SMARTSAT
Cooperative Research Centre

Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Program

# *Challenges and Opportunities for Intelligent Systems in Space*

## *8th Space Forum*

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SmartSat CRC

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# SmartSat CRC Panelists

**Prof Anna Moore –** Director, ANU Institute for Space & Director, Advanced Instrumentation and Technology Centre, ANU

**Dr Andrew Seedhouse -** Chief of Division, National Security and Intelligence Surveillance and Reconnaissance, Defence Science and Technology Group

**Aude Vignelles -** Executive Director, Program and Capability, Australian Space Agency

**Brad Yelland -** Chief Technology Officer, BAE Systems Australia

**Dr Koukou Suu –** GM Market & Technology Strategy, ULVAC

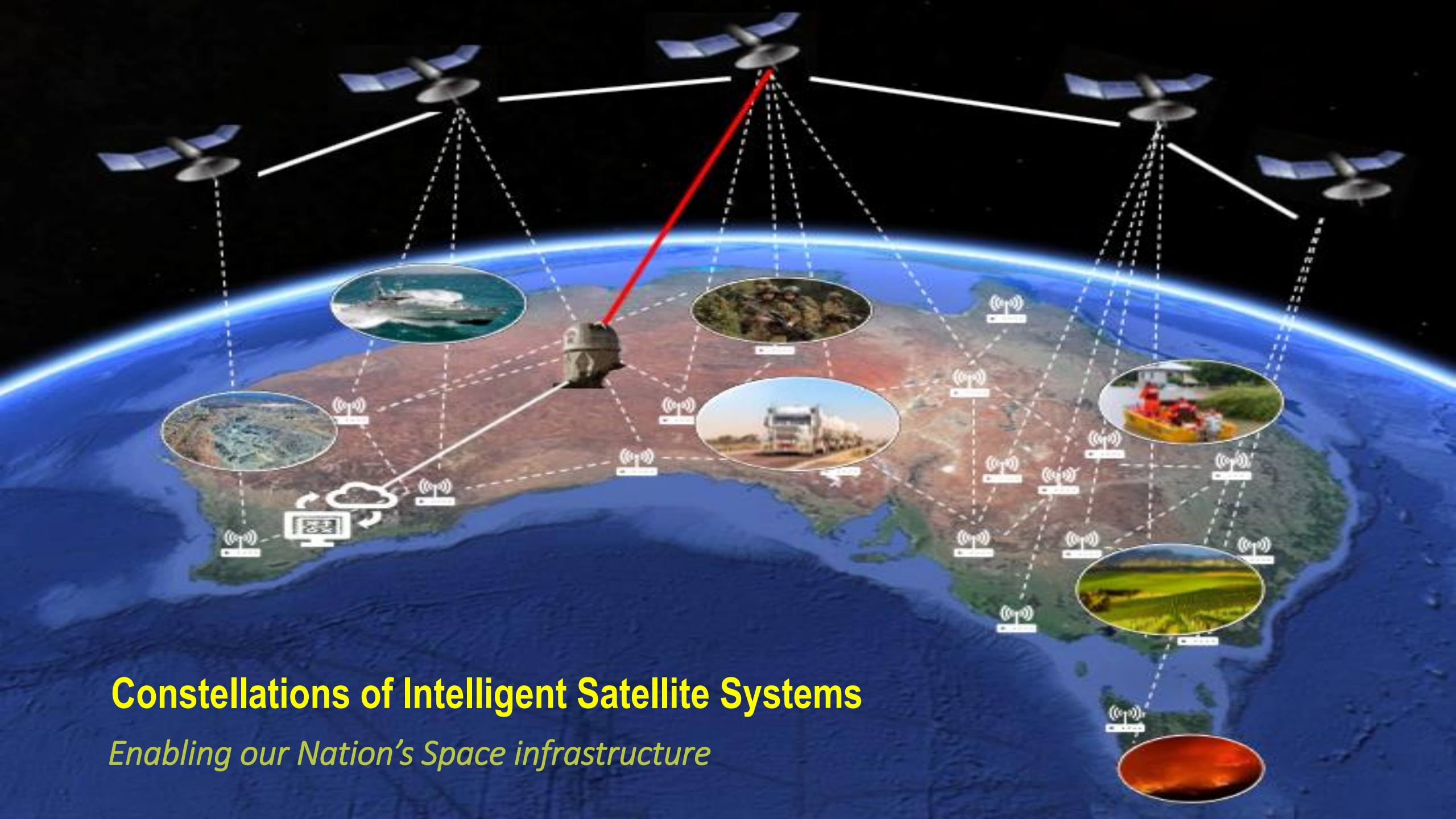
**Shaun Wilson -** Founder & Head of Business Development, Shoal Group

