In-Space Missions - BAE Space

Centre For Earth Observation Instrumentation
Emerging Technologies Workshop

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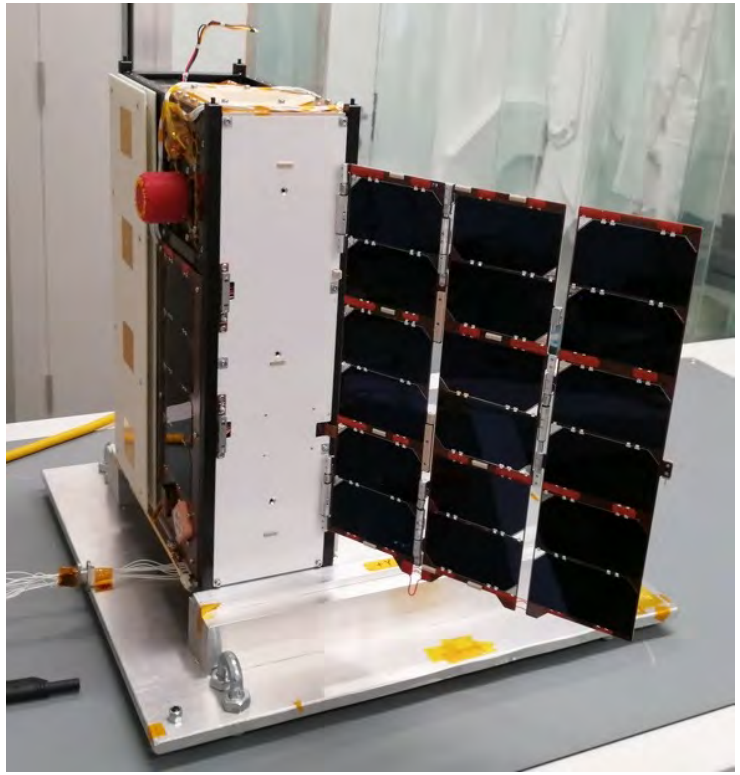
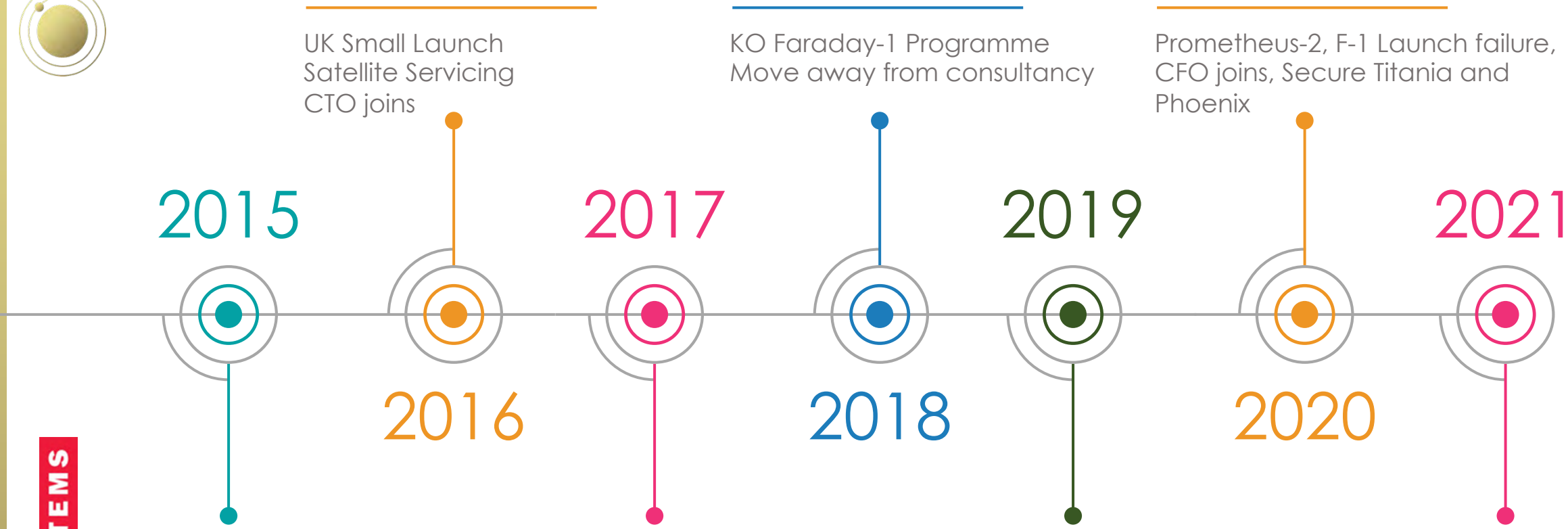
In-Space Missions

