Scottish Centre of Excellence in Satellite Applications

Dr. Hina Bacai

Business Development Manger
28 October 2014

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

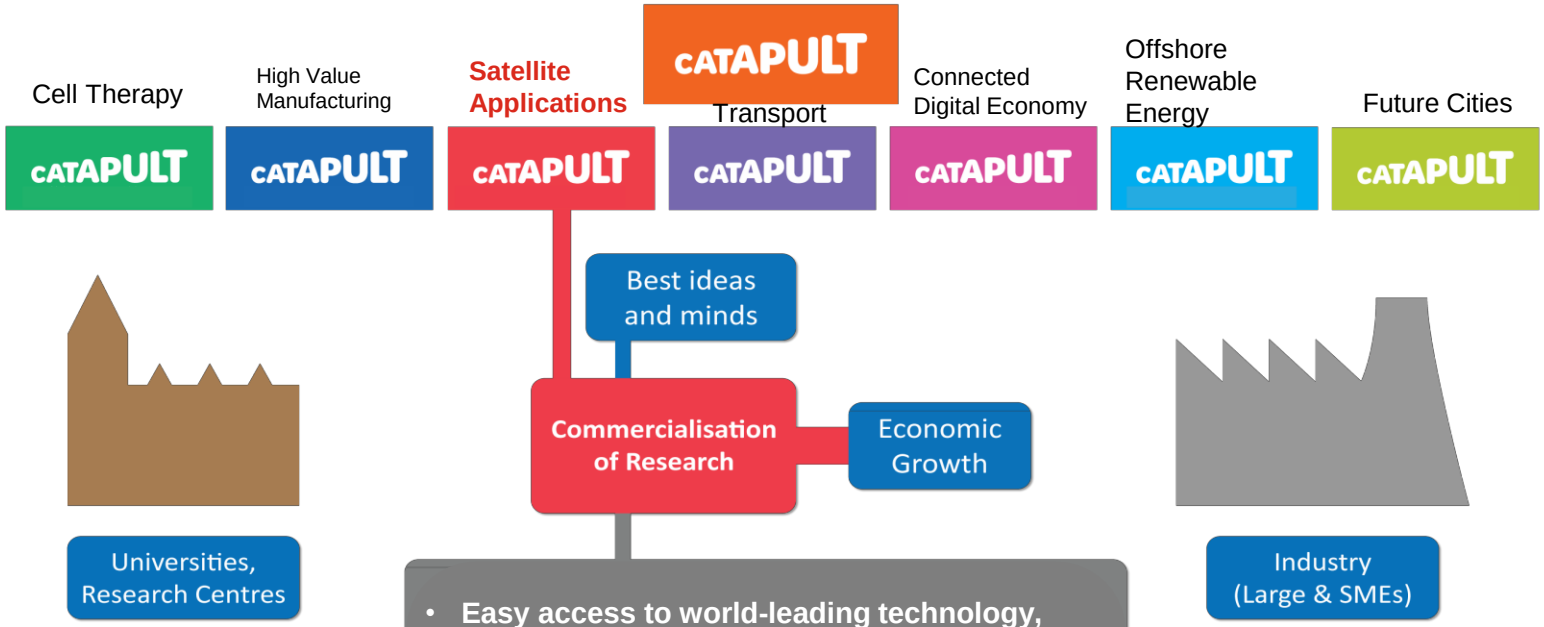
Overview

Scottish Centre of Excellence in Satellite Applications

- **What is the Satellite Applications Catapult**

- **Brief Overview of Scottish Centre of Excellence**
  - Aims and Areas of Focus
  - Partners
  - Programme of Activities

The Catapults



- **Easy access to world-leading technology, expertise and science**
- **Stimulating collaborative, business led R&D**
- **Delivering contract research for business and government**
- **Platforms and services to accelerate business realisation**
- **Provide a coalescing force for the sector**

Pioneering, Agile, Collaborative, Entrepreneurial

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Catapults - A New Force for Innovation & Growth

