

Satellite Applications Catapult

Emerging opportunities for new satellite platforms

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Emerging Technologies Workshop

College Court, Leicester

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CATAPULT

Satellite Applications Catapult

Addressing the Commercial Space Market



Upstream Markets

Manufacturers, Suppliers, Payload Builders

Mission Platforms

In-Orbit
Demonstrator

Airborne
Demonstrator

Flat Sat

Comms

EO

Nav

Technology
Programmes

Apps Platforms

Downstream Markets
Transport, Security, Civil
Protection, Climate, Energy,
Natural Resources, Internet
of Things.

Lower barriers
of learning
and costs of
innovation

Drives
demand



CATAPULT
Satellite Applications

Upstream technologies at the Satellite Applications Catapult

The primary reason for setting up the SA Catapult:

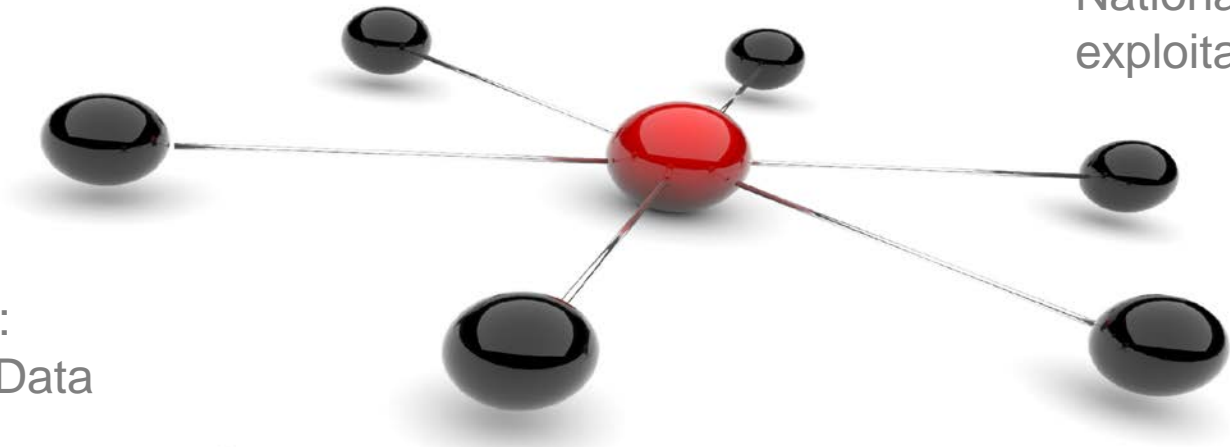
Drive growth in the downstream sector

Upstream supports come if a great potential is identified in the resulting downstream market

Development and Operation of Nano and Micro Satellites Missions support commercialisation with ease of access and usability of satellite data

Data Reception,
Processing, Archiving and
Dissemination

Ground Assets integrated into
National, European and Worldwide
exploitation networks



Operating and supporting the
operations of thematic centres:
Centre of Excellence for SAR Data
or Mission Communications
Service Centre

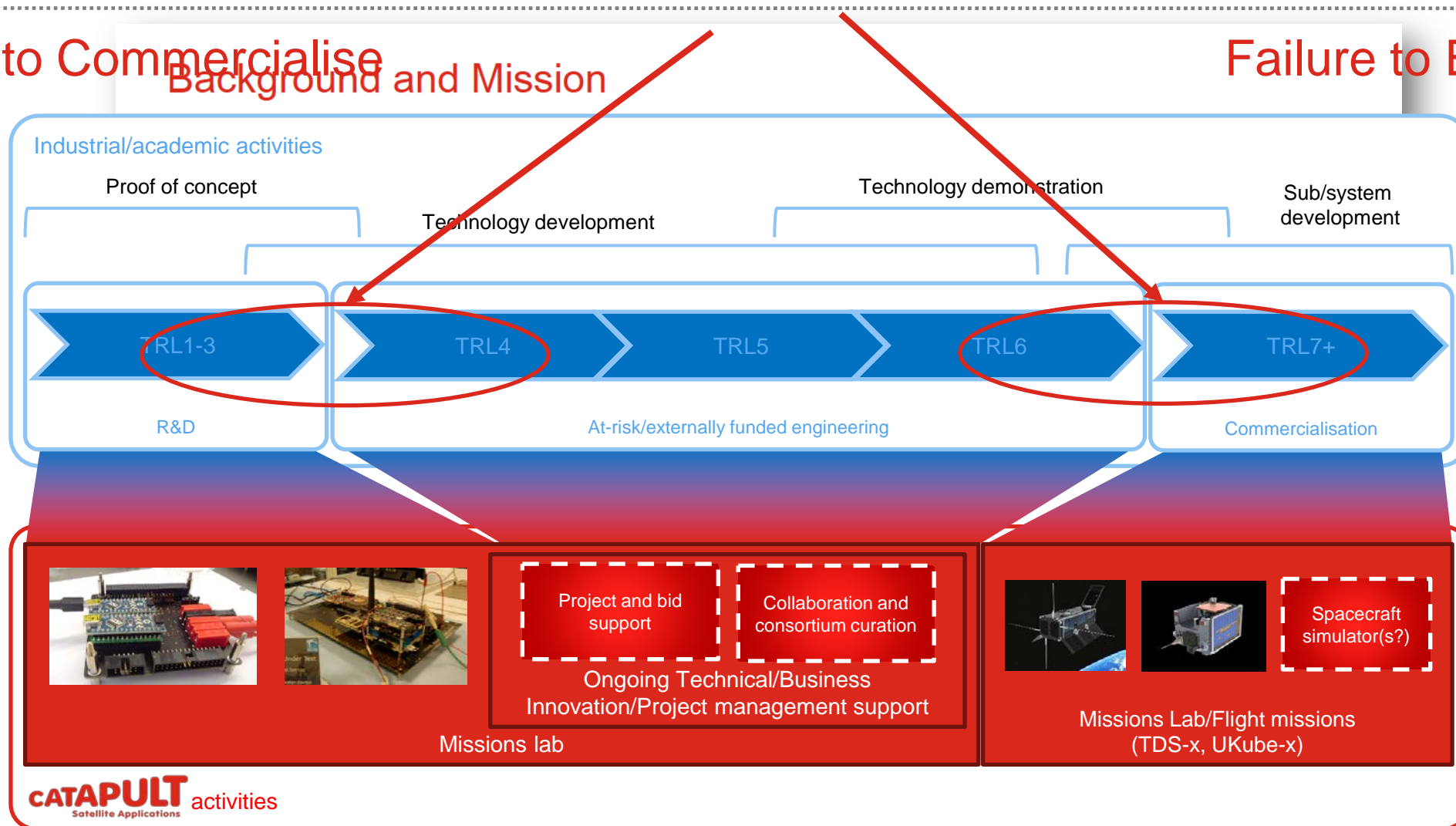
Applications and Solutions
Development



The Missions Team: End-to-end Support for Technology Development Challenges

Failure to Commercialise

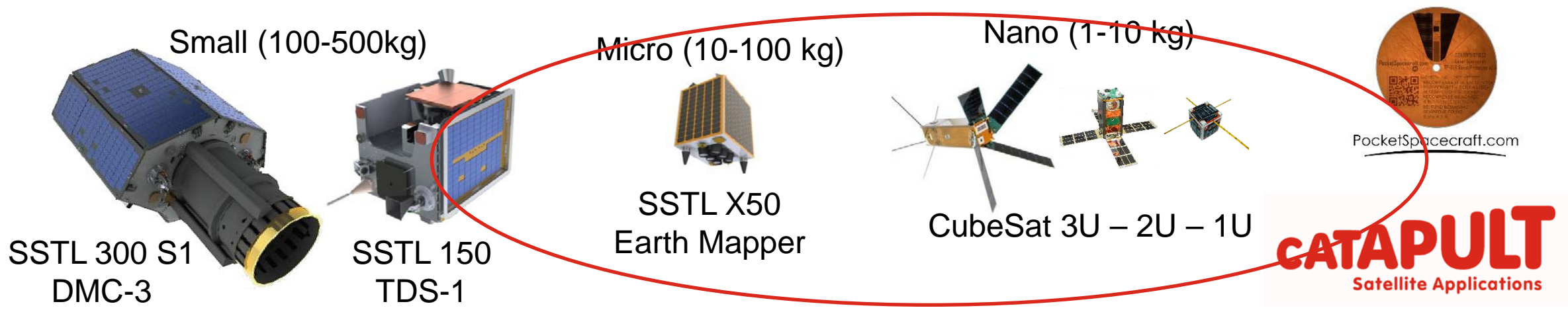
Failure to Exploit



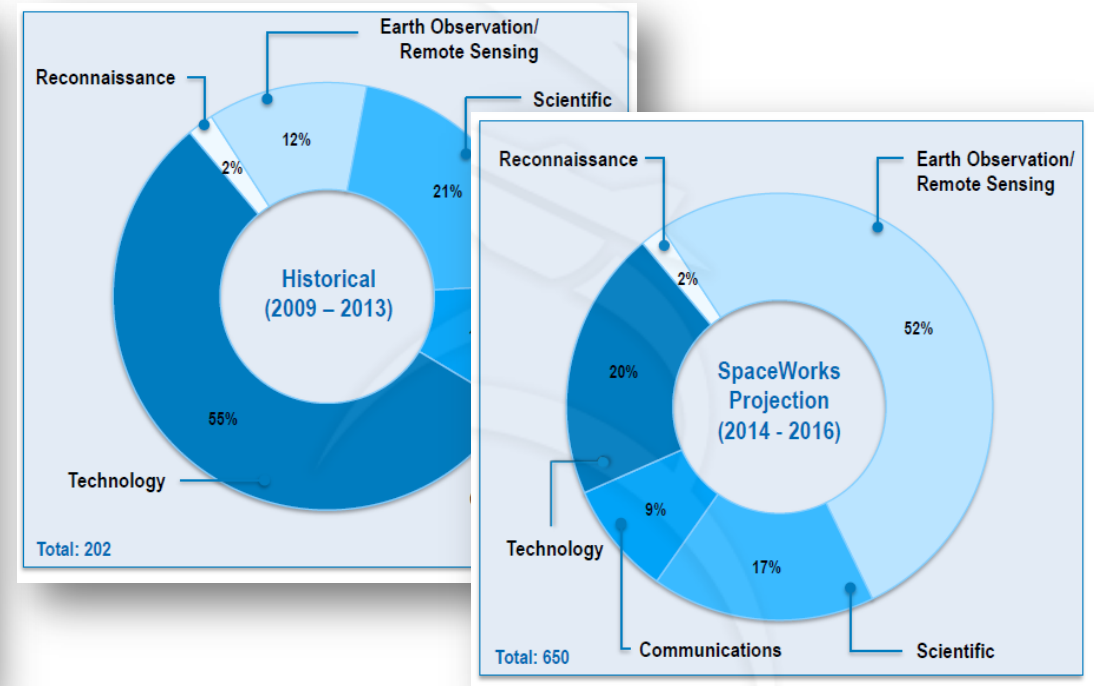
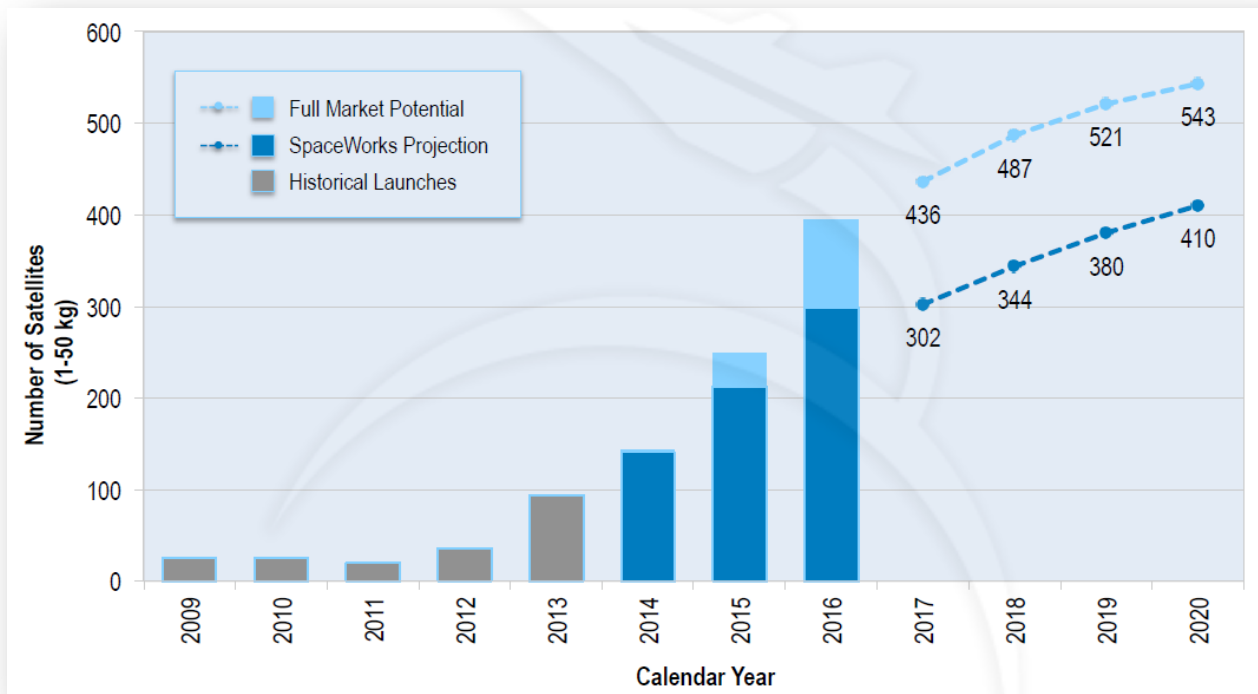
Emerging opportunities: Nano and Micro Satellite Missions enabling entrepreneurship in space

