

## Satellite Applications

# Overview and activities

Prof Nick Veck

UKSA “Would like to meet”

London

13 February 2018

“To Innovate for a better world,  
empowered by satellites”

We work with  
**Innovate UK**

**CATAPULT**

# Catapults: Closing the gap between concept and commercialisation

## The vision: a network of world-leading centres:

- Bringing research and business together
- Accelerating commercialisation
- Investing for the long term
- Not for Profit



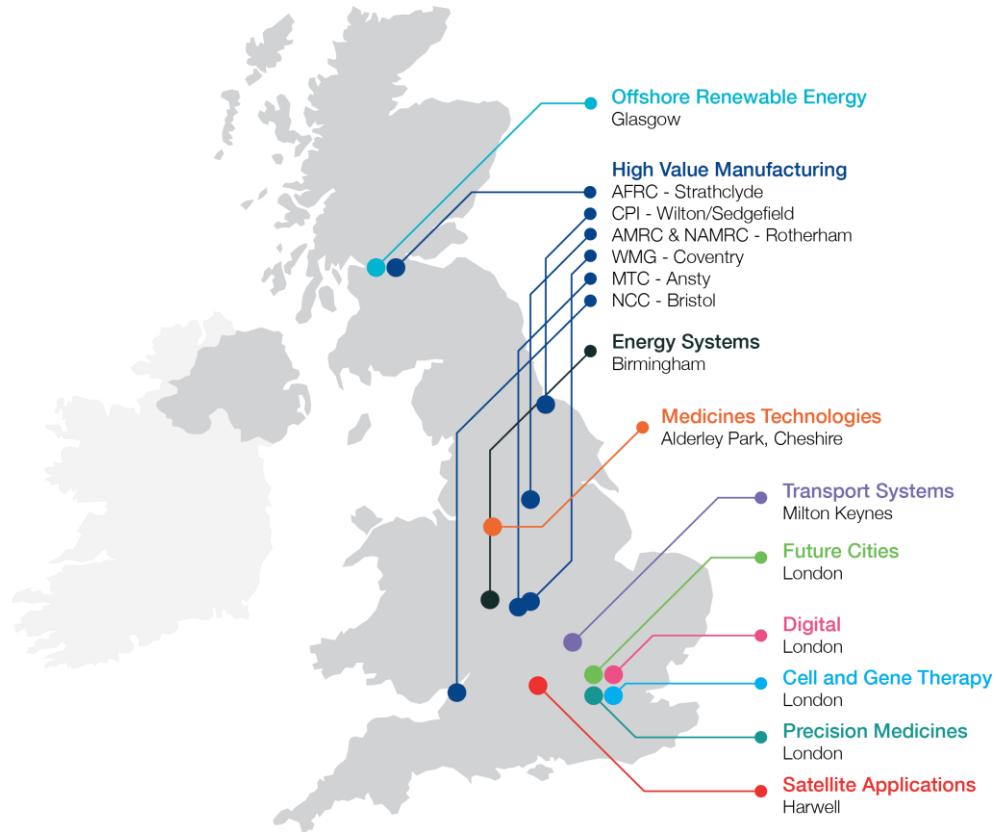
# Catapults – The Network

10  
Catapults

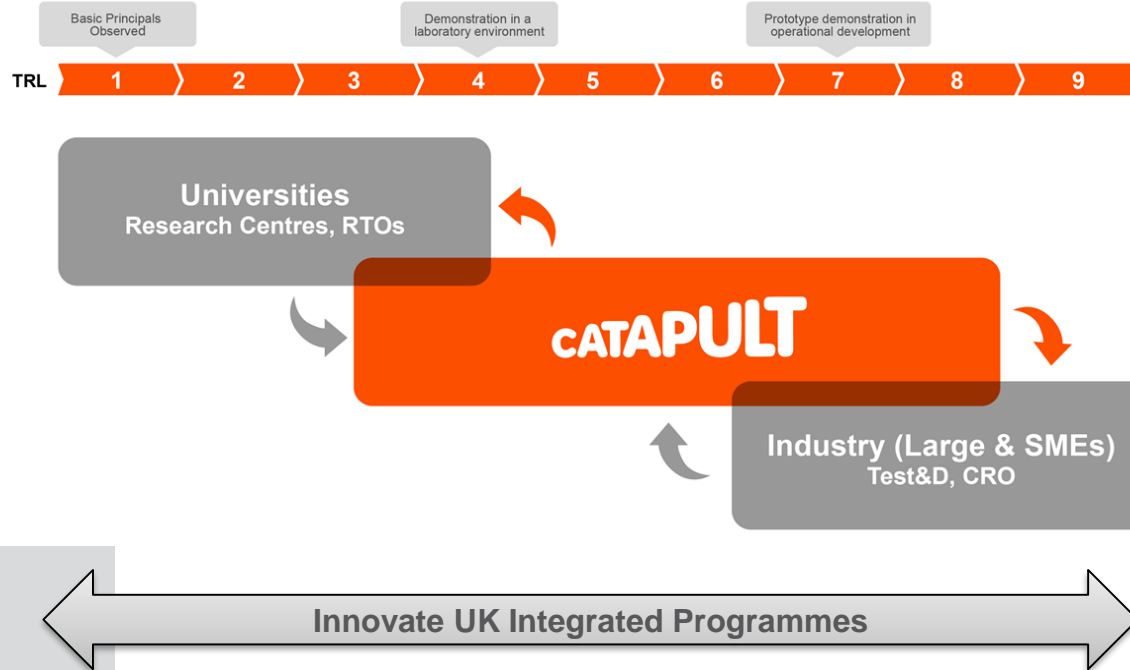
Recently added: Compound  
Semiconductor Applications  
Catapult

£1bn

Private & Public Sector  
Investment



# Catapults – a force for innovation & growth



# What is Innovation?

“Innovation is:

- production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres;
- renewal and enlargement of products, services, and markets;
- development of new methods of production; and
- establishment of new management systems

**It is both a process and an outcome.”**

*Crossan and Apaydin, 2010 – a variant on the OECD definition*

# Variants of Innovation

## Product Innovations

- A good/service that is significantly improved with respect to its intended purpose
- A good/service that is altered to widen its usage to new applications / markets



## Process Innovations

- A change in internal processes that leads to a reduction in costs, higher quality or leads to new good/services and/or new market access
- Covers changes in technology, working practices, supporting roles, *e.g.*, better procurement *etc*



# Variants of Innovation

## Marketing Innovations

- Activities related to increasing and broadening the appeal of the good or service, without changing the form or function, *e.g.*, packaging, advertising, public engagement strategy, pricing strategy *etc*