**Dr Doug Griffin –** Space Program Lead & Chief Engineer, UNSW Canberra

**Martin Duursma -** Partner, Main Sequence Ventures (CSIRO Innovation Fund)


The Space 2.0 Revolution
Soon...
$1,000B
Augmenting i4.0
Huge opportunity for new advanced industries

# Catalysing the transformation of every sector



Constellations of Intelligent Satellite Systems
Enabling our Nation's Space infrastructure

# Enabling our Nation's Space infrastructure

Advanced Communications, Connectivity & IoT

Intelligence in Advanced Satellite Systems & Sensors

Earth Observation Next Generation data Services

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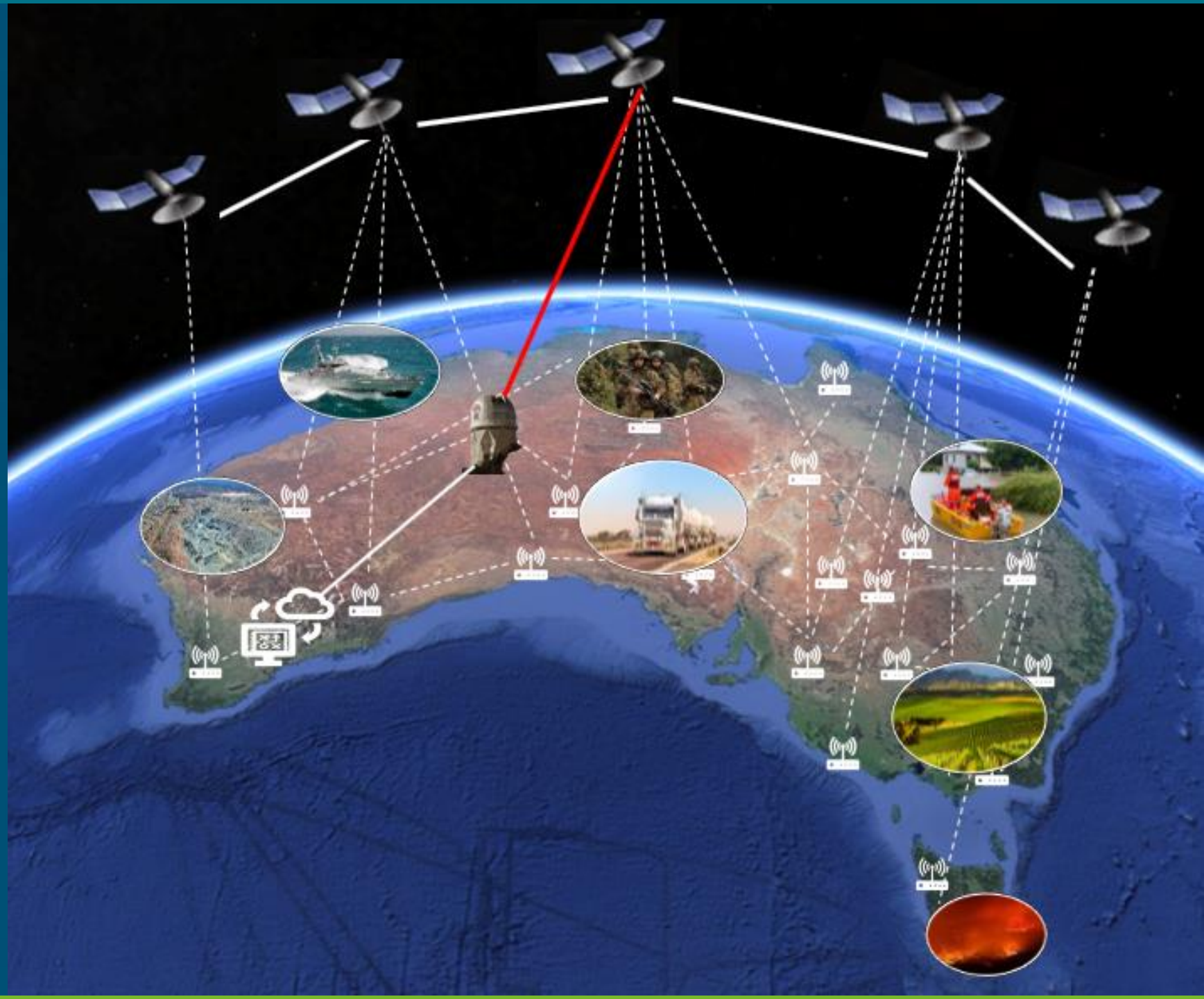
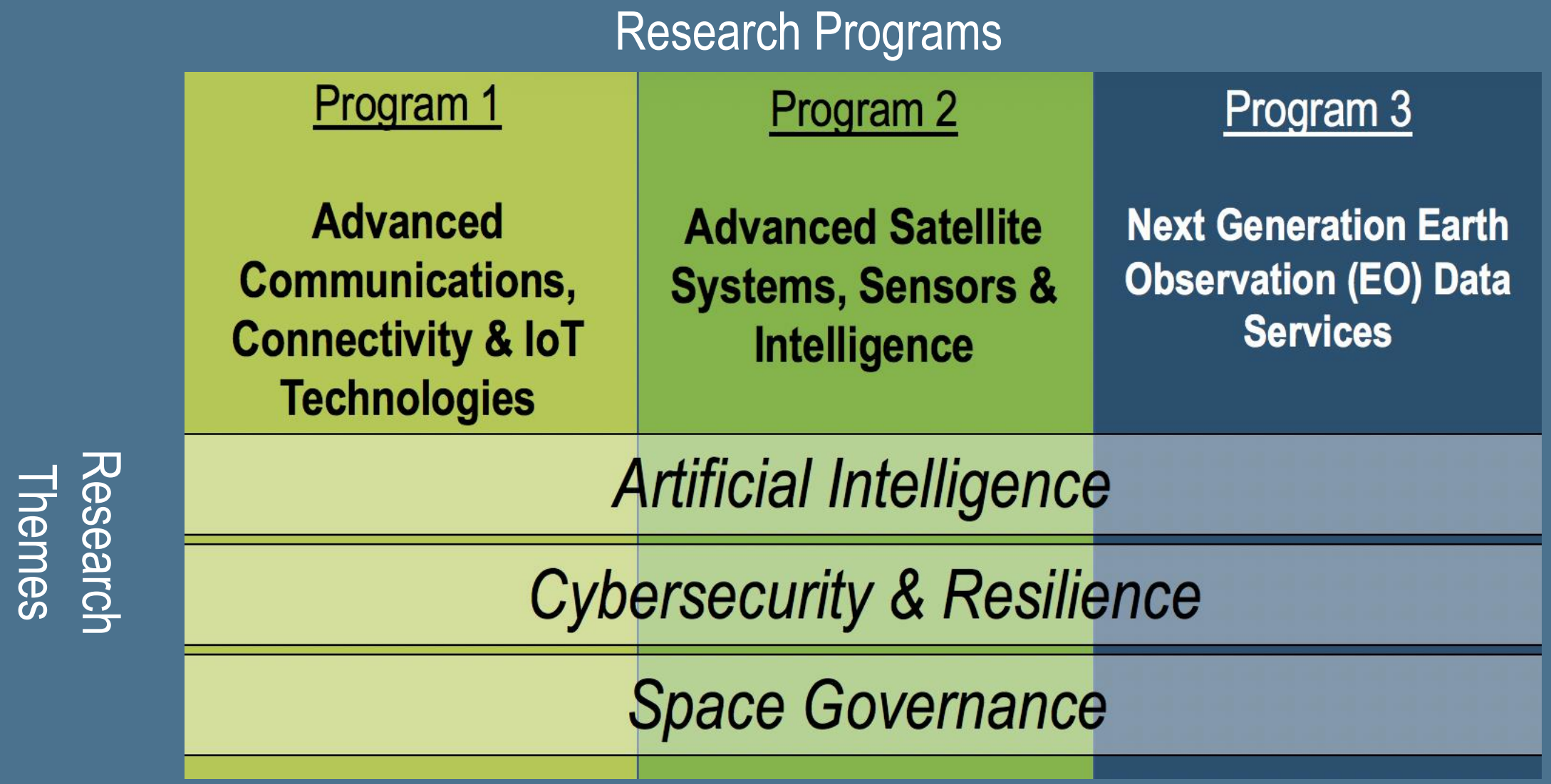


# SmartSat CRC Research Agenda

*3 Interlocking Programs x 3 Themes*



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# Research Program

## PROGRAM 1 — Advanced Communications, Connectivity & IoT Technologies

- Laser communications
- Next Generation ground stations & terminals
- Mobile optical antennas
- Quantum cryptography
- Adaptive communications networks
- Spectrum sensing & Cognitive radio
- Next generation IoT architectures
- Ad-hoc connectivity
- Satellite & terrestrial network integration