- The space industry offers commercial opportunities yet only a small fraction of companies reach orbit
  - Capital Intensive
  - Long schedules
  - Complex
- Sustainability issues
  - Early satellites and businesses often fail leading to increase in debris population
  - Satellite usage is inefficient
  - Launch has an environmental impact



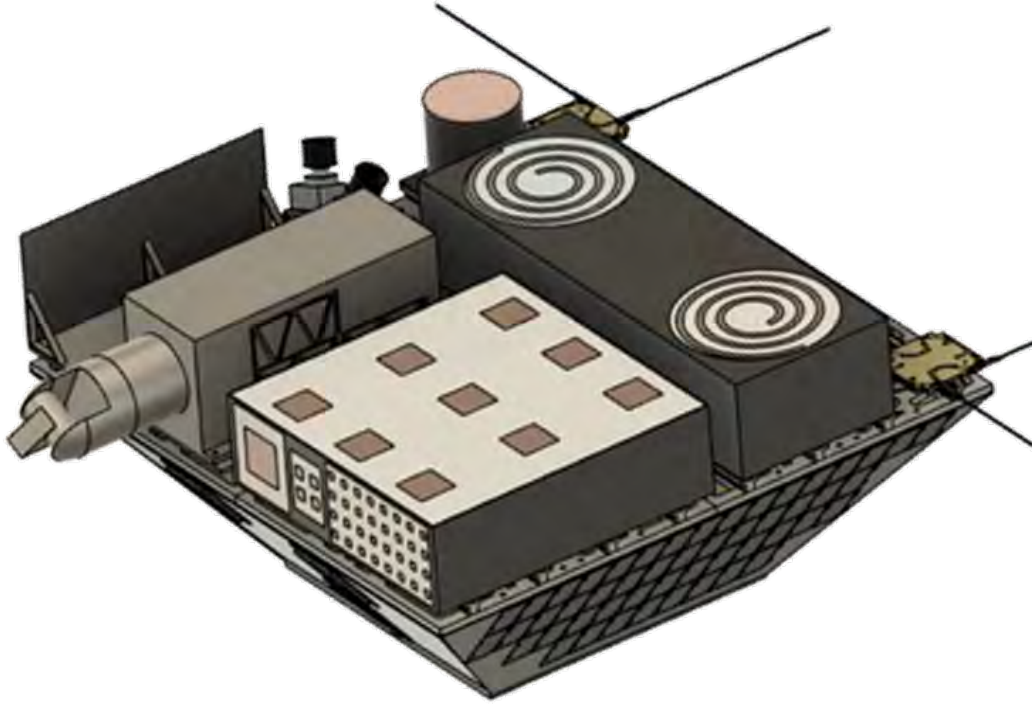
In-Space Missions timeline



BAE Systems: Ambition in Space

Missions

- Low-cost standardised platforms providing rapid mission development
- Exploit cubesat/smallsat supply chains,
  - Not vertically integrated
- Dedicated missions
- Rideshare missions
- Digital Missions
  - Query, Task, Simulate, Host



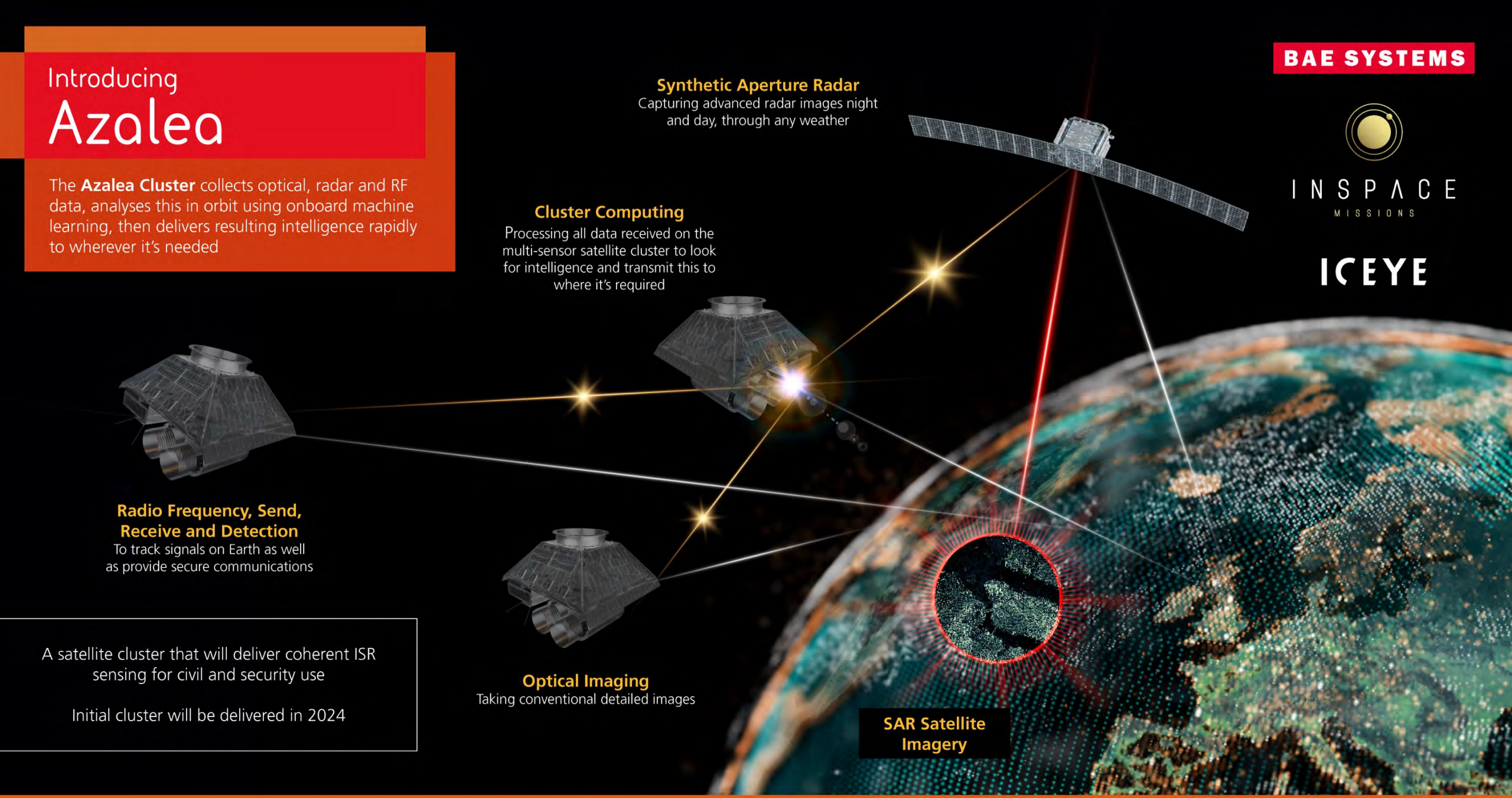
Introducing Azalea

The **Azalea Cluster** collects optical, radar and RF data, analyses this in orbit using onboard machine learning, then delivers resulting intelligence rapidly to wherever it's needed

BAE SYSTEMS

INSPACE MISSIONS

ICEYE



Synthetic Aperture Radar
Capturing advanced radar images night and day, through any weather

Cluster Computing
Processing all data received on the multi-sensor satellite cluster to look for intelligence and transmit this to where it's required

Radio Frequency, Send, Receive and Detection
To track signals on Earth as well as provide secure communications