- Standardisation
- Miniaturisation of technology
- Reduced launch costs – piggyback
- Enables risk-taking, innovation
- Low cost and ease of manufacture
- Test bed for new technology

Generally accepted definitions of satellite mass classes under 500 kg:



Size of the market

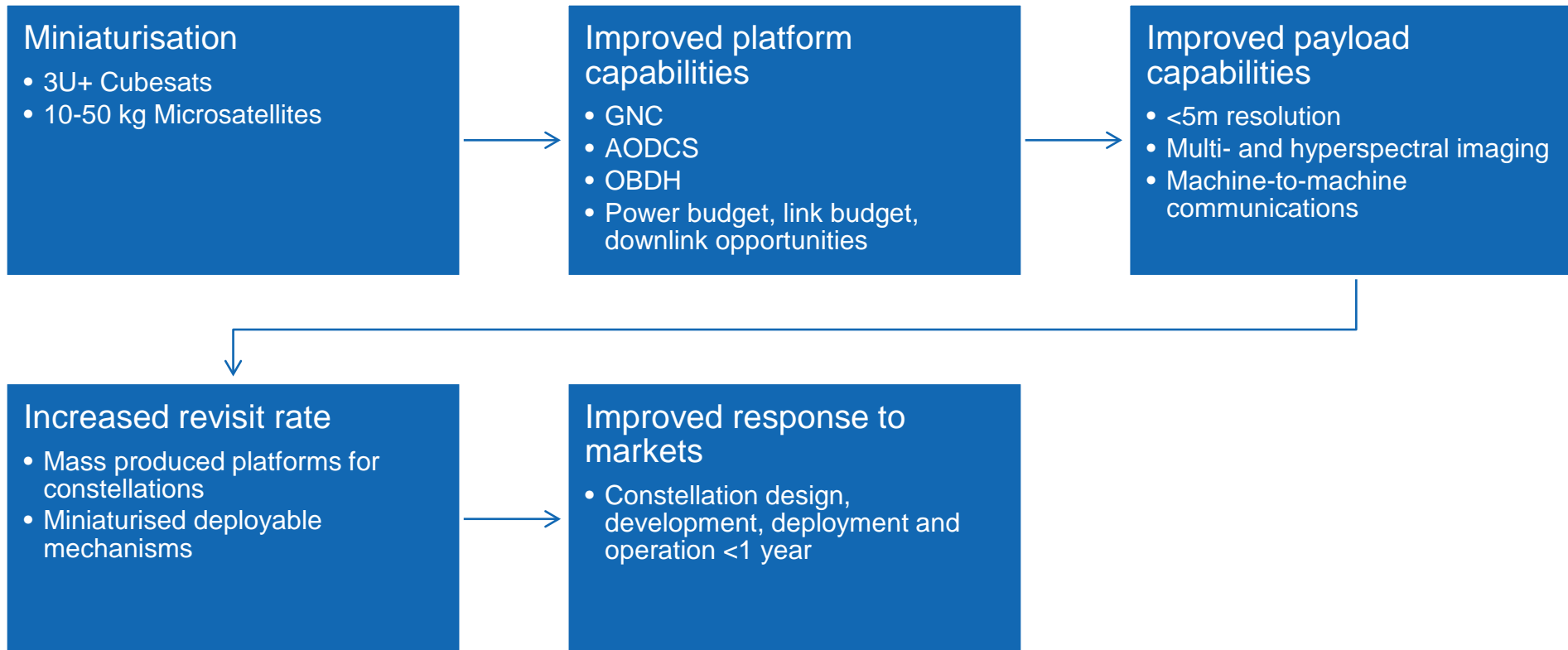


Projections based on announced and future plans of developers and programs indicate between **2,000 and 2,750 nano/microsatellites** will require a launch from **2014 through 2020**

The nano/microsatellite market has grown considerably with the adoption of CubeSat standards, microelectronics and other technology development, entrance of new developers, new government programs, and furthering of applications