Satellite Applications
High Value Manufacturing
Offshore Renewable Energy
Connected Digital Economy
Transport Systems
Future Cities
Cell Therapy
***Precision Medicine**
***Energy Systems**

7 +2*
Catapults

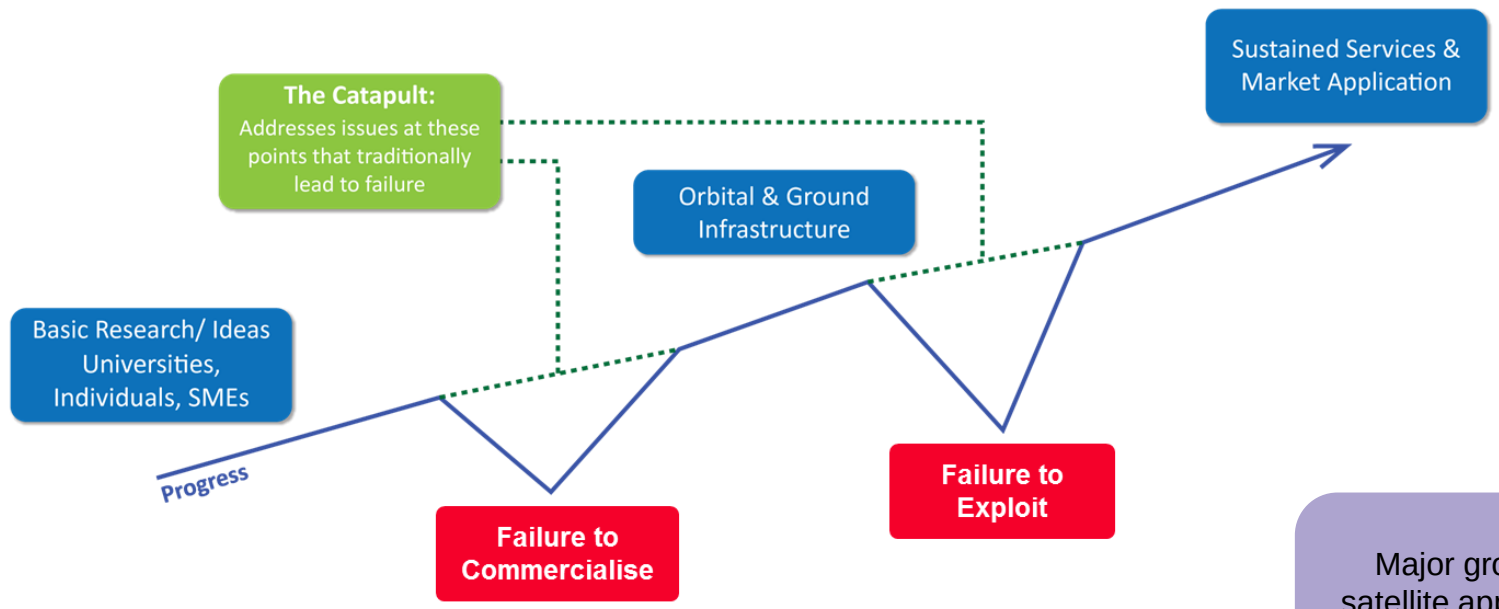
£1bn
private and public sector investment

All Catapults up and running in
2013

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Addressing the “Two Valleys of Death”



Major growth in satellite applications but significant barriers for new businesses

£40bn Market by 2030

10%pa Growth

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

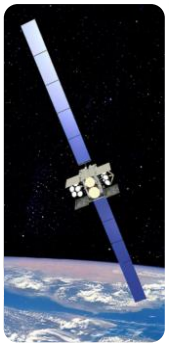
Addressing the Commercial Space Market

***P**ioneering*

***A**gile*

***C**ollaborative*

***E**ntrepreneurial*



Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Regional Centres of Excellence

Scotland

Lead: University of Strathclyde
Partners: Scottish Enterprise, Scottish Universities, OREC, Energy Technology Partnership
Focus: Energy, Future Cities, Oil and Gas, Offshore Renewable Energies & Maritime

The North East

Lead: Business Durham
Focus: Maritime and Transport

The East Midlands

Lead: University of Leicester
Partners: University of Nottingham
British Geological Survey
Focus: Transport and Sustainable Living

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

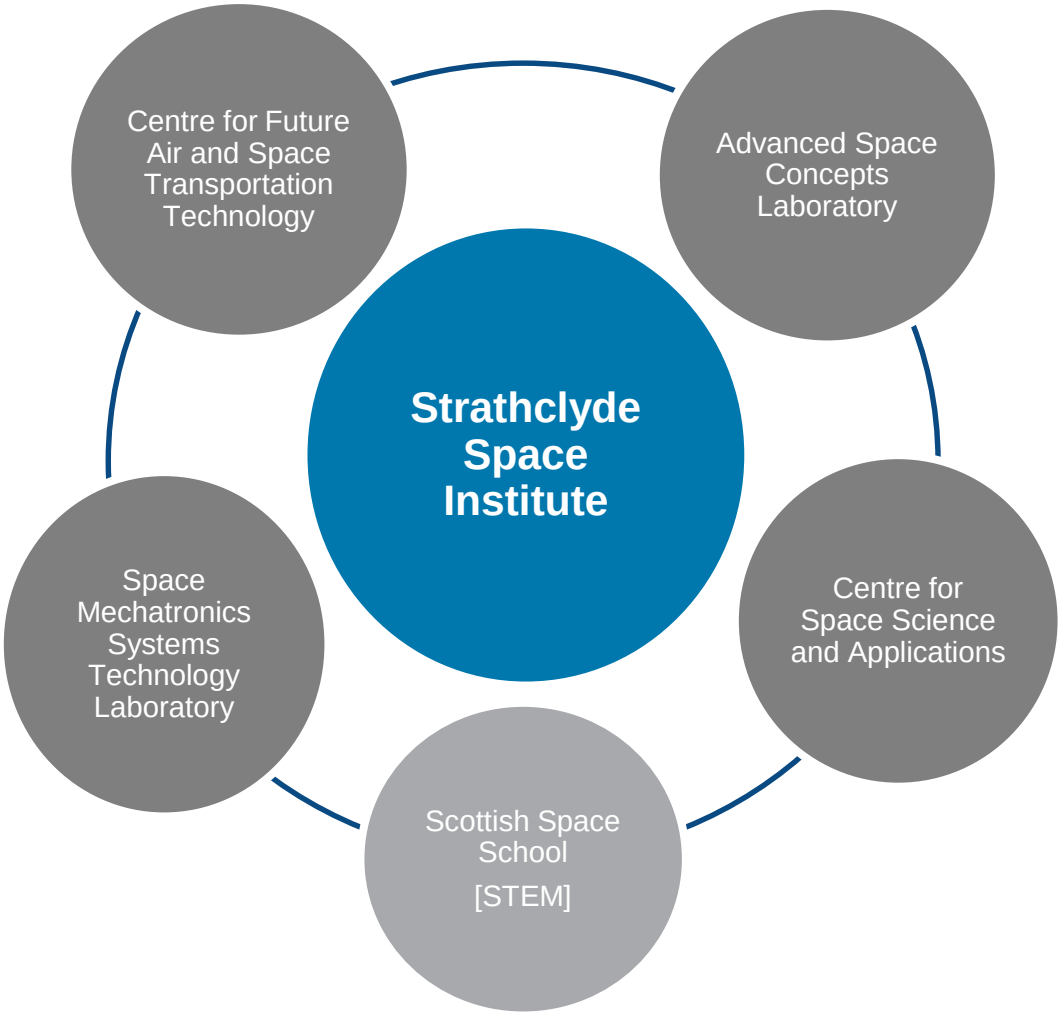
Goals

- To link and engage with other market sectors who today do not use satellites, but through whom future new applications of satellite capability will develop
- Assist the Catapult in broadening and deepening the business-research relationships for the benefit of the UK economy.

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Centre of Excellence within the Strathclyde Space Institute

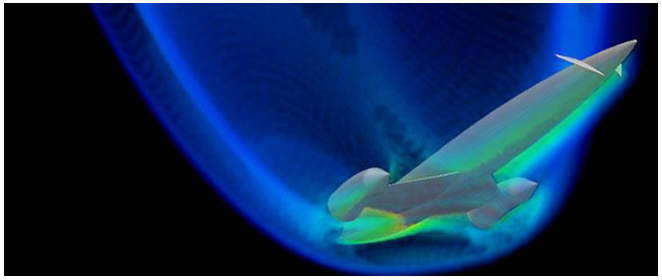


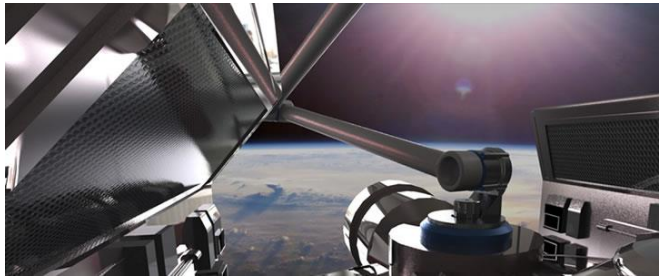
Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

SSI capabilities and facilities

- Award-winning research centres across platforms, access to space, robotics, apps
- Lead for EU FP7 VISIONSPACE (€2.1M) and STARDUST (€4.2M) programmes, direct funding from CALT/CASC (£1.5M)
- UHF/VHF/S-band ground station, space robotics lab, regional supercomputer
- Hosting the Satellite Applications Missions Lab which is a test bed for CubeSat technology
- Space Systems CPD Course – on-site, webinar, and on-line delivery





Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Technology and Innovation Centre

- £90M Regional hub for industrial Knowledge Exchange, opening early 2015
- Tier-1 international industry primes across energy, future cities, aerospace
- Regional Centre located on 4th floor next to Energy Technologies Partnership
- Will host networked Concurrent Design Faculty and Data Visualisation suite

ITREZ
Scotland's International Technology and Renewable Energy Zone

Fraunhofer

SSE

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Regional space development lead

1st Scottish Space Symposium

1st Scottish Space Systems Symposium *Institute of Advanced Studies*
22nd June 2010 *James Weir Building*
Montrose Street
Glasgow

Scotland is emerging as an international centre for a range of disruptive new space technologies. While this growing industrial and academic capability is recognised in sectors of the space industry, the profile of this capability needs to be raised in Scotland. In addition, the potential of Scotland to continue to grow in the space sector needs to be unlocked by developing a strong sense of community and reaching out to industry and university groups who do not yet recognise the opportunities space can provide.

This workshop aims to provide:

- *An opportunity to network with the Scottish space technology community*
- *A forum to identify key capabilities, future partnerships and opportunities*
- *A platform to raise the profile of the Scottish space technology community*

09:45-10:00 Registration and coffee

10:00-10:15 Welcome and objectives
Ross White, Scottish Enterprise

10:15-10:45 Working with ESA in the UK and across the Continent
Martin Ditter, Head of UK ESA (s4_ditter)

10:45-11:00 Coffee Break

11:00-12:30 Short presentations on key capabilities
5 minute summary presentations by each organisation highlighting track record and key capabilities

2nd Scottish Space Symposium

2nd Scottish Space Symposium *Glasgow Hilton*
BRINGING SPACE DOWN TO EARTH *William Street,*
6th March 2012 *Glasgow*

The symposium aims to:

- *Provide a platform to raise awareness for the involvement in the downstream Space Sector*
- *Promote 'Space enabled Services' to a wide range of potential users, especially those who are not aware of the benefits that space technologies can bring them.*
- *Identify potential user needs/requirements and future opportunities.*

09:45-10:00 Registration and coffee

10:00-10:15 Welcome to Space Symposium & Objectives
Ross White, Scottish Enterprise ([1] - Ross White - SE.pdf)

10:15-10:30 Overview of the UK Space Sector
Keith Mason, UKSA ([2] - Keith Mason - UKSA.pdf)

10:15-11:15 Developing Applications & Services Using Space Assets
Alan Brunstrom, ESA ([3] - Alan Brunstrom - ESA.pdf)

11:15-11:30 Coffee Break

11:30-12:15 Technology Strategy Board (Satellite Applications Catapult)
Michael Lawrence, TSB ([4] - Micheal Lawrence - TSB.pdf)

12:15-13:30 Networking Lunch

13:30-14:15 UK downstream suppliers
Steve Greenland, Clyde Space Ltd ([5] - Steve Greenland - Clyde Space.pdf)

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Scottish Centre of Excellence in Satellite Applications

Rallying point for Scottish SMEs and larger companies in a range of end-user markets, to access satellite applications and services:

- Focused on areas of strength and local networks: Energy and Future Cities
- Taking a leading role in driving growth in satellite applications by engaging the wider-end user community and their supply chains.
- Bringing end-user communities together with the relevant upstream/ downstream partners to stimulate innovation and create new satellite applications
- Consolidating links between the science knowledge base and the business community, helping to create the ‘virtuous circle’ of applications pull and technology push.

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Leveraging relevant expertise

From across the UK innovation landscape to create projects and activity:

- Satellite Applications Catapult Centre, Harwell
- Network of Centres of Excellence in Satellite Applications (EMBRACE and the North East Satellite Applications Centre of Excellence)
- Other Scottish and UK Universities and Research Institutes e.g. Dundee, Edinburgh, Glasgow, Strathclyde, Surrey, Reading, UKATC
- Other Catapults e.g. ORE Catapult and Future Cities Catapult
- Space sector / Innovative SMEs

Scottish Centre of Excellence in Satellite Applications

Scottish Centre of Excellence - Energy

Economic Importance to Scotland:

- Key sector contributing 18% of the Scottish GVA (£18 billion)

Size of the Opportunity

- Move towards distributed energy production, intelligent smart grids and the use of renewable plant over large spatial scales, both onshore and offshore
- Expected scale of capital investment in new renewable energy ventures and the upgrade of grid infrastructure – opportunity to deliver a range of new downstream services

Strathclyde Capability

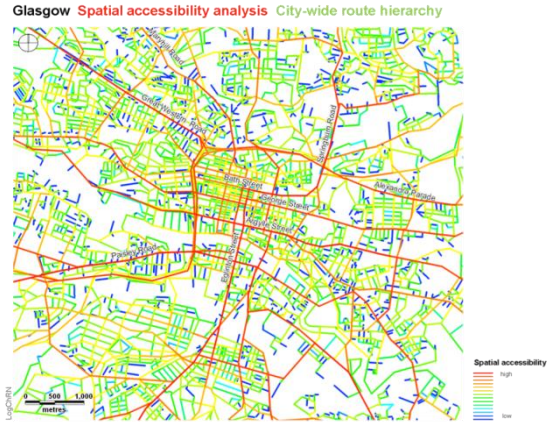
- Research Capability in Energy – Key priority for Strathclyde
- Existing KE Infrastructure

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Scottish Centre of Excellence - Future Cities

- £24M TSB/City Council/Strathclyde venture to demonstrate integrated technologies
- Strathclyde City Observatory (TIC) to provide a pipeline of real-time data sets
- Live data flows across energy use, public transport systems, pedestrian footfall
- Opportunities to exploit City Observatory (located in TIC with Regional Centre)



Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

Consortium partners

Key delivery partners:

- University of Strathclyde – consortium lead
- Scottish Enterprise / Network Integrator (Callum Norrie)
- Offshore Renewable Energy Catapult
- Energy Technology Partnership

Other partners:

