Establishing Australia as a Global Leader in Delivering Quality Assured Satellite Earth Observation Data

Provision of an enduring high-quality national assurance capability for instrument calibration and satellite image and product validation

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An initiative of the Australian Earth observation community

TBD approx. May 2021

Prepared as part of the detailed scoping report series for the Australian Space Agency Earth observation Technology Roadmap.

Executive summary

- Satellite Earth observations and other forms of remote sensing contribute over $5 billion annually to Australian GDP and $543 billion to APEC economies, and provide essential data to sectors representing approximately 75% of global GDP.

- Australia's Earth observation application development capabilities are widely regarded as among the best in the world. Australia's reputation for scientific excellence, decades of experience and advantageous geographic location, along with the availability of in-country infrastructure, mean that Australia is poised to become a global focus for the satellite Earth observation programs of foreign governments and private companies through the provision of quality assurance for their Earth observation sensors, data sets, derived products and services.

- Quality assurance, which includes instrument calibration pre- and post-launch, along with satellite image and product validation and provenance (certification) of Earth observation satellite data is essential for satellite operators to produce information to demonstrate their data are fit for use. This builds trust, increases user confidence in the accuracy and reliability of satellite Earth observations, and can drive growth in the global market for spatial information.

- Uplift of Australia's quality assurance infrastructure and capability is required to transition from research to operational capability. Additional investment is required to provide consistent and assured coverage, adequate maintenance, development of skilled personnel and research and private sector opportunities for Government led operational infrastructure.

- A national quality assurance capability for satellite Earth observation instruments and their data is proposed: The Australian Centre for Earth Observation Quality Assurance (ACEOQA). The Centre will leverage and consolidate existing quality assurance infrastructure and bring online new capabilities to meet the needs of the Government, research and commercial sectors. The Centre will bring these capabilities together under one umbrella, providing a centralised access point to grow the Australian satellite Earth observation industry.

- ACEOQA presents enormous potential for growth in sectors supporting the development and maintenance of quality assurance infrastructure, increases the opportunity for realising the value of satellite earth observation data across the entire economy, and helps safeguard the long-term supply of critical satellite Earth observation data streams for Australia.

- Development of quality assurance infrastructure and co-ordination will mean Australia can join and bolster eight global networks and respond to open requests for calibration and validation assistance from international partners including the United States, European Union, Japan, Israel, Germany, France, Italy and the United Kingdom.

Key Recommendations

The flagship recommendation of this report is:

Investment is required to uplift Australian calibration and validation infrastructure and capability to support Australia in becoming a global leader in testing and quality assurance for domestic and foreign satellite earth observation missions, accelerate the growth of the Australian space sector, and create opportunity and resilience for the nation.

To enable Australia to become the leading international provider of quality assurance services for Earth observation satellites and data, this report also recommends:

1. **Creation of a national capability** (Australian Centre for Earth Observation Quality Assurance (ACEOQA)) enabling Australian and International Government, research and industry to perform coordinated quality assurance of Earth observation satellite data and imagery. This facility will leverage existing NCRIS, ASA, CSIRO, GA, BOM, University and Government activities and infrastructure to bring them together under one umbrella.
2. **Coordination of quality assurance infrastructure**, maintenance and research, across Government, research and industry to enable Australia's position as a world-leading provider of modern manufacturing and highly skilled technology services
3. **Provision of the quality assurance infrastructure and quality indicator certification** services required to support advanced satellite Earth observation capabilities for decision-making and resilience across agriculture, mining, defence, environment, and in response to natural disasters.
4. **Creation of a centralised point of access** to data provenance tools for industry and researchers to create new services and products ensuring transparency and traceability of satellite Earth observation data and derived products.
5. **Deployment of a series of Satellite Cross-Calibration Radiometers** to improve accuracy and consistency between optical satellites.

These objectives are designed to:

- Increase international private and Government sector investment in Australia;
- Grow the Australian economy through innovation and entrepreneurship across construction, technology and scientific opportunities;
- Leverage existing investment to promote a sustainable growth model for a new pathway in the Australian space industry;
- Develop infrastructure, research and commercial expertise that can be leveraged to add additional value in other domains and industries;
- Access new Earth observation data that will provide a step change to information production that is relevant for managing Australia's climate, environment and resources;
- Service the multitude of emerging small/micro/mini satellites, particularly from the private sector, that do not have access to pre-flight and/or onboard calibration;
- Enhance Australia's Earth observation satellite development; and,
- Demonstrate Australia's commitment to its international partners by investing in the provision and quality assurance of high value satellite Earth observation data products.