

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”

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



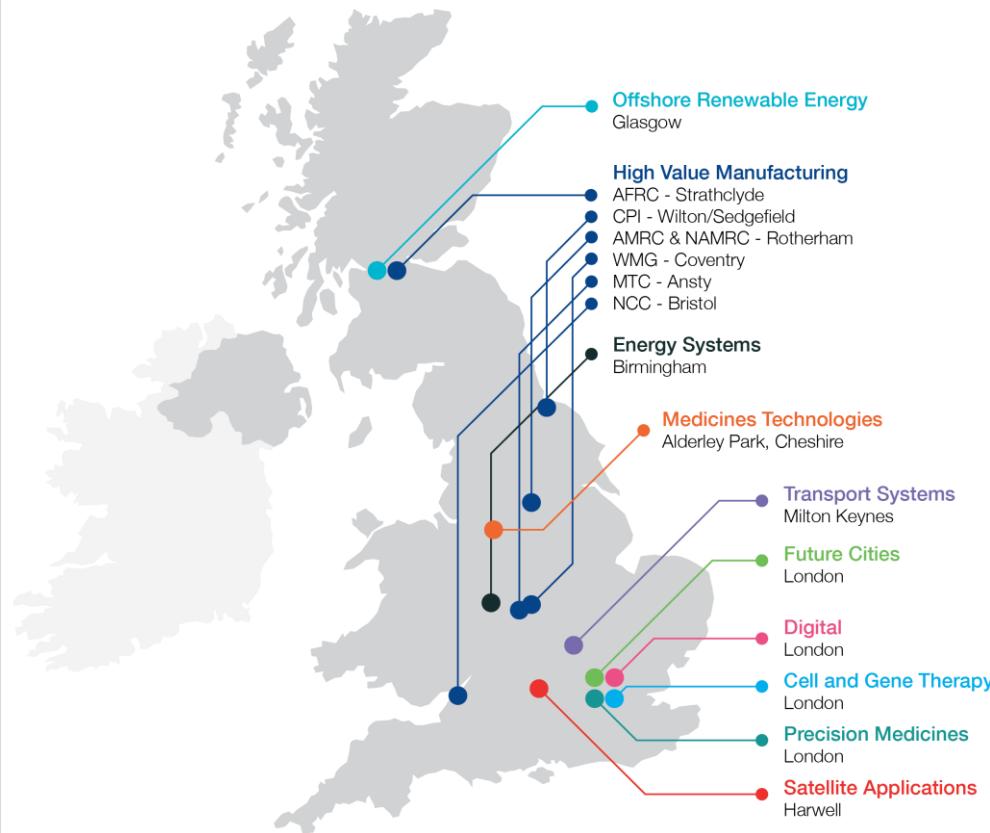
Catapults – The Network

10
Catapults

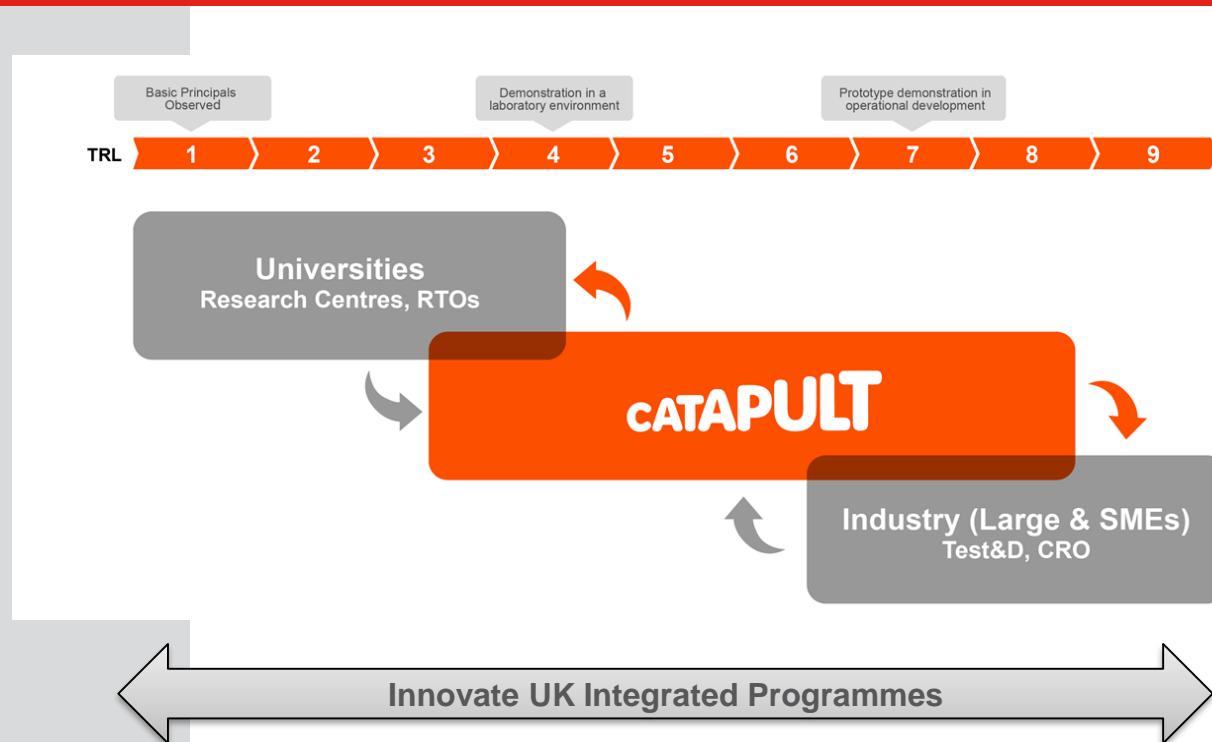
Recently added: Compound
Semiconductor Applications
Catapult

£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 goods/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

Closed innovation		Open innovation	
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.	CATAPULT Satellite Applications

Disruption



‘Disruption’ suggests “difficulties/problems”



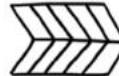
‘Disruption’ suggests something that’s short-lived