- Innovation Centres in Sensor and Imaging Systems (CENSIS) and Oil & Gas
- West of Scotland KTP Centres
- European Space Agency (ESA) / Int. Apps. Prog. Office at OREC
- UK Astronomy Technology Centre
- University of Glasgow
- University of Edinburgh, School of Geosciences
- University of Dundee, Space Technology Centre

Priorities for action

- Raising awareness and promoting capability in Satellite Applications
- Understanding needs and strategic direction of individual companies, helping them to bridge the gap in terms of knowledge of the research base
- Facilitate knowledge exchange through People Exchange and other mechanisms
- Translating research outcomes into compelling propositions for SMEs and industry primes to become engaged

Ongoing/existing Projects in Energy

Examples of Live Projects at Strathclyde:

- Satellite services to deliver offshore renewable energy resource maps
- Use of GPS timing signal for Smart Grid synchronisation/ protection
- Emerging apps in ocean colour monitoring for sediment profiling

Planned Energy focused Workshops / Events

- Workshop 1: Live demonstration of offshore wind resource mapping software tool – held at Offshore Renewables Catapult

- Workshop 2: Live demonstration of smart grid protection hardware – Power Network Demonstration Centre

ORE Catapult - Collaboration Strategy with the Scottish Centre of Excellence in Satellite Applications

Objectives defined by ORE Catapult

- To ensure the Catapult network has an opportunity to engage in all relevant UK and European research and development in relation to the space and renewable energy.
- To ensure the Catapult network manages input into relevant (space/renewable energy) projects effectively and efficiently.
- To ensure the Catapult network can influence the scope of relevant (space/renewable energy) projects to most closely align with its objectives.
- Agree a strategy and clear definition of the channels of communication to be used.

Establishing the Steering Board with cross-institutional representation

Scottish Enterprise – *Karen Wilson & Gordon Venters, Engineering and Aerospace, Defence & Marine*

Scottish Space Network - *Callum Norrie, Integrator*

Offshore Renewable Energy Catapult - *Andy Macdonald, Engineering Technology Manager*

Energy Technology Partnership - *Barrie Shepherd, Executive Director*

UK Astronomy Technology Centre - *Julian Dines, Head of Innovation*

European Space Agency - *Alan Brunstrom, Head of Applications and Services Business / Ian Downey, UK IAP Ambassador Platform*

University of Strathclyde – *Max Vasile, Professor, Mechanical and Aerospace Engineering*

University of Strathclyde - *Walter Johnstone, Vice Dean Knowledge Exchange*

University of Glasgow – *Colin McInnes, James Watt Chair of Mechanical Engineering*

University of Edinburgh - *Iain Woodhouse, Professor of Applied Earth Observation, School of Geosciences*

University of Dundee - *Steve Parkes, Spacecraft Electronic Systems, Space Technology Centre*

Clyde Space Ltd - Craig Clarke, CEO

Scottish Universities Physics Alliance - *Richard Mosses, Commercialisation Manager and MD of Scottish Optoelectronics Association*

University of Strathclyde Institute for Future Cities – *Richard Bellingham, Director Sustainable Cities & Energy Policy*

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications

What can the Scottish Centre do for you?

- Provide a point of contact for the downstream user community in different areas of satellite applications
- Facilitate engagement between academics and industry partners
- Organise and coordinate workshops/events that will raise the awareness of the research base to attract industry partnerships
- Access to the expertise at the Satellite Applications Catapult
- Provide a local hub of industry expertise in Energy, Future Cities, Oil & Gas and other areas
- Local access to world class facilities such as Data Visualisation Suite, Concurrent Design Facility, Missions Lab in the Technology Innovations Centre (TIC)

Scottish Centre of Excellence in Satellite Applications

Key Staff

Malcolm Macdonald
Director & Academic Lead
Malcolm.macdonald.102@strath.ac.uk

Hina Bacai
Business Development Manager
Hina.Bacai@strath.ac.uk

Linda Wallace
Knowledge Exchange Liaison
Linda.Wallace@strath.ac.uk

Scottish Centre of Excellence in Satellite Applications

CATAPULT Satellite Applications