



SUBMISSION TO THE INQUIRY INTO AUSTRALIA'S RESEARCH FUNDING

Terms of Reference

This submission addresses the Terms of Reference (ToR) in the House Standing Committees on Education, Employment and Training's inquiry into Australia's Research Funding with particular reference to:

- The diversity, fragmentation and Efficiency of research investment across the Australian Government, including the range of programs, guidelines and methods of assessment grants;
- The process and administrative role undertaken by research institutions, in particular universities, in developing and managing applications for research funding;
- The effectiveness and efficiency of operating a dual funding system for university research, namely competitive grants and performance-based block grants to cover systemic costs of research; and
- Opportunities to maximise the impact of funding by ensuring optimal simplicity and efficiency for researchers and research institutions while prioritising delivery of national priorities and public benefit.

Key Recommendations

Geoscience Australia is an important national science agency and is willing to provide input into this inquiry. As GA is not the direct recipient, or distributor of Australian Government research funding, the Terms of Reference as stated for the *House Standing Committees on Education, Employment and Training's inquiry into Australia's Research Funding* do not appear to be directly applicable to GA nor require specific recommendations to be made by GA. However GA indirectly benefits from such funding through collaborations with recipients of funding, for example National Collaborative Research Infrastructure (NCRIS) facilities and Cooperative Research Centres (CRCs). GA also contributes data and information to these entities and makes co-contributions in them and therefore has an interest in how funding decisions are made, and any proposed changes to current funding arrangements. Thus we have taken the opportunity to provide, with this submission, an overview of the science undertaken at GA and an overview of collaborations with recipients of Australian Government research funding.

Additionally we have identified two areas where GA could provide support to the administration of Australian Government research funding in the future. It is recommended that GA:

- Provide advice to relevant government agencies and programs on allocation of funding, where funding is for activities that we have expertise on (geosciences and research infrastructure); and
- Support the governance of funded organisations, for example several of the NCRIS facilities, in a similar way that GA invites other government agencies to be involved in the governance of the Digital Earth Australia program, consistent with the model that has flourished under AuScope.

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1 Executive Summary

Geoscience Australia (GA) is Australia's national geoscience agency. GA works in partnership with a wide range of Australian Government departments and entities to provide geoscience services, information and advice. GA is a publically funded research agency (PFRA) whose role is to inform government, industry and community decisions on the economic, social and environmental management of the nation's natural resources. The funding that GA receives is predominantly direct appropriations from the federal budget. GA is not eligible to receive traditional research funding; however, GA is involved in and depends on, collaborations with institutions that do receive Australian research funding to deliver value to Government.

GA frequently collaborates with research institutions including the Australian Institute of Marine Science (AIMS), the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Cooperative Research Centres (CRCs), National Collaborative Research Infrastructure Strategy (NCRIS) facilities, Universities, the Learned Academies and the National Environmental Science Program. These mutually beneficial collaborations give an indirect link to Australian research funding.

From the position of GA as a preeminent national science agency with collaborations with numerous Australian research institutions, we make a submission to the *House Standing Committees on Education, Employment and Training's inquiry into Australia's Research Funding*. Whilst the terms of reference are not directly applicable to GA, we have close links to institutions who do receive this funding, and thereby a keen interest in how funding is allocated.

In the future it is recommended that GA:

- Provide advice to relevant government agencies and programs on allocation of funding, where funding is for activities that we have expertise on (geosciences and research infrastructure); and
- Play a role in the governance of funded organisations, for example several of the NCRIS facilities, in a similar way that GA invites other government agencies to be involved in the governance of the Digital Earth Australia program, consistent with the model that has flourished under AuScope.

2 Overview of Geoscience Australia's activities related to Australian Research Funding

Geoscience Australia conducts work across the geoscience disciplines including: spatial science, energy, minerals, natural hazards, location information, water, and positioning and navigation information. GA currently has three major programs:

- Exploring for the Future (EFTF), a \$100.5 million initiative by the Australian Government dedicated to boosting investment in resource exploration in Australia;
- Digital Earth Australia (DEA), an ongoing investment to provide government and businesses with accurate and timely spatial information; and
- Positioning for the Future (PFTF), a \$220 million investment by the Australian Government to develop satellite technology that will provide all Australians with access to reliable and high accuracy GPS services. This program will deliver social, economic and environmental benefits across many sectors including transport, safety, agriculture and engineering. It will be supported with ongoing funding.

Vast quantities of data are captured through these programs, and by default this data is provided free and open source, including through National Critical Research Infrastructure System (NCRIS) Facilities such as the National Computational Infrastructure (NCI). In this way the data GA collects contributes significantly to the research community. There are some specific and isolated instances where data is not made publically available due to commercial or security considerations.

GA delivers scientific value to Australia across several geoscience sectors (see GA's Value to the Nation¹ document). GA is a PFRA, funded through appropriations in the federal budget and not eligible to receive traditional Australian Government research funding.

2.1 Australian Research Collaborations

As an applied science agency GA has collaborations and partnerships with several entities that are the recipients of Australian Research Funding. As such GA indirectly benefits from this funding and has a keen interest in how it is allocated now and into the future. These collaborations and the enabling research infrastructure they provide play a crucial role in GA being able to achieve our outcomes in the past and will into the future. Ensuring that government investment in science remains coordinated and communicated from the research phase through to operational applications is an important over-arching challenge. GA works closely with all of our collaborators at formal and informal levels to try and ensure this outcome.

A summary of our key research collaborations is provided in the following sections.

¹ <http://www.ga.gov.au/value-to-the-nation>

2.1.1 NCRIS Facilities

National Computing Infrastructure (NCI)

GA is a founding member of the NCI Partnership that provides operational funding for the NCI. In return, GA receives a percentage of the NCI resources for computational projects and data storage. Use of the peak machine at the NCI has become business as usual for many aspects of GA's science, particularly in processing and analysis of satellite imagery for the DEA program; modelling of geophysical data for the Exploring for the Future program; radar interferometry for the Geodesy capability; and simulation of natural hazards for the Community Safety capability. The NCI is becoming increasingly important as a repository for large GA data sets, providing machine accessible access through data services.

Australian National Data Service (ANDS), Research Data Services (RDS) and National eResearch Collaboration Tools and Resources (NeCTAR)

GA has collaborated with each of these entities individually in the past and is continuing to since they have aligned business plans going forward from 2017/2018.

RDI/RDSI

This program has allowed GA to access data storage, located at the NCI. This has been supplemented by support for the development of data services for geophysics data through a grant from RDS to the NCI.

NeCTAR

GA has benefitted from the virtual laboratory program. GA has worked with the Virtual Geophysics Laboratory and the Virtual Hazards, Impact and Risk Laboratory, which has enabled more users to access our data and code in a user friendly way. NeCTAR is still working on the Virtual Labs core code base, which GA is benefitting from through the ANDS program.

ANDS

The GA informatics team works very closely with ANDS, both through participation on multiple working groups (data management, software citation, data services, provenance, vocabularies) and through the use of the ANDS vocabulary and identifier services. GA has also benefitted peripherally through ANDS support for specific geoscience related data projects, such as the ongoing AuScope Digitally Enhanced Virtual Laboratory project and prior to this, an extension of the Virtual Labs core code to enable provenance capture.

Terrestrial Ecosystem Research Network (TERN)

GA has collaborated with TERN to provide environmental data (for example land cover information) through the analysis and provision of Landsat data. The DEA at GA can provide an operational pathway for research out of TERN.

AuScope

GA is a partner of the AuScope program and pays an annual subscription, this entitles GA to apply for NCRIS funding through AuScope for various geoscience projects. GA collaborates heavily with AuScope, primarily in the Geodesy and Minerals Exploration domains. The Geodesy capability has benefitted from significant instrumentation purchased using funds from AuScope, for example the gravity infrastructure project. A GA officer is the Component Lead for the Geospatial Framework and Geospatial Observatory Program of AuScope. The Minerals capability has benefitted through the acquisition of geophysical data using AuScope equipment and financial and computing support for data delivery through the AusGIN portal.

Integrated Marine Observing System (IMOS)

The Marine section at GA collaborates with IMOS in regards to improving access to marine data and tools. For example, GA uses the SQUIDLE software and the IMOS platform for analysing and providing open access to video that is acquired of seabed environments. GA does not currently have representation in the governance of IMOS. If GA had representation this would add a geoscience perspective to the development of priorities for the acquisition and delivery of marine data.

GA also collaborates with other NCRIS domain groups, primarily through participation in working groups and committees such as the Earth and Environmental Science Facilities Forum (EESFF), AeRo and eResearch Australasia.

2.1.2 CRCs

Bushfire and Natural Hazards CRC

GA is involved in three of the research clusters (Built Environment, Flood and Coastal Management and Emergency Management Capability) and is the lead end user on two of the research themes. The BNHCRC is end user/stakeholder focussed which enables GA to understand stakeholder requirements from the industry sector to the community level, ensuring our science and research outputs are utilised, contributing to GA's strategic priority of *Ensuring Australia's Community Safety*.

CRC-Spatial Information (CRC-SI)

(Note from 1 July this CRC will cease, GA will continue to participate in the successor entity Frontier SI)

The CRC-SI is relevant to several business areas at GA. At a high level we collaborate on topics of mutual interest, in particular applied research into positioning and Earth observation. We do these through several initiatives:

- A GA officer chairs the program board for positioning, and another is the positioning research program manager,
- A GA officer is a board member on the research program into spatial infrastructures,
- GA is a project partner on several positioning research program projects,
- GA is a project partner on research projects into rapid spatial analytics

- GA is working collaboratively on the Open Data Cube (ODC) initiative and developing the Australian Industry Strategy for Digital Earth Australia.
- GA is a project partner on research projects into rapid spatial analytics

Collaboration with the CRC-SI has allowed GA to gain insights into the spatial requirements of Australian businesses and supported improvements to the management of key national datasets, contributing to GA's strategic priority of *Providing Fundamental Geographic Information*.

Deep Exploration Technologies CRC (DET-CRC)

GA is a project partner and a member of the Science Steering Committee of the DET-CRC. GA has benefitted from new drilling technology developed by the CRC, utilising it for the collaborative drilling program in Stavely, Victoria. This new drilling technology has significantly reduced drilling costs and has led to the development of the National Drilling Initiative between GA and state geological surveys, which will improve the pre-competitive data collection below the surface. This data has contributing to GA's strategic priority of *Building Australia's Resource Wealth*.

Mineral Exploration CRC (MinEx CRC)

GA is a project partner, member of the Steering Committee and the Leader of Program 3 (The National Drilling Initiative) for the MinEx CRC. Program 3 is a direct result of the new drilling technologies developed in the DET-CRC and is a collaborative National Drilling Initiative between GA and state geological surveys. The new drilling technology will be further improved by the MinEx-CRC, this coupled with the development of new data analysis techniques will be used by GA to improve in-house capabilities and products to attract exploration investment to Australia. This will contribute to GA's strategic priority of *Building Australia's Resource Wealth*.

2.1.3 Other entities

National Environment Science Program (NESP)

The NESP comprises seven collaborative research hubs and GA has had a long-term participation in the Marine Biodiversity Hub, which provides nationally consistent scientific information to support evidence-based decision making about marine species, marine protected areas, and pressures on the marine environment. GA's involvement in the Hub has focused on research into the distribution and characteristics of seabed features in the extensive Commonwealth marine area. This work has helped GA build baseline geoscience data and information that informs decision making across a range of government organisations involved in the marine sector. Including these other government end-users in setting national priorities for the NESP would better focus the program on key national data and information gaps.

International Ocean Discovery Program (IODP)

GA is an active participant in international research collaborations as well. There is currently no consistent method to Australian investment in international research programs. This inconsistency limits Australia's leverage and influence in these international programs, in particular our ability to

address key national priorities. An example of GA involvement in one of these programs is the Indian Ocean Drilling Program (IODP). Australia is involved in the IODP through a purchased membership and does so in order to gain access to strategically important research capabilities. GA's influence could be significantly improved for the IODP if there were mechanisms in place to make consistent decisions about Australian involvement and where the funding for this involvement should come from.

CO2-CRC

(Note the CO2-CRC used to be CRC, it is now a company but has retained the original name)

GA is a company member, member of the board, member of the Project Advisory Committee, Leader of precious and current Otway Stage 2 and 3 research projects of the CO2-CRC. Although not a CRC, the CO2-CRC does receive Australian federal government research funding in addition to funding from industry and academic partners. Technologies and science developed as part of the CO2-CRC project builds GA's ability to provide pre-competitive information that will support establishing a commercially viable carbon-sequestration industry in Australia. GA benefits from this partnership as it enables us to better provide technical and advisory support to the Government for carbon capture and storage activities in Australia.

3 Optimising research funding to better address national priorities

There are many partnerships and collaborations that GA is involved with that are the recipients for Australian Research Funding as summarised in Section 2. These relationships benefit the work of GA, helping us to meet our strategic priorities. However, GA is not directly involved in the decision making process around the allocation of funding, even when the funding is directed to geoscience or research infrastructure, which GA is well placed to provide advice on. As GA is a PFRA whose priority is to deliver scientific outcomes that are in line with national priorities and are to the benefit of the public, there is a greater role that we could play in ensuring that funded research organisations are meeting government objectives.

In the future GA could:

- Provide advice to relevant government agencies and programs on allocation of funding, where funding is for activities that we have expertise on (geosciences and research infrastructure); and
- Support the governance of funded organisations, for example several of the NCRIS facilities, in a similar way that GA invites other government agencies to be involved in the governance of the Digital Earth Australia program, consistent with the model that has flourished under AuScope.