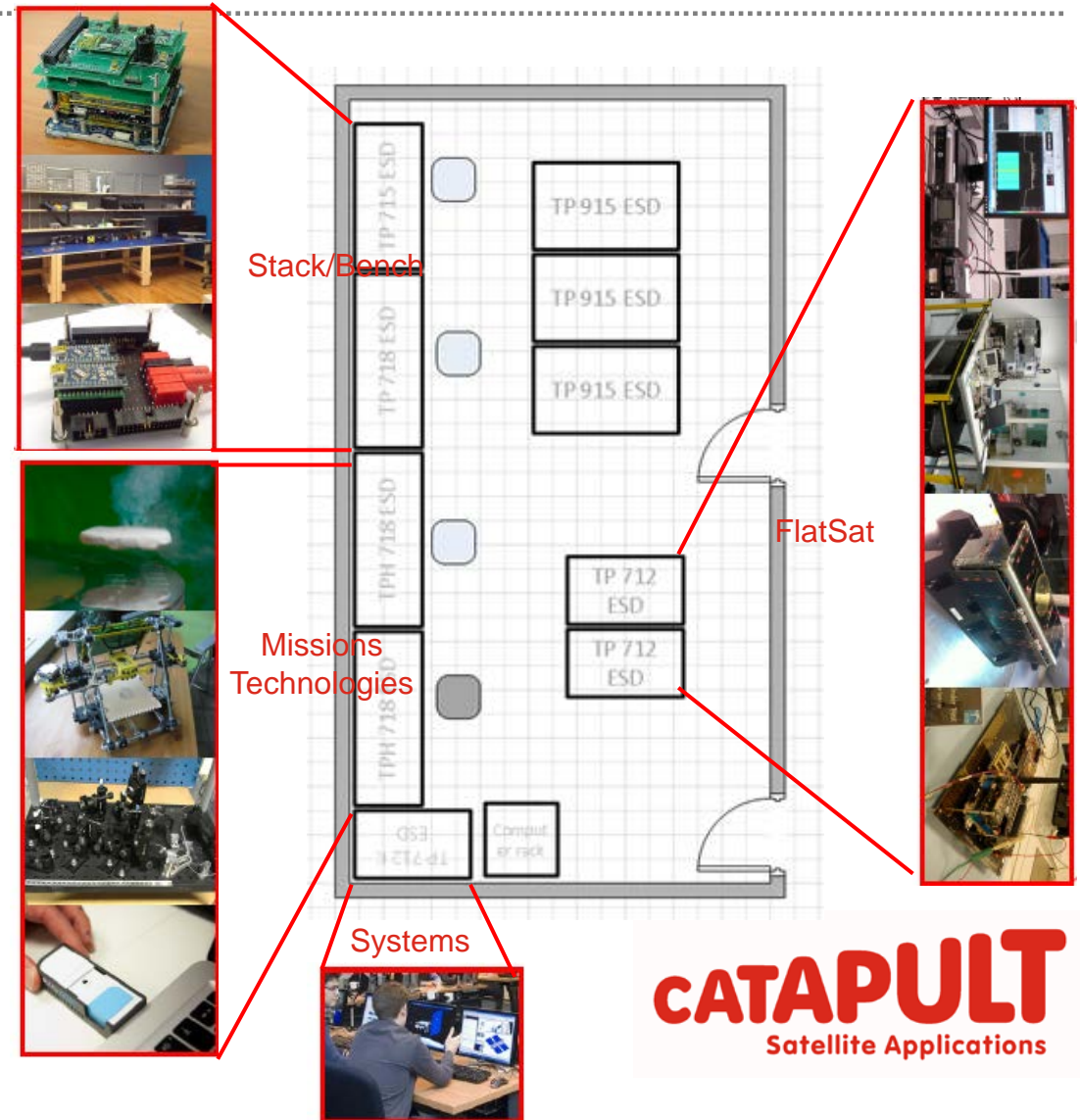
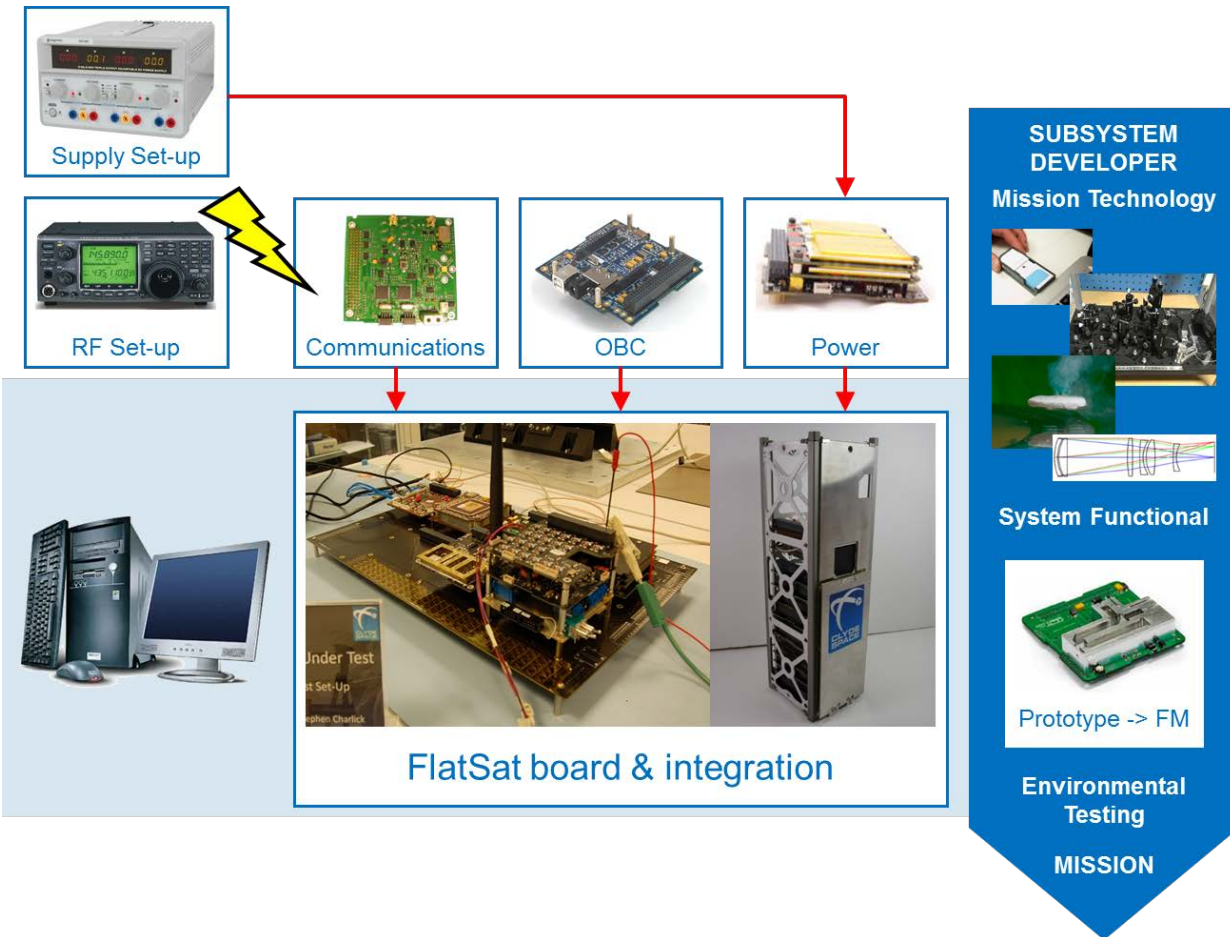


