Australian Antarctic Science Program

Governance Review

December 2017

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A Blizzard [at Cape Denison], Frank Hurley (1885-1962), Australasian Antarctic Expedition, 1911-14.
# Australian Antarctic Science Program Governance Review 2017

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Executive Summary

The purpose of this review is to advise on a governance model for the Australian Antarctic Science Program (AASP) as currently administered by the Australian Antarctic Division (AAD). The critical context for this advice includes the strategic importance of Australia’s Antarctic sovereignty claims and the role of science in that claim, the establishment of a new Antarctic Science Foundation, the current $2 billion investment in Antarctic logistic capability, the development of Hobart’s role as an Antarctic gateway, and the impending termination of funding for the Antarctic CRC and Gateway programs. Future funding for Antarctic science, and the science program itself, were outside the scope of the Review.

Consultation meetings were held with over 50 people from 23 Australian government, corporate and research organisations, and telephone discussions were held with leaders from the British and New Zealand programs. The key findings from these consultations were that the current governance model:

1. Has strengths in the support of collaborative science from multiple government agencies and universities and in the education of future Antarctic scientists, and has a positive economic impact in Hobart and beyond.
2. Would benefit from greater coherence, scientific independence and clarity of leadership, has a number of administrative inefficiencies, and has suffered from uncertainty over future funding arrangements.
3. Does not adequately resolve the tension between researcher-driven science and policy-driven science (particularly where the science requires a major campaign with large logistical support), or support a comprehensive data plan.

Nine recommendations have been made around structure, strategy and administration. Three themes underpin these recommendations:

1. **Enduring collaboration**: to ensure that the future model institutionalises long-term collaborative science, at the discipline, research agency and international level; with coherent leadership.
2. **Integrated strategy and planning**: to ensure that the Antarctic science community has a clear voice in the development of science strategy and the design of the science program (without undermining the role of the Australian Antarctic Division as the national operator and science program leader).
3. **Streamlined administration**: to remove duplication and inefficiency in the administration of competitive grants and in the assessment of Southern Ocean marine science voyage proposals.

The recommendations are summarised below in Figure 1, with notes on the key features.

Implementation of these recommendations would be facilitated by the early appointment of the proposed new Science Council, to act as a steering committee for the development of more detailed plans.
### Figure 1: Summary of Recommendations

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<th>1. Science Program Governance Structure</th>
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<td><strong>3.2 All marine science voyage assessments to be undertaken in a single integrated process by the Marine National Facility (MNF) and AAD.</strong></td>
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1. Background

The need for a review in 2017 of the governance of the Australian Antarctic Science Program was identified in the 2016 Australian Antarctic Strategy and 20 Year Action Plan. The Plan commits the Government to revitalise Antarctic science by ‘implementing a coordinated and effective Antarctic science funding model to increase Antarctic research by leading Australian institutions together with international and industry partners’.

The Review was tasked to provide ‘recommendations and options to ensure the most efficient governance arrangements are delivering the best value for money for Australia’s national interests and scientific priorities in Antarctica’. The full Terms of Reference are at Attachment A. The current scientific priorities for the Australian Antarctic Science Program are out of scope for this Review.

The Terms of Reference required the Review to consult widely. A diagram of the current governance model (Attachment B) was produced in consultation with the Australian Antarctic Division (AAD), then used as the basis for consultation with a wide range of stakeholders. Discussions covered what was working well, what wasn’t, and how the model could be improved. All participants were enthusiastic about the review process, and cooperated fully.

Formal consultation meetings were held with over 50 people from 23 Australian government, corporate and research organisations, and telephone discussions were held with two international counterparts to the AAD. A full list of the entities that were consulted is at Attachment C.

A final roundtable consultation was held in Hobart in mid November, with representatives from most key stakeholders present or participating by telephone. The findings and proposed recommendations were outlined, and a range of issues were discussed. This Review report was then finalised.

Officers from the Department of the Environment and Energy, including the Australian Antarctic Division, provided much assistance to the Review. The findings and recommendations however are the Reviewer’s alone.
2. Context

The two key references preceding the current review are:

- 20 Year Australian Antarctic Strategic Plan (2014); a report to the Australian Government by Dr Tony Press.
- Australian Antarctic Strategy and 20 Year Action Plan (2016); a policy statement by the Government.

The key matters covered by these reports that provide critical context for the current Review may be summarised as:

- Australia’s assertion of sovereignty over 42% of the Antarctic continent, and our related maritime claims, are of great strategic importance.
- These claims are underpinned by our occupation and science in the Australian Antarctic Territory, and by our active participation in the Antarctic Treaty System and related science bodies.
- The Australian Government is currently making a $2 billion investment in Antarctic logistic capability (sