



Australian Government



Australian
Space Agency

Space Infrastructure Fund (SIF): Robotics, Automation and Artificial Intelligence Command and Control Centre

Consultation paper

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Purpose

The Australian Space Agency (Agency) is currently undertaking public consultation to inform the design of the Robotics, Automation and Artificial Intelligence (AI) Command and Control Centre grant opportunity guidelines (a grant under the Space Infrastructure Fund (SIF)). The Agency is seeking consideration of the proposed objectives and delivery framework for the Command and Control Centre, and welcomes comments and feedback during the consultation phase.

Introduction

The Agency's purpose is to transform and grow a globally respected Australian space industry that lifts the broader economy and improves the lives of Australians. Under the *Australian Civil Space Strategy 2019-28* (the Strategy), Australia is seeking to significantly grow its space market segment from around 10,000 jobs and a market size of \$3.9 billion up to another 20,000 jobs and \$12 billion by 2030.

Activities to grow Australia's space sector are guided by the seven National Civil Space Priorities that are set out in the Strategy. One of these Priorities is *Robotics and automation on Earth and in Space*. Guided by this priority, and through the investment provided by the SIF, the Command and Control Centre will capitalise on Australia's strengths as a world leader in remote asset management (e.g. the control of infrastructure and other assets remotely through automation and other technologies). Australia is well positioned to leverage this opportunity as it has extensive experience in the applications of robotics, automation, and artificial intelligence (AI) in mining, oil and gas, transportation, agriculture and fisheries sectors, and is already being used to deliver space applications. The Command and Control Centre will providing a focus, and centre of excellence, to grow these capabilities in industry and academia.

The Agency has a Memorandum of Understanding (MoU) with the Western Australian (WA) Government, represented through the WA Department of Jobs, Tourism, Science and Innovation signed on 10 July 2019, which can be accessed [online](#). The MoU reinforced the collaboration on robotics, AI, internet of things (IoT), advanced networking and remote asset control for Earth and space. This grant opportunity supports the objectives of the MoU.

About the Space Infrastructure Fund

The Australian Government announced the \$19.5 million SIF as part of the 2019-20 Federal Budget. This is an infrastructure investment over three years from 2019-20 to help remove some of the barriers to the growth of the Australian space sector. Filling gaps in Australia's space infrastructure allows businesses and researchers to focus on providing space-related solutions for the benefit of Australia.

The SIF specifically aligns with the National Civil Space Priority Areas, and the national and international pillars identified in the Strategy. It targets seven infrastructure related projects.

Table 1 shows each project within the SIF, their primary location and the allocated funds.

The Agency is currently designing the framework for each project, with regular updates on each project available through subscription to the Agency's newsletter at www.space.gov.au. Further information on the SIF and the projects are outlined in the **fact sheet**, available online.

Table 1: SIF Projects

Project	Location	Funding*
Robotics, automation and artificial intelligence command and control centre	Western Australia	\$4.5 million
Mission Control Centre	South Australia	\$6.0 million
Pathway to launch	National	\$0.9 million
Space data analysis facilities	Western Australia	\$1.5 million
Space manufacturing facilities	New South Wales	\$2.0 million
Space payload qualification facilities	National	\$2.5 million
Tracking facilities upgrade	Tasmania	\$1.2 million

* A small proportion of funds are for administration purposes

Robotics, Automation and AI Command and Control

The Robotics, Automation and AI Command and Control Centre was a joint announcement on 10 July 2019 by the Hon Karen Andrews MP, Minister for Industry, Science and Technology and the Western Australian Minister for Innovation and ICT; Science, the Hon Dave Kelly MLA. The Australian Government has committed \$4.5 million to the Command and Control Centre as part of the SIF.

The project will be delivered through an open grant process. The successful applicant will build and operate the Centre. The phasing of funding is shown in Table 2.

Table 2: Profile of Command and Control Centre funding under the SIF

Entity	2019-20	2020-21	2021-22	Total
Australian Government	\$1.0 million	\$2.0 million	\$1.5 million	\$4.5 million

As part of the announcement, the WA Government committed \$2.0 million towards the MoU partnership with the Agency and indicated further funding will be considered in future budgets. The MoU has a number of broad areas of collaboration, of which robotics, automation and AI are a key feature. The funding support, if any, from the WA Government will be announced in due course.

The Australian Government also expects that the successful applicant will contribute funding and in-kind resources. The Agency plans to deliver the Command and Control Centre grant using an open competitive process, administered by the Business Grants Hub (through AusIndustry). The proposed timeline for delivery is shown in Table 3.

The intended aim of the Command and Control Centre is to support the development and operation of robotic and remote asset management activities in space. This includes robotic operation of on-orbit space assets and automated command, control and management of robotic activities on the Moon or Mars. It also includes in-orbit servicing of satellites as well as assisting in the delivery of technology necessary for object handling, manipulation and assembly of satellite parts and also gateways or off-earth base construction equipment. With access to these facilities, start-ups, SMEs as well as researchers and educational institutions will be able to focus on their core businesses activities, and more quickly deliver their products and services. This does not limit larger organisations or satellite infrastructure from potentially using the Command and Control Centre. The primary use of the facilities is intended to be for civilian activities.

The location of the Command and Control Centre is not defined, other than the requirement that it must be in Western Australia.