## Organisational Innovations

- Radical changes to working practices, supported by the tools to allow for success, *e.g.*, changes in distribution of responsibilities and decision making, sharing of knowledge, attitude to internal vs external work, overall company culture



# Variants of Innovation

Vacek, 2009

<b>Closed innovation</b> 	<b>Open innovation</b> 
All the best people are working for us	Not all of the best people work for us . We must work with clever people within and outside our company.
R&D creates profit only when we invent, develop and market everything ourselves.	External R&D can create remarkable value; to employ it, we need absorption capacity, often as internal R&D.
If we develop the product ourselves, we will be the first on the market.	R&D can create profit even if we do not initialise and perform it ourselves.
Winner is who gets the innovation to the market first.	To develop better business model is more important than to be the first in the market.
We will win if we develop most of the ideas (and the best of them).	We will win if we make best use of internal and external ideas.
We must have our intellectual property under control so that our competitors can't take advantage of it.	We must be able to profit from others using our intellectual property and we must license the intellectual property if it supports our business model.



# Disruption



‘Disruption’ suggests “difficulties/problems”



‘Disruption’ suggests something that’s short-lived



‘Disruption’ suggests something minor unlikely to have significant impact



INNOVATION

DISRUPTION



DOING THE SAME  
THINGS A BIT  
BETTER.

DOING NEW  
THINGS

MAKING THINGS THAT  
MAKE THE OLD THINGS  
OBSOLETE

# Satellite Applications Catapult – at the heart of the Harwell Space Cluster

ESA Business Incubator

STFC: Jasmine HPC  
DataCentre

Space Industry & SME  
Business Units

STFC:  
Diamond Light Source

Rutherford Appleton  
Labs

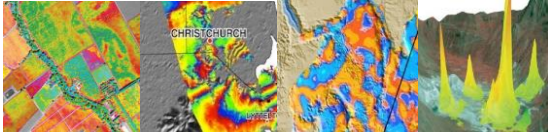
ESA ECSAT

EDRS Gateway

Satellite Applications  
Catapult



# The Opportunity for the Space Sector



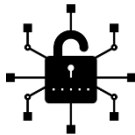
**Earth Observation – monitoring**

**Communications – connecting**

**Navigation – locating**

**Applications**

INTEGRATION FOR A CONNECTED AND INFORMATION CENTRIC WORLD



# Satellite Applications Catapult – Strategy at a Glance

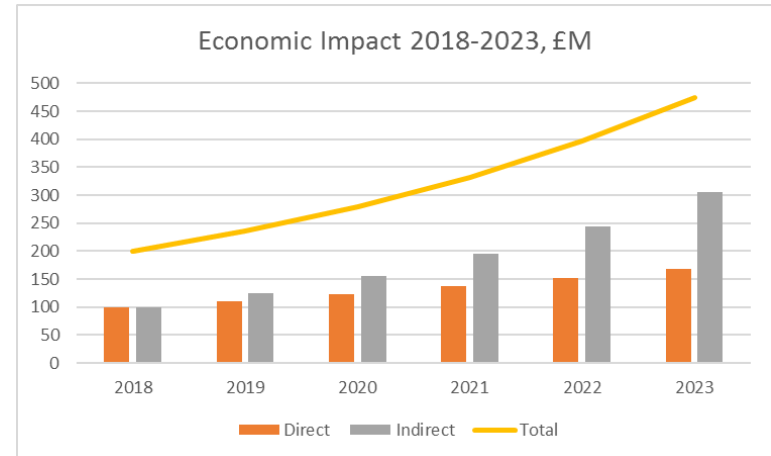
## We do Three Things ...

- We **'Energise'** new markets by stimulating demand and overcoming barriers to innovation adoption
- We **'Empower'** technologies, accelerating TRL development towards new market opportunities
- We **'Enable'** businesses to overcome the unique challenges of working with a space-based services



## ... across Four Global Markets

- Intelligent Transport
- Blue Economy
- Government Services
- Sustainable Living



## Three Things ... 1: Energising the Market

**Energising the Market:** We unlock latent customer demand, open new markets, and drive exports by raising awareness, changing preconceptions and showcasing the power of space derived services. As a neutral, trusted partner we can uncover unmet needs in diverse markets right across the economy, and act as a channel to solution providers

### Changing Perceptions

- Stakeholder Workshops
- Speaking at Conferences
- Engaging industry fora

### Stimulating Collaborations

- Market-led Challenges
- Collaborative Projects
- Published Opportunities

### Thought Leadership

- White Papers and Blogs
- Technology Showcasing



## Three Things ... 2: Empowering the Technology

### Empowering the Technology:

We help companies advance their products to be closer to the market opportunities. We identify the barriers to entry, such as regulation, powerful incumbents, or simple accessibility, and then find the mechanisms to overcome them. We provide the linkages to related technologies and their communities (like machine learning, geospatial and the 'Internet of Things') which enable the benefits of space to be realised.

### Addressing Barriers

- Engaging Regulators
- Exchanging Knowledge
- Platforms and Facilities

### Impactful Collaborations

- Technology-led Challenges
- Collaborative Projects
- Published Opportunities

### Thought Leadership

- Horizon Scanning Reports
- White Papers and Blogs
- Technology Showcasing



## Three Things ... 3: Enabling Business

**Enabling Business:** We connect businesses of all sizes with the resources they need to launch and grow. This includes improving the supply of finance, business support, information, and skills. It can also mean demonstrating credibility and fostering the right partnerships, and delivering contracts to Catapult for delivery to our customers. Now that a vibrant and dynamic start-up ecosystem has been created, we are increasingly focusing on ways to help businesses 'scale up', to ensure global pre-eminence.

### Attracting Investors

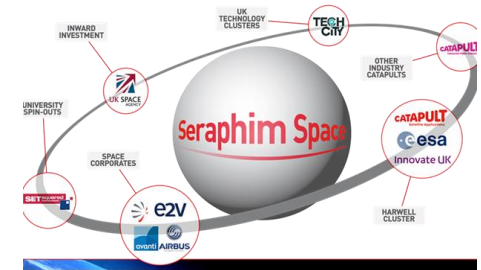
- Raising Awareness
- Investor Events
- Support to Due Diligence

### Encouraging Start-Ups

- Hackathons & Competitions
- Support to Spinouts
- Supply Chain Events

### Accelerating Growth

- Facilities and Expertise
- Knowledge Exchange
- Business Sprints
- Spin-Up/Scale-Up
- Catapult-as-a-Customer



... across Four Global Markets





# 1: Intelligent Transport Systems

Increased exploitation of autonomous systems will require increased resilience in positioning, timing, communications and information support systems.

## Autonomous Systems

- Robust navigation
- Resilient and ubiquitous communications

## Safety and Security

- 'Communications Everywhere' for Emergency Services
- Enhanced mass-market services (e-Call)

## Traveller Services

- Seamless connectivity for infotainment
- Platooning



## 2: Blue Economy

The increasing focus on improving the efficiency and sustainability of the marine environment requires the global connectivity and observation that satellites can provide.

### Sustainable Fisheries

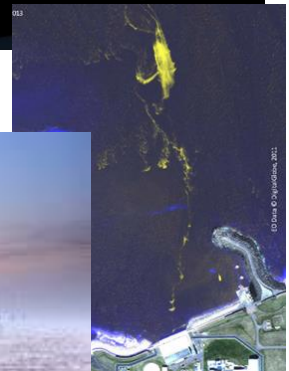
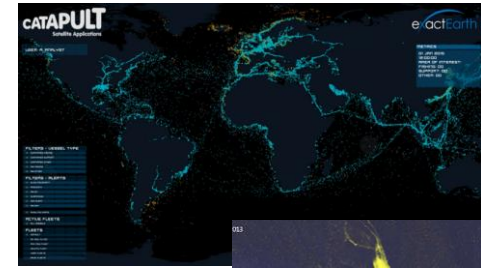
- Ocean Mind Business Unit, tackling illegal, unregulated and unregistered fishing
- Aquaculture Monitoring

### Port and Hinterland Development

- Smart Ports, including communications and logistics
- Resilience and Security

### Coastal Monitoring and Protection

- Offshore Infrastructure
- Coastal Infrastructure



## 3: Sustainable Living

The UN Global Goals highlight the need for sustainable development of cities, agricultural land and power generation.

There is a need to better understand the impact of human activity on the environment in new, transparent ways.

### Environmental Monitoring

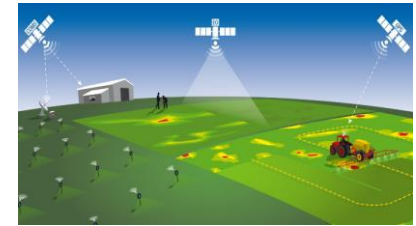
- Mining and Extractive Industries
- Illegal logging, flooding and pollution (EASOS)

### Food Security

- 'AgriTech' and crop health management
- Livestock and grazing management

### Natural Resources Management

- Water
- Energy



## 4: Government Services



Our goal is to enable the public sector to save money, innovate and become more productive by using space technology and data

### Space for Smarter Government

- In partnership with UKSA
- Exports enabled via the International Partnership Programme

### Satellite Enabled Cities

- Planning and Local Government (with FCC)
- Healthy New Towns

### Health and Wellbeing

- Rural Health  
(E.g. Diabetes Management)
- Emergency Response



# Exploring New Markets

Alongside our 4 priority Global Markets, we are already investigating options for significant new markets to move into once the current programmes mature

Here we show the leading candidates currently being considered.

## **FinTech & Insurance**

- Improving Access to Financial Services
- Financial Intelligence
- Insurance and Risk Management

## **Health and Wellbeing**

- Health Connectivity
- Emergency Response
- Environmental aids to Preventative Healthcare

## **Sustainable Energy**

- Managing remote infrastructure
- Overcoming environmental hazards
- Energy demand reduction

## **Tourism & Heritage**

- Planning and Managing Change
- Monitoring Heritage Sites
- Tourism Sustainability

## **Climate and Weather**

- Risk Awareness and Management
- Support to long-term planning

## **Infotainment and Sport**

- Connectivity and tracking (e.g. ocean racing, cycling)
- Low-cost mobile broadband
- Visualisation and Media (Augmented reality with EO)

# Exploring New Technologies

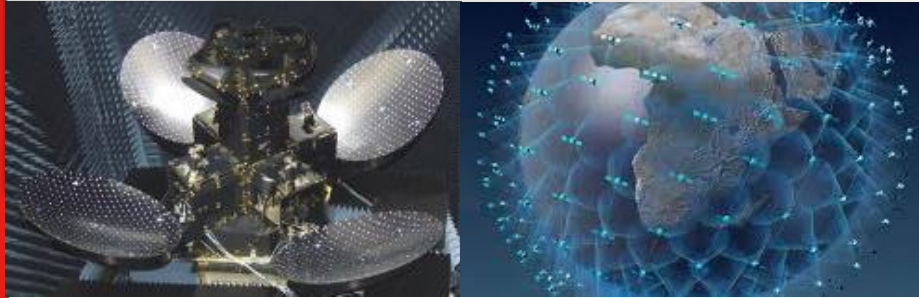
## Wireless Communications

### Advanced Satellite Constellations

- Platforms & Payloads
- Device Technology
- Ground Segment Operations
- Novel Mission Concepts

### Mobile Connectivity and Positioning Systems

- Advanced antenna systems
- 5G Hybrid Networks
- Semiconductors & Devices
- Novel PNT Concepts
- Hybrid Devices (IoT)
- Cyber Security



## Digital Intelligence

### Robotics and Autonomous Systems

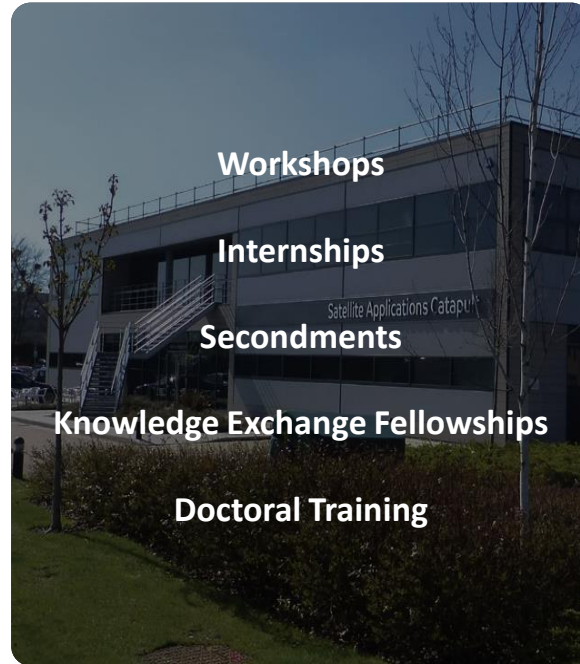
- Artificial Intelligence
- Autonomous systems
- Novel sensors and data processing architectures
- Multi Platform Operations (UAVs & HAPS)

### Smart Geospatial Systems

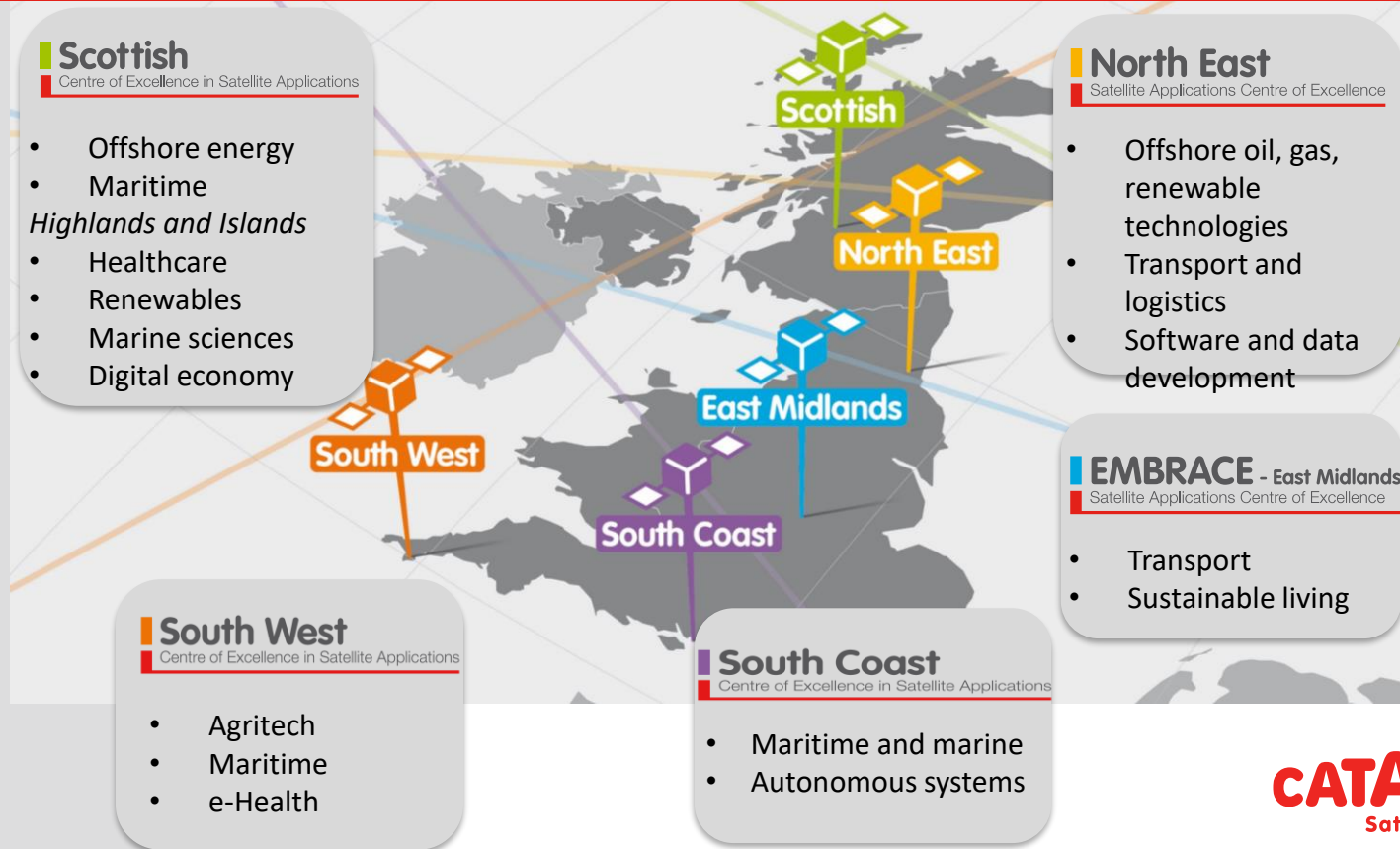
- Computing architectures
- Geo-Visualisation
- Geospatial Media
- Edge & Fog Computing
- Democratisation of data
- Data refinement



# Knowledge Exchange: Bringing people & ideas together



# UK Reach: Centres of Excellence





# Business Funding & Innovation



# Satellite Applications Catapult – Summing up...

## **The Satellite Applications Catapult is now well established in the UK Space landscape**

- Since our inception in 2013, we have established a strong team, and a unique collection of facilities that are in demand
- Our services are demonstrably supporting the Satellite Applications sector, and we have developed a programme of activities industry is keen to engage with
- We have consistently delivered against plan, and our economic impact is already measurable

## **Our plan is bold, ambitious, and builds on our success**

- We have a clear vision for accelerated market impact, and economic success
- We will continue our current market-led initiatives to achieve maturity, and prepare the way for new markets to follow
- We will expand our support to businesses, through enhanced regional support, new and improved facilities, and more targeted support to growing businesses with exceptional potential
- Our core programme will deliver £475M of economic impact per year by 2023, in return for an investment of £68M

## Satellite Applications

Thank You!

We work with  
**Innovate UK**

**CATAPULT**