‘Disruption’ suggests something minor unlikely to have significant impact



INNOVATION



DOING THE SAME
THINGS A BIT
BETTER

DISRUPTION



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

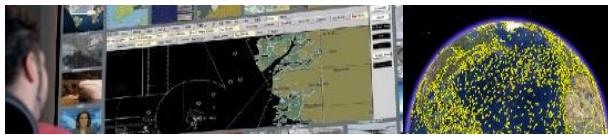
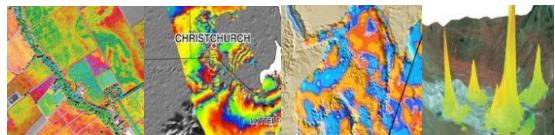
ESA ECSAT

EDRS Gateway

Satellite Applications
Catapult



The Opportunity for the Space Sector



Earth Observation – monitoring

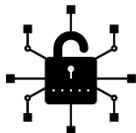
Communications – connecting

Navigation – locating



Applications

INTEGRATION FOR A CONNECTED AND INFORMATION CENTRIC WORLD



Satellite Applications Catapult – Strategy at a Glance

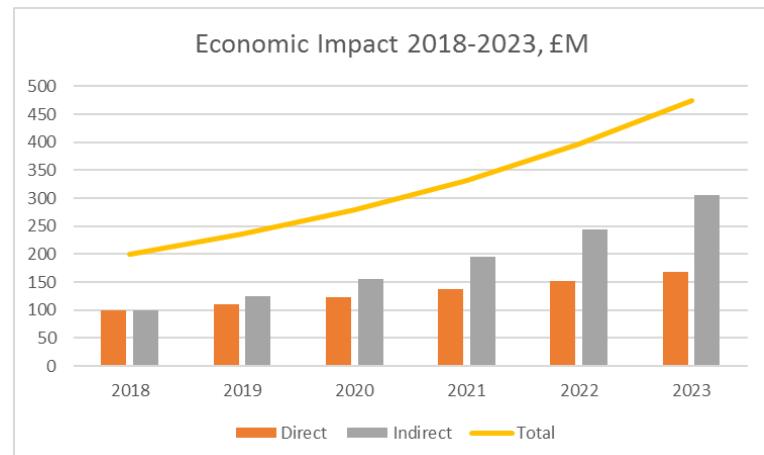
We do Three Things ...

- 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.



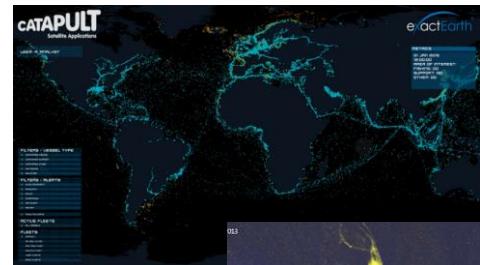
Sustainable Fisheries

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



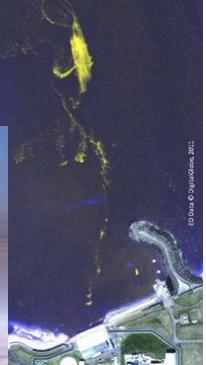
Port and Hinterland Development

- 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.

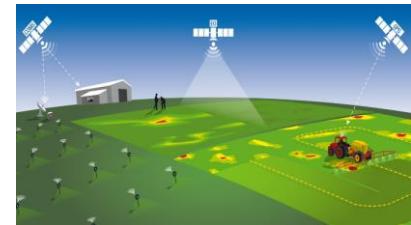
Environmental Monitoring

- 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

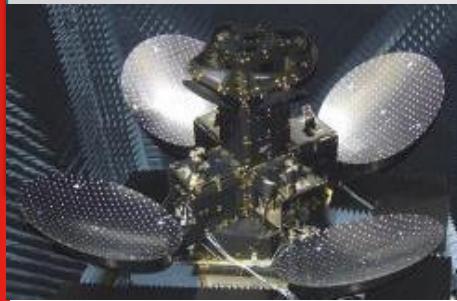
Wireless Communications

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

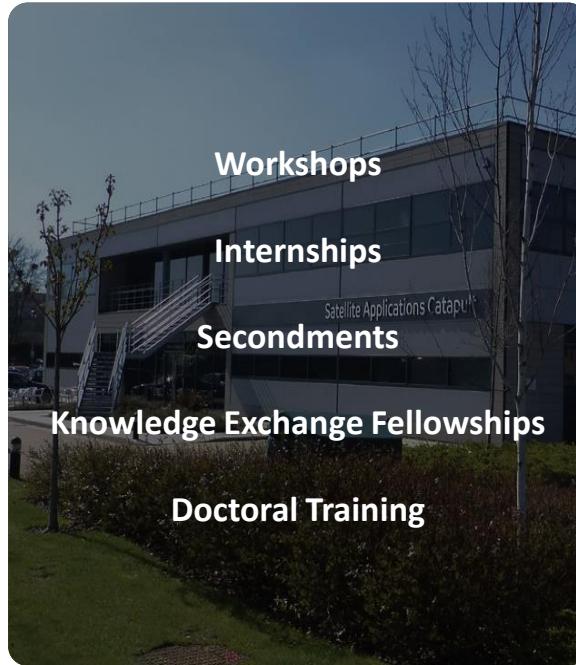
- Computing architectures
- Geo-Visualisation
- Geospatial Media
- Edge & Fog Computing
- Democratisation of data
- Data refinement