Table 3: Proposed delivery timeline for the Command and Control Centre SIF (indicative only)

Milestone	Proposed timeline
Stakeholder consultations - website	September 2019
Face-to-face briefing consultation in Perth	23 September 2019
Program design and Robotics, Automation and AI Command and Control Centre Grant Opportunity Guidelines finalised	October 2019
Command and Control Centre grant open for application	November-December 2019
Applications submitted and assessed	January-February 2020
Applicants notified; Successful applicant(s) announced; successful applicant(s) enter into funding agreements with the Australian Government	March-April 2020
Projects undertaken, with regular reporting	April 2020 – February 2022

Program Objectives

The Command and Control Centre is where operation of remote robotics missions can take place. The proposed objectives for the facility are as follows:

1. Establish a platform for SMEs (including start-ups) and researchers to develop, test and operate and support the application of robotics, automation, AI and remote management activities in space, being in-orbit servicing, satellites, gateways, space stations, the Moon, Mars or beyond.
2. Support the Agency to deliver on national and international joint missions in robotics, automation and AI.
3. Establish partnerships with organisations to conduct and support operations either in space or on Earth.
4. Provide consideration of the degree to which Australian industry benefits from the outcome of the project, as well as in the delivery of the project.
5. Provide an enduring, accessible operating model for industry and other organisations to access the capability of the Command and Control Centre, including beyond the last instalment of Australian Government funding in 2021-22.
6. Provide infrastructure to operate technology in space.
7. Establish a development and test centre for remote technology which are to be operated in remote, extreme and humanly unsafe environments in space and on Earth.
8. Provide an Earth-based test facility, and potentially representative operating environments, and interface modules to support remote live operations.
9. Provide secure and robust communication links to ground stations for space communication.

Capabilities

10. The proposed capabilities of the Command and Control Centre are:

- a. Capability for reliable and robust communications between Earth, gateways, space stations, other spacecraft or celestial bodies
 - b. Capability for managing communication delays with equipment in space or on Earth
 - c. Capability to test a full range of robotic operations, in remote, extreme and humanly unsafe environments and cater for anticipated communications paradigms including disconnected autonomous operations
 - d. Capability to integrate with South Australia's Mission Control Centre.
11. The centre will support activities that expand Australian space industry capability and capacity, and explore avenues that involve Australian businesses or Australian products and services. Some examples of such activities are as follows:
- a. Research and development (R&D)
 - b. Training
 - c. Testing and validation
 - d. Collaborative R&D.

Governance and processes

The Agency proposes that the application process would involve a single stage application to be lodged online. Depending on the number of applications received, and subject to sufficient quality against the assessment criteria, the Agency proposes to allocate all funding through a single grant under one funding round.

Applications for grants will be assessed against assessment criteria outlined in the final Robotics, Automation and AI Command and Control Centre Grant Opportunity Guidelines as informed through this consultation. The successful applicant will need to demonstrate how they meet these criteria in their grant application.

The Agency proposes that the assessment criteria would include:

- How well the proposal meets the Command and Control Centre objectives
- Capacity and capability to deliver, including management capability and governance
- The impact of grant funding and alignment with the Strategy's investment principles, including leveraged funding or co-investment (excluding other Commonwealth funding).

An expert panel will be formed to provide advice to the program delegate. The expert panel is expected to comprise around 4-5 representatives. Experience of panel members will include:

- Expertise relating to robotic and AI facilities and operations
- Business model development and/or
- Expertise relating to the space industry.

The panel will assess eligible applications and make recommendations for funding to the program delegate. The Grants Hub will ensure that any actual, perceived or potential conflicts of interest are appropriately managed through Conflict of Interest processes.

Successful applicant(s) to the Command and Control Centre will need to enter into a funding agreement with the Commonwealth, which will confirm milestones, payment and reporting arrangements.

The Agency will undertake monitoring and evaluation of the Command and Control Centre grant and the SIF as a whole. This will include an evaluation of the grant to measure how well the outcomes and objectives have been achieved. The Agency may use information from the application and project reports for this purpose. The Agency may also conduct interviews or request more information to assist the understanding of the grant impact and to evaluate how effective the program was in achieving its outcomes.

The Agency may contact the successful applicant/grant recipient up to two years after the project is finished for more information to assist with this evaluation. The Agency would ensure that the specific information required will be appropriate, involve a minimal administrative burden for the program participants and the Agency, and respect the confidentiality and privacy of all parties involved.

Conclusion

The Agency values feedback and comments during consultation and is seeking written comments on this paper and proposed program design. Submissions can be uploaded into the Department of Industry, Innovation and Science consultation [portal](#). The online portal will be open until 11:59pm AEST 24 September 2019, with a face-to-face consultation to occur on 23 September 2019 at St Martins Tower in Perth. Further enquiries can be sent via email to Consultation@space.gov.au or by calling +61 2 6276 1166.

Responses to any or all of the following questions are of particular interest to the Agency:

- Are there objectives of the Command and Control Centre that should be edited, removed or added to ensure the Centre enables the growth of Australia's space industry?
- What mission types would potential users like the Command and Control Centre to be able to support (for example launches to different orbits, size of satellites and missions in deep space)?
- Would different levels of resilience and secure communications be required depending of the type of mission (national versus international, crewed versus un-crewed, etc.)?
- Are there program design features of the Command and Control Centre that are considered overly restrictive, or, are there design features that are too ambiguous that would prevent the program objectives being met?
- Are there other concerns or suggestions not identified?