## PROGRAM 2 — Advanced Satellite Systems, Sensors & Intelligence

- MBSE & Digital twins of small satellite systems
- Autonomous, cooperative satellite formations
- Artificial Immune Systems in Satellite Swarms
- Trusted Autonomous Formations
- Self-healing satellite systems
- Agile & resilient satellites
- Satellite system & data security
- Advanced pointing & manoeuvring
- On-board machine learning models
- Advanced adaptable payloads
- HgCdTeIR Optoelectronic sensors
- Quantum sensors

## PROGRAM 3 — Next Generation Earth Observation Data Services

- Secure & integrated data intensive space systems
- Customer-centric EO Analytics
- EO Data fusion architectures
- EO data visualization
- Hyperspectral sensing
- Design methodologies for mission specific services
- Integration Testbed for rapid product development

**THEMES** — ARTIFICIAL INTELLIGENCE | SECURITY & RESILIENCY | SPACE GOVERNANCE

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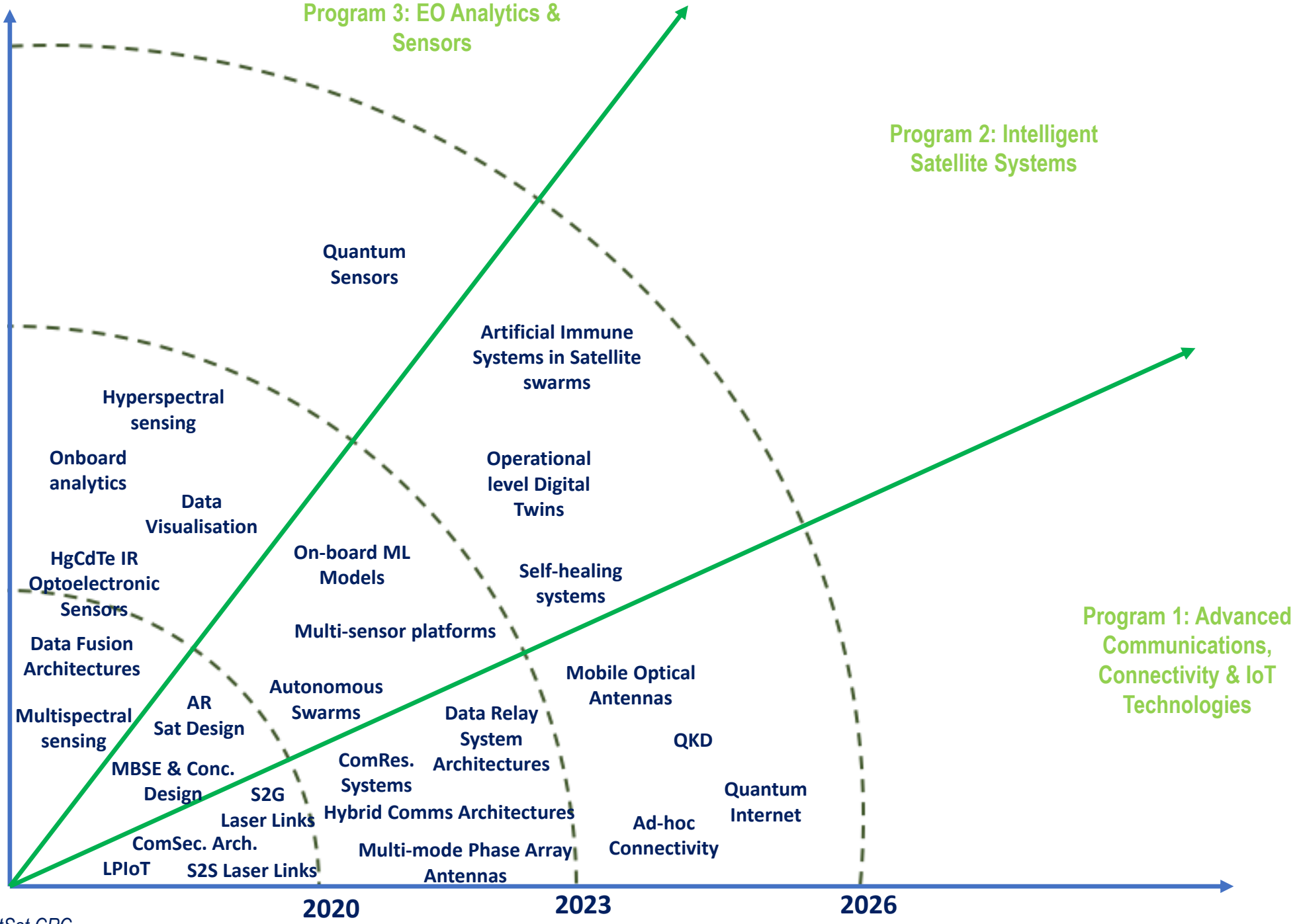
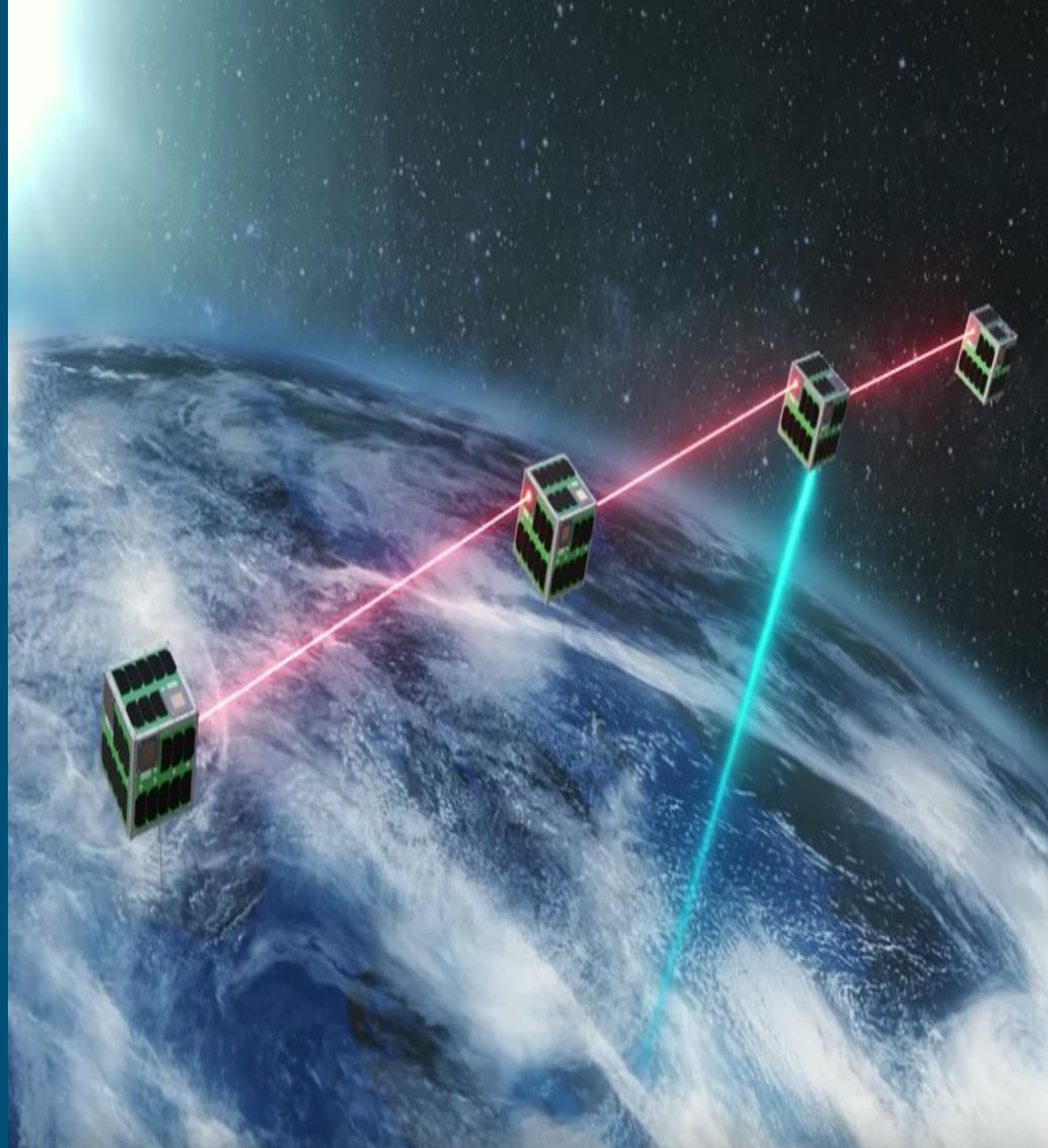
# Technology Roadmap