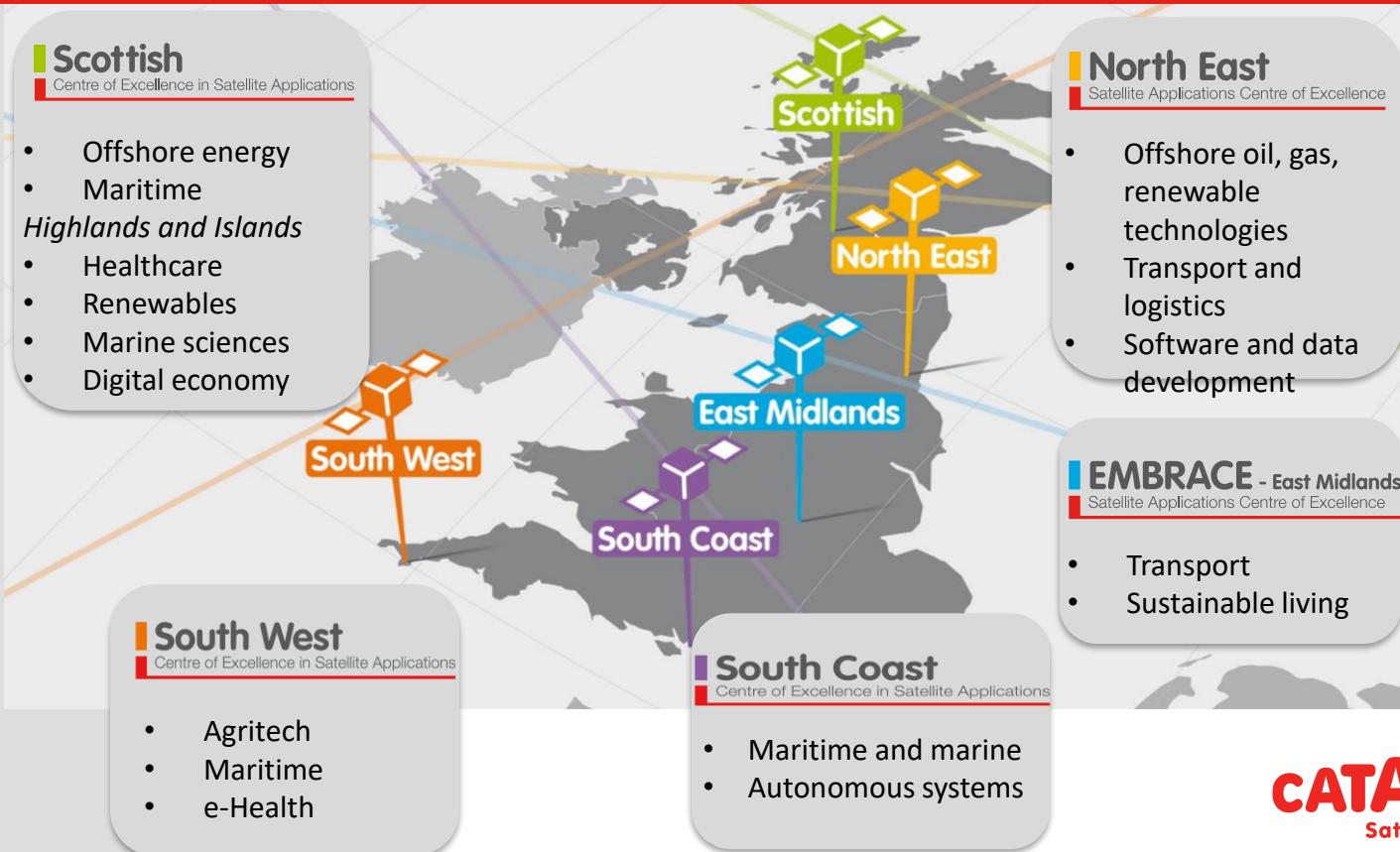
Knowledge Exchange: Bringing people & ideas together



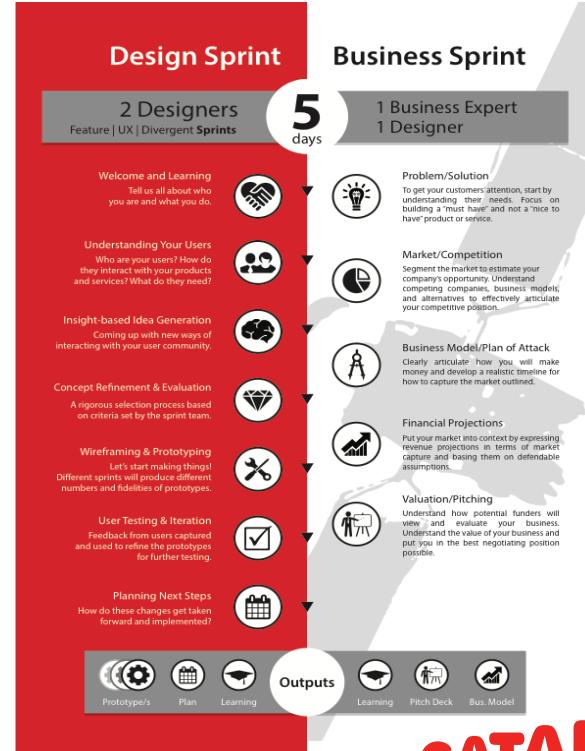
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UK Reach: Centres of Excellence



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
26 investment of £68M

Satellite Applications

Thank You!