

# SmartSat CRC Submission

## House of Representatives Standing Committee on Industry, Innovation, Science and Resources

### Inquiry into Developing Australia's Space Industry

#### Purpose

This document provides input from the SmartSat CRC<sup>1</sup> to this inquiry concerning how government and industry supported collaborative research and development can better underpin space industry development and contribute to a range of benefits for all Australians.

SmartSat CRC would like to formally acknowledge, through this submission, the value already being gained from the high level of government support to Australia's space sector, including through the establishment of the Australia Space Agency. This support has been extremely helpful in developing capabilities and capacity across Australia in recent times.

#### Background

SmartSat CRC was established in 2019 to conduct translational research that creates game-changing technologies and generates know-how that will make our space industry more competitive and future-proof the jobs of all Australians. We do this through three research programs:

- Advanced communication, connectivity and "Internet of Things" (IoT) technologies;
- Advanced satellite systems, sensors and intelligence; and
- Next generation earth observation data services.

Our mission is to

*"build an Australian sovereign space capability through world-class research and development in space systems, technology and solutions to enhance Australia's economic prosperity and deliver national benefit".*

SmartSat aims to support the initiatives of government and the Australian Space Agency through the delivery of coordinated, impactful research that is undertaken collaboratively by industry, academia and government research organisations.

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<sup>1</sup> <https://smartsatcrc.com>

Points of contact:



To support prioritisation of our funded research activities we have developed of a number of documents including:

- The *“SmartSat CRC Strategic Plan 2021-2025”*;
- An *“Agriculture and Natural Resources Sector Priorities”* statement
  - supported by Acil Allen;
- A *“Mining and Energy Sector Priorities”* statement
  - supported by Nova Systems;
- A *“Defence and National Security Priorities”* statement
- A *“Space Industry Skills-Gap Assessment”*;
  - supported by University of Western Sydney and Asia Pacific Aerospace Consultants with input from the Australian Space Agency; and
- A smart satellites *“Technology Roadmap”* focused on our agreed research programs.

These documents have been developed to ensure SmartSat CRC supported activities are *“user informed, industry driven and research powered”*.

SmartSat CRC has also joined with like-minded organisations to lead an effort that will produce a *“2030 Space and Spatial Industry Roadmap”*. This work was initiated due to a perceived gap in understanding how the growing synergy between the space and spatial<sup>2</sup> sectors can contribute to the achievement of the Australian Space Agency goals for industry growth. This work is not expected to be complete until later in 2021 and is not presently mature enough to develop a submission to the inquiry.

The primary message from SmartSat CRC to this inquiry is that these internally produced documents are critical to ensure optimal allocation of our resources to achieve the goals set for us by our participants and endorsed by the Department of Industry CRC Program.

**Access to Government endorsed national space research and innovation priorities aimed at driving societal, economic, environmental and national security outcomes for Australia is essential for this discussion, but at present this does not exist.**

**The best guidance available for a vision for Australia’s future space sector is the Australian Civil Space Strategy, with additional insights provided by the 2020 Defence Strategic Update. Whilst valuable, these documents do not provide sufficient granularity to shape funding decisions, including by us, that support necessary growth in Australia’s space industry.**

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<sup>2</sup> Spatial science, and the industry it supports, is at its core about positioning and location. Traditionally it has been represented by cartography and surveying. Over the last century, photogrammetry, Geographic Information Systems (GIS), remote sensing through Earth Observation (EO) and position, navigation and timing through Global and Regional Satellite Navigation Systems (GNSS and RNSS) have come to characterise what is commonly known today as ‘spatial’.

Australia currently funds or supports space technology development through numerous public funded programs at the national and state level with significant programs<sup>3</sup> including:

- Australian Space Agency (ASA) Moon to Mars program
- ASA Space Infrastructure Fund
- ASA International Space Investment initiative
- Industry Department CRC Program and CRC-Projects Program (which in-part funds SmartSat CRC)
- Defence Innovation Hub
- Defence Next Generation Technology Funds (which in-part funds SmartSat CRC)
- CSIRO Future Science Platform

At present these programs independently decide where to invest with a loose coordination layer being provided through the Space Industry Leaders Forum<sup>4</sup>. Collectively this list represents more than \$350 million of funding over a 15 year period to deliver, in part, space industry outcomes.

It would arguably be more effective to have agreed national space research priorities that cover a range of stakeholders/program delivery agencies (e.g. the Australian Space Agency, Department of Defence, CSIRO, Geoscience Australia, industry associations etc) to inform decision making within these programs.

It must be recognised that funding organisations need to meet their own objectives, however coordinating priorities at the national level also has clear advantages in helping focus the application of resources on areas delivering the greatest national benefit.

Given a number of space research strategies and roadmaps already exist, and more are under development, this is largely a consolidation activity but identifying common interests and priorities may also help identify critical areas worthy of additional funding.

## **Additional Input to Inquiry**

In addition to this overarching statement, we offer targeted comments on the other issues identified within the inquiry Terms of Reference.

### **Development of space satellites, technology and equipment**

There are a number of programs at the national and state level driving this outcome, the most recent example being the announcement by the South Australian Premier to fund the manufacture, launch and operation of SASAT-1.

It is important that funding to develop space hardware contributes to sustainable industry growth and prevents an undesirable outcome for industry of stop/start orders and sporadic

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<sup>3</sup> For this list "significant" means greater than \$10m of government funding per program. There are many more smaller programs.

<sup>4</sup> The Space Industry Leaders Forum Terms of Reference states "The Australian Space Agency Charter describes the purpose of the Forum and stipulates that the Agency will establish and facilitate the Forum as the primary mechanism for engagement and coordination with the space industry within Australia."

funding. This is a very similar problem to Defence shipbuilding where long gaps in orders leads to dangerous loss of skills and capabilities and impaired international competitiveness. Globally, space systems manufacturing is a highly specialised, strongly competed and often protected sector.

It would be beneficial to develop a National Space Mission program to ensure a managed pipeline of spacecraft and payload manufacturing that can support national challenges. This will not require large amount of funding but it is important that it is sustained, competitively selected, and designed to deliver certainty such that industry can build capacity, infrastructure and invest in people.

A civil program, similar in design to the Department of Defence's Resilient Multi-mission Space Science, Technology and Research Shot (STaR Shot), should be considered to support research translation pathways for our leading space research activities. This program should aim to reduce technology risk for innovative Australian developed technology thereby encouraging commercialisation by industry.

Such a program should not be seen as a subsidy but as a necessary partnership between government and industry to mature novel technologies and attract commercial investment. Many other nations have such programs, mostly conducted by national space agencies as technology demonstration missions.

### **International collaboration, engagement and missions**

Space is inherently an international enterprise and very few countries retain the ability to develop new space capabilities independently. The Australian Space Agency has delivered a comprehensive enabling framework for international engagement.

SmartSat CRC is also an internationally connected business with growing links to NASA, ESA and the UK Space Agency and with many participants having links to or being based in the USA, UK, Italy, Canada, Japan and others.

The key to international partners is shared values, mutual interests in outcomes and co-contribution.

Programs such as Moon to Mars are critical to open doors and support valued Australian contribution of technology and expertise to large scale international endeavours, not just producing a diplomatic outcome.

### **Commercialisation of research and development, including flow on benefits to other industry sectors**

A key enabler for commercialisation of space R&D is "flight heritage". Space businesses tend to be conservative in terms of technology adoption, strongly favouring systems that exhibit "flight heritage". This is a result of the high capital investments and continuing risk profile of launch and space operations. Australia has a proud history of developing innovative space technology but have been hindered by limited options to demonstrate its operation in space. This means commercial sales of Australian space technology are nearly impossible.

The national mission approach to technology demonstration previously mentioned would address this limitation and create many new commercial opportunities for international sales by Australian industry.

SmartSat CRC is currently funding several projects developing novel space technology within the program areas listed above but, commercialisation of this technology without “flight heritage” is challenging at best. CRC’s are not resourced to fund space launch. Currently our approach is to look to our partners, such as Defence and larger international companies, to support launch of the most promising technologies. This however, places commercial constraints on the ability of industry, especially smaller and start-up companies, to fully realise the commercial benefit of space R&D activities.

In addition to this issue, we assert that that more can be done to increase utilisation of space services, including geospatial and other space derived information, across Australia. To this end we have engaged prospective end-users from a range of sectors including Agriculture, Natural Resources, Mining and Energy.

Forming these “End-User Advisory Boards” serves two purposes:

1. Allows SmartSat CRC researchers to better understand a range of applications of space technologies beyond traditional markets; and
2. Allow end-users to better understand emerging space technology and inform their constituents of how space services can create economic opportunities for them.

We think replicating these structures nationally could achieve the mutual outcome of creating new markets for space systems and generating economic and social benefits for all Australians through informed application of space and spatial services.

We are on the cusp of a range of emerging space services including low cost and ubiquitous “Internet of Things” communications services and new space-based sensing systems, including advanced artificial intelligence (AI) based processing, being able to transform business across the Australian economy. The challenge is how to couple supply and demand, including stimulating international demand for leading edge Australian technologies.

### **Future research capacity, workforce development and job creation**

It is critical that this be aligned with industry growth and this is very challenging. Ensuring the skills pipeline (vocational and tertiary) delivers the right numbers and the right skills is critical to achieving sustained industry growth. Such efforts should pay close attention to and provide support for diversity and inclusion initiatives. This will overcome a long history of male dominated STEM workforce, and retention, ensuring our best students and workers stay in the industry and preferably stay in Australia thus reaping the benefits from the capitalisation of the whole Australian workforce.

SmartSat CRC has conducted a workforce skills-gap analysis with our partners to help target the right areas for graduate and postgraduate support by our university participants. This work will inform the critical education and training component of the SmartSat CRC program.

Similarly, we aim to engage industry early to ensure supported PhD candidates are working on agreed industry research problems and that pathways to employment exist. This can also be challenging when dealing with foreign students and sensitive technologies.

**SUBMISSION ENDS**