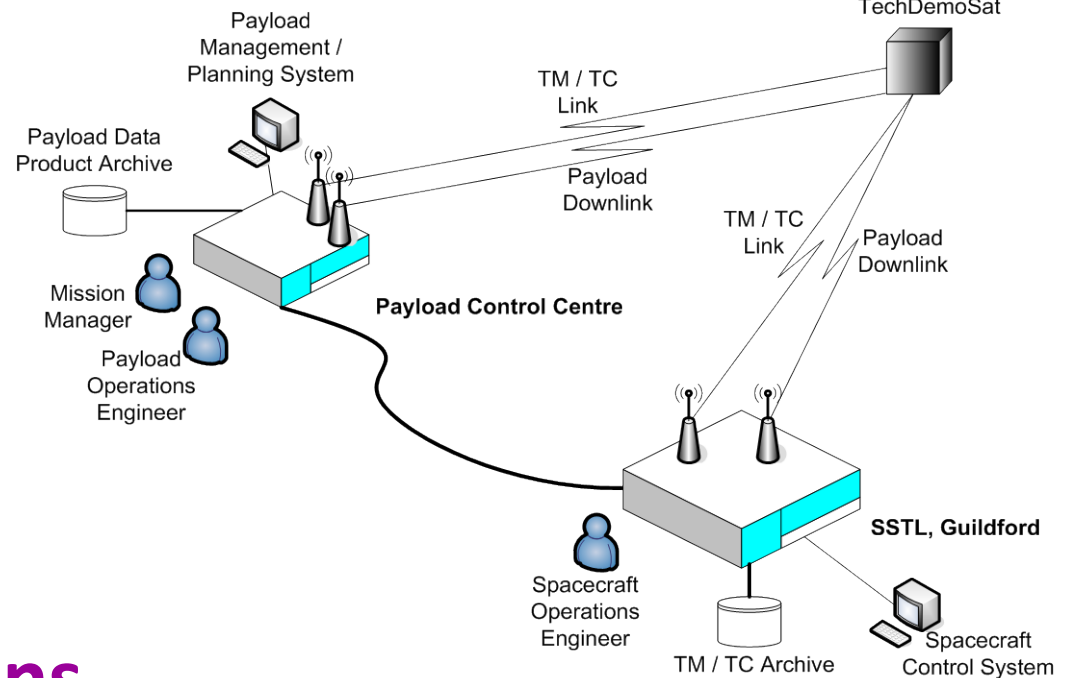
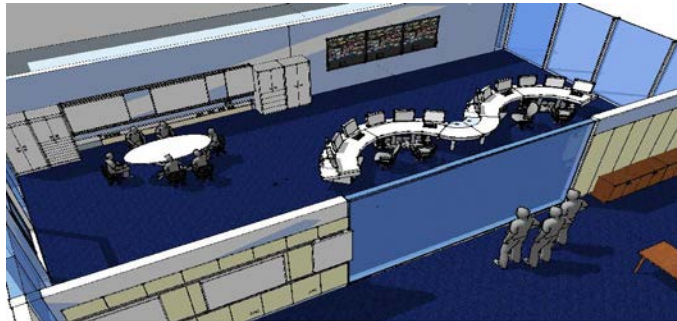


- **Technology proving / demo** includes in-orbit through TechDemoSat follow-on missions as well as access to national test facilities (anechoic chamber, thermal-vacuum, RF-test equipment etc)
- **Service prototyping** includes access to Earth Observation and Sat Nav data together with Sat Comms products and services. Existing ISIC facilities will enable a quick start for the Catapult.

Technology Demonstration - in orbit



Low cost Satellite Operations Centre



Prototype Applications and Services – on the ground



Technology Strategy Board
Driving Innovation

Summary

‘Space can increasingly be seen as an important potential source of economic growth, social wellbeing and sustainable development’

OECD The Space Economy at a Glance 2011

Get involved – join _connect

Join the Space Special Interest Group



Welcome to _connect

Welcome to _connect. This new platform, brought to you by the Technology Strategy Board, provides an effective and powerful way for you to collaborate online, network and share knowledge with other innovators.

[Join _connect](#)

  **Share Knowledge**  **Join Networks**  **Find People**

The screenshot shows the _connect platform interface. It features a blue header with the text 'Welcome to _connect' and a paragraph describing the platform's purpose. Below this is a 'Join _connect' button. The main navigation bar includes icons for Home, Share Knowledge, Join Networks, and Find People. To the right of the text is a network diagram with various colored nodes (blue, green, purple) and connecting lines.

Space
Special Interest Group

 **Join this network**

Knowledge
Transfer
Networks

Technology Strategy Board
Driving Innovation

For more information...

www.innovateuk.org

_connect Network: <https://ktn.innovateuk.org>

Background on most promising markets: Offshore renewable energy



1. 120GW potential for wind energy in European waters, plus wave and tidal in the longer term.
2. Capital spend in UK over the next 15 years averages >€13Bn/year, plus €4.7Bn/year on operations (about 40% of European total).
3. Supplier industry is pan-European.
4. Prime opportunity is for improved prediction of wind energy output and of weather windows for construction and maintenance.
5. Potential European benefits:
 - up to €3Bn in reduced costs for Meteorological Masts;
 - €11m for every day that wasted vessel charters are avoided by better weather forecasting;
 - €300m/year for every 1% increase in energy output.
6. The key is integration of GNSS, EO, Satcoms and terrestrial systems (e.g. floating Lidar), to improve wind and sea state forecasting.

Background on most promising markets: Carbon trading and forest certification



1. Global carbon markets were valued at €108Bn in 2009:
 - of importance to all European economies.
2. Prime opportunity is in forest carbon trading:
 - worth €133m in 2010 and growing 10%/year; but forecast to grow hugely to €29Bn by 2030 if Reduced Emissions from Deforestation & Degradation (REDD) is part of regulated carbon reduction schemes;
 - certification of forests equally a growing market with big potential.
3. Aim is to improve the accuracy of forest asset valuation:
 - 10-40% of the value of carbon credits is withheld as a buffer against inaccurate assessment – this can be significantly reduced;
 - improvements worth up to €2Bn/year by 2030 in European markets.
4. The key is integration of:
 - GNSS with evolving EO capabilities for initial assessment, ground truthing (i.e. field surveys and spot checks) and detailed mapping;
 - Satcoms in longer term for downloading of EO & GIS information to surveyors in the field.

Background on most promising markets: Re/insurance



1. European insurance industry is the world's biggest, with three of the top five countries by value (UK, Germany & France):
 - €490Bn in 2010 premiums income (excluding-life insurance).
2. Prime opportunity is damage assessment and loss adjustment:
 - Global trend in insured losses from disasters has doubled in past ten years from €18Bn to €35Bn;
 - Loss adjusters are the "Second Responders";
 - Critical need for communications and validation of location and time, for making and reporting their assessments;
 - Cost of loss adjustment is up to €2.5Bn across Europe: the aim is to make major savings and efficiency improvements in this area.
3. Key is integration of GNSS and EO with Satcoms for ground-truthing and two-way communications:
 - Development of smart-phone applications linked to transportable Satcoms hubs and pico-cells.