1. Space-based satellite systems to support networked capabilities

At least 3 Experimental Launch Missions of satellite constellations to build the ‘prototype’ of Australia’s first space infrastructure for Comms & EO



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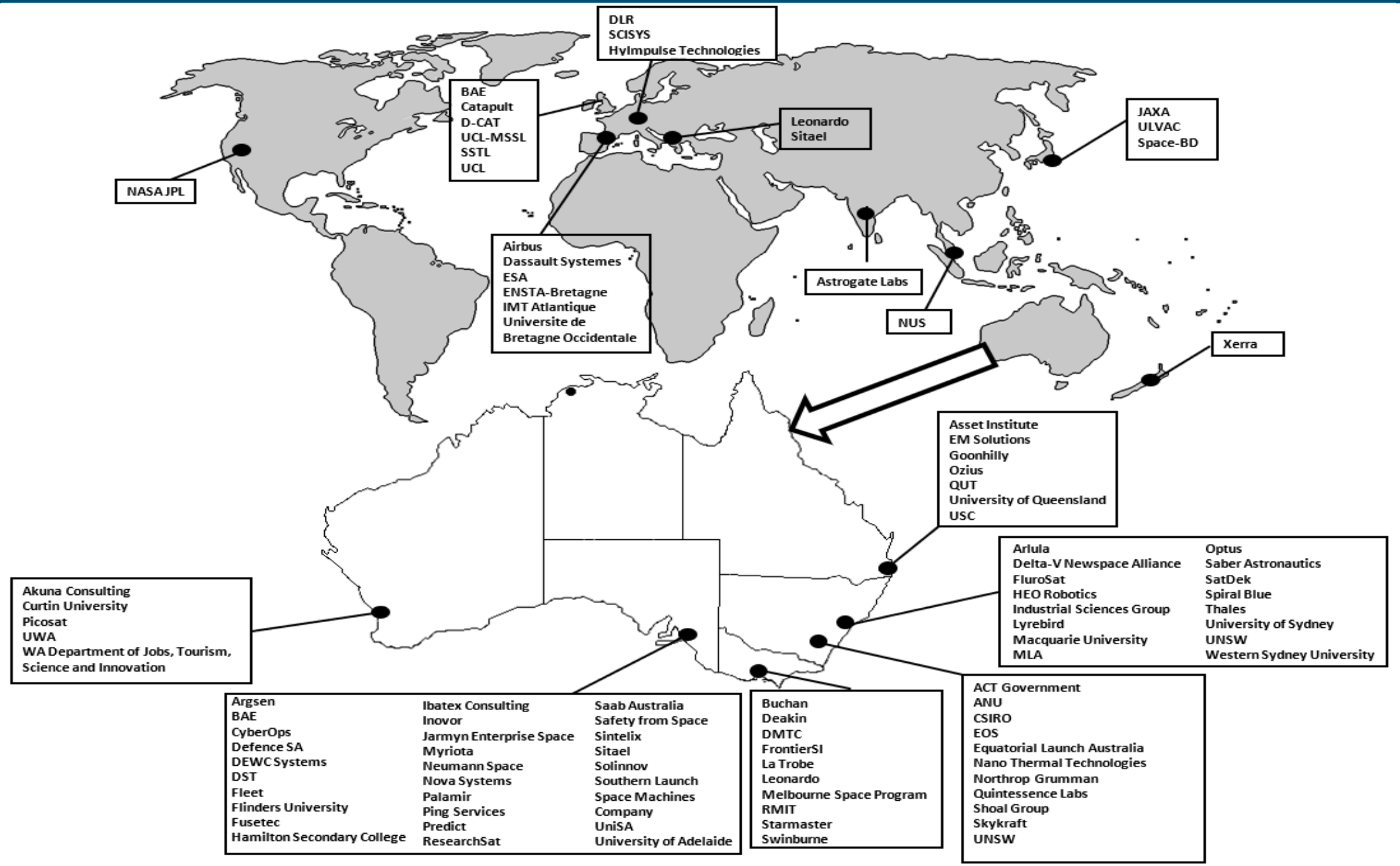
# The Biggest Space Industry-Research Collaboration in Australia's history

## 90 organisations, $245M total R&D commitment

# *A truly International Collaboration*




Inspiring young engineers & scientists, Building our workforce, futureproofing their careers
73
PhDs
400
Space Engineers & Scientists
Boosting the Start-up ecosystem
ASSC
State Nodes
International Internships
SmartSat CRC 'College'