Technology Challenges



Facilities at the Catapult: Missions Laboratory

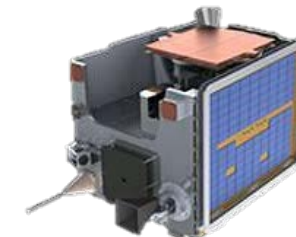
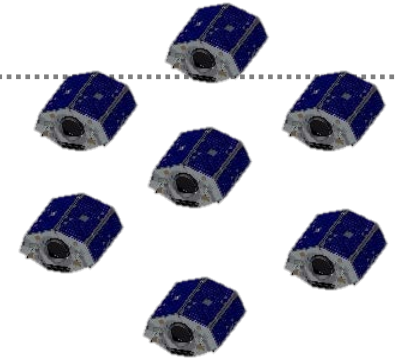
Mission (in the) Lab in a Nutshell



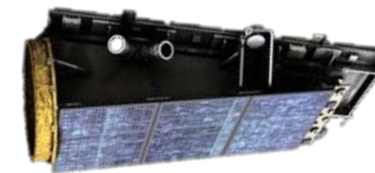
Facilities at the Catapult: In-Orbit Demonstration Programme

- Building on the success of TDS-1 and Ukube-1 for payload-provider engagement
- Current work focusing on **IOD Programme feasibility study** funded by the Technology Strategy Board
- Aim to demonstrate **benefits of a regular, resilient programme of demonstration missions** to offer flight opportunities for new upstream and downstream technology concepts
- Enables a portfolio of CONOPS to be maintained
 - Thematic missions
 - Service demonstration
 - Technology demonstration
 - Platform development
 - **Payload development**
- Objective to provide **regular access to space** to drive development of new technologies