Optical Imaging
Taking conventional detailed images

SAR Satellite Imagery

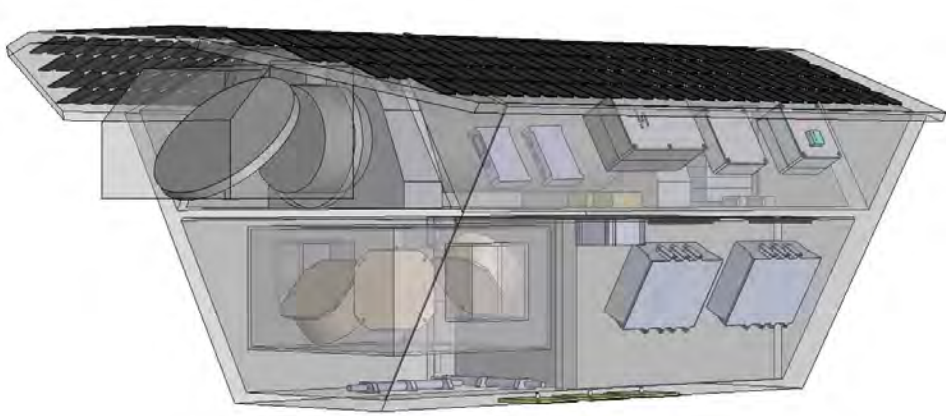
A satellite cluster that will deliver coherent ISR sensing for civil and security use

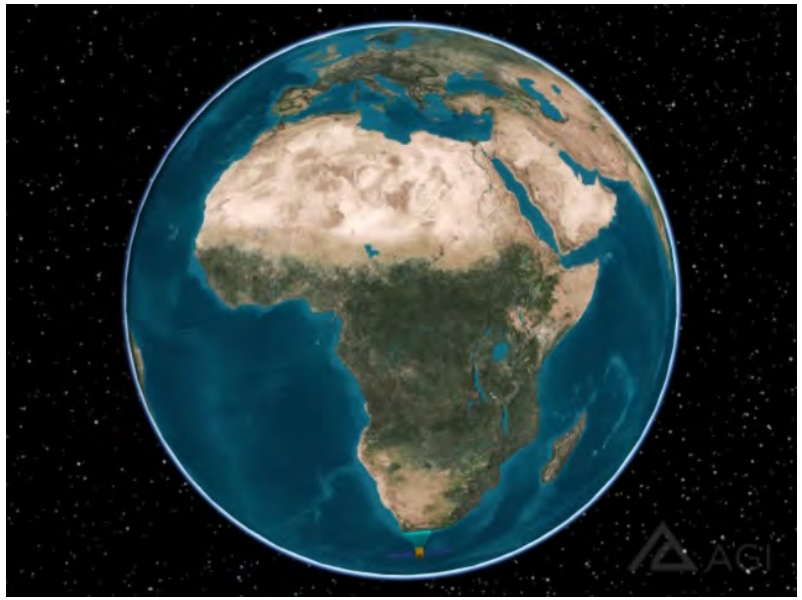
Initial cluster will be delivered in 2024

Three multi-sensor satellites from BAE Systems & In-Space Missions, and one SAR satellite in partnership with ICEYE

High-Resolution, Wide-Swath EO

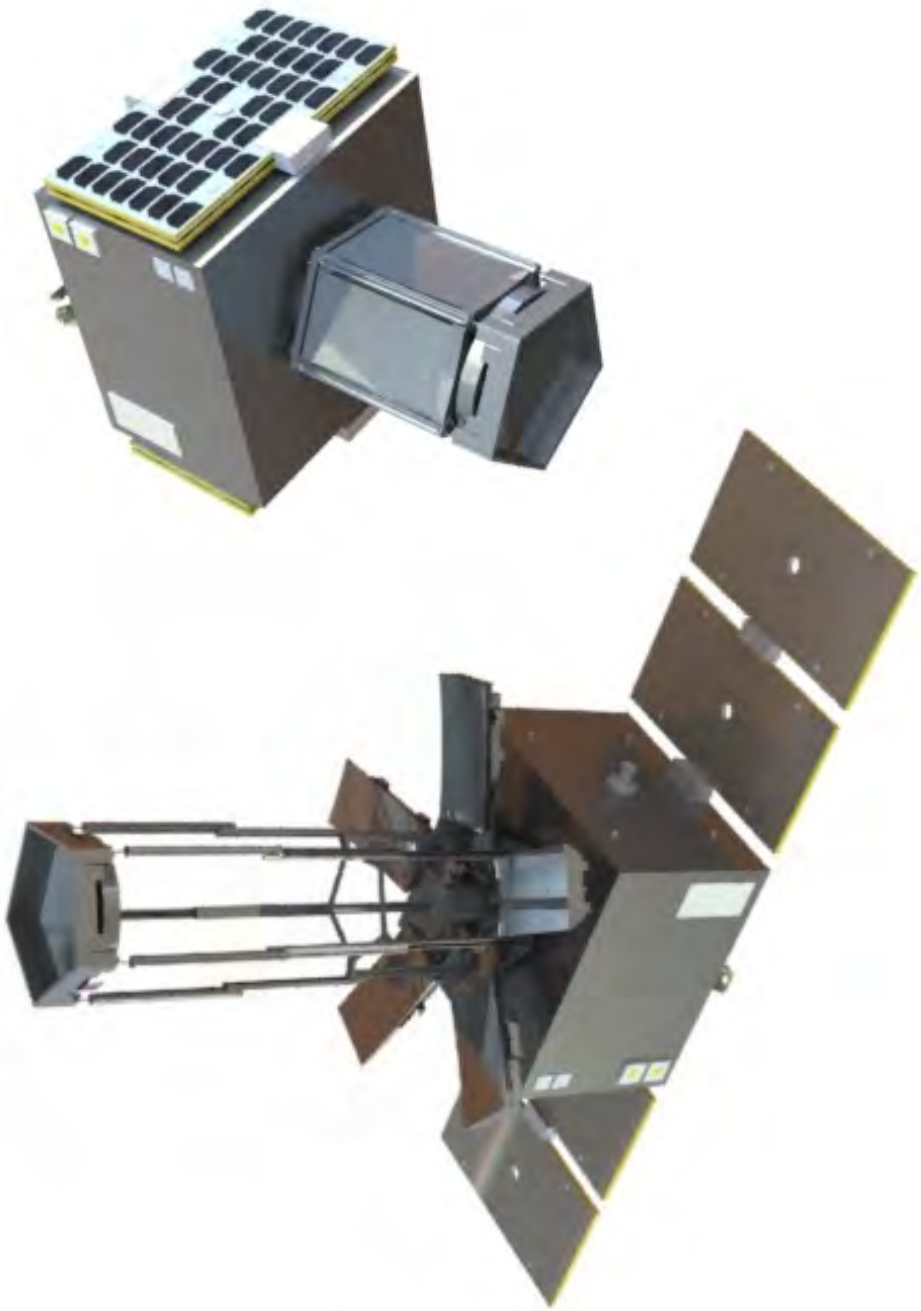
- Global Imaging Systems (GIS) concept for novel optical payload
  - 1 m resolution over a 200 km swath
  - Lower-cost imaging constellation
  - Improve coverage and update rates
  - Reduce image price
  - Stimulate EO analytics market
- ISM spacecraft concept
- CEOI Pathfinder Grant
- Talk tomorrow
  - Liam Sills
  - 12:20





Deployable optics

- Supersharp concept for deployable optics for thermal IR sensor
  - Approx 1.4m aperture
  - Approx 3m gnd res
- ISM spacecraft concept
  - Preliminary concept based on DRAGON
- Applied for CEOI Flagship Grant
- Talk tomorrow
  - Ian Parry
  - 11:40



Space Domain Awareness

- Two SDA projects underway
- Oxford Dynamics
  - UKSA Enabling Technologies Programme (ETP)
  - Radar, ML
- LMO
  - Luxembourg DoD funding
  - Edge processing, autonomous operation

OXFORD DYNAMICS

LMO

Faraday Dragon

- Multi-customer rideshare mission
  - Targeted at Asia-Pacific region
- Supported by UKSA International Bilateral Fund
  - Phase 1
    - Payload selection and mission definition
    - Creation of a multi-agency framework
  - Phase 2
    - Implementation

Philippine Space Agency

Office for Space Technology & Industry, Singapore

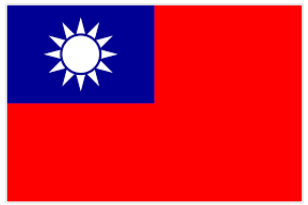
Agency for Science, Technology and Research SINGAPORE

ADDVALUE

GISTDA

NUS National University of Singapore

OXFORD SPACE SYSTEMS



TASA

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Conclusions

- BAE Systems/In-Space working to develop UK space capability
- Dedicated, rideshare and fully digital missions
- Actively partnering to help develop UK supply chain
  - Future sensors may include
    - Hyperspectral
    - Low frequency SAR
    - Event based, neuromorphic sensors