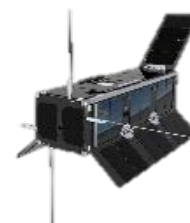
Commercial Missions/hosted payloads



TechDemoSat-1



NovaSAR



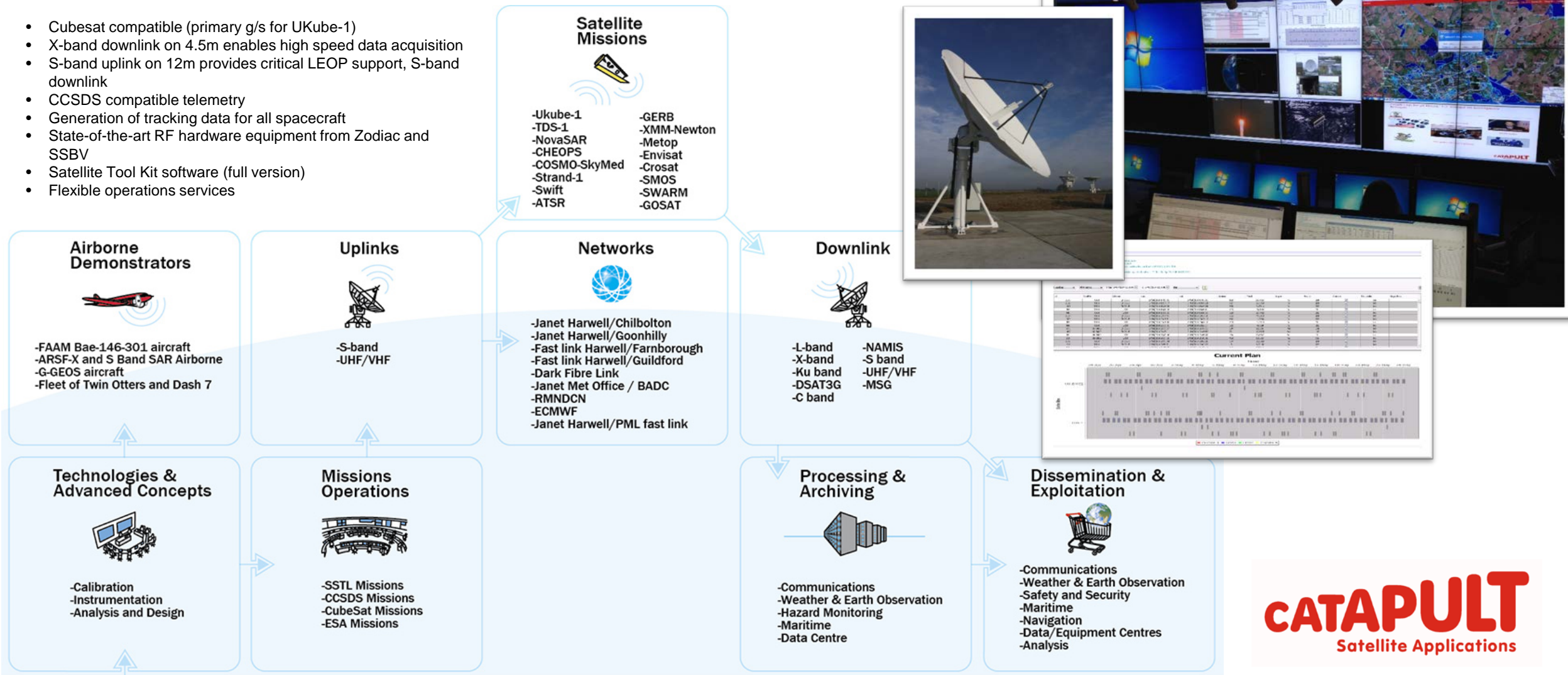
Ukube-1

Technology Strategy Board
Driving Innovation



Facilities at the Catapult: Operations Centre

- Cubesat compatible (primary g/s for UKube-1)
- X-band downlink on 4.5m enables high speed data acquisition
- S-band uplink on 12m provides critical LEOP support, S-band downlink
- CCSDS compatible telemetry
- Generation of tracking data for all spacecraft
- State-of-the-art RF hardware equipment from Zodiac and SSBV
- Satellite Tool Kit software (full version)
- Flexible operations services



Technologies Development Platforms Missions Lab & In-Orbit Demonstration Missions

Rapid development and integration with spacecraft platforms

System development up to functional checkout

Showcase technology and experimentation

Access to Consultation and Design services

Collocation of systems, operations and
Assembly Integration and Testing

Collaborative framework for viable exploitation
granting access to further funding

Suitability to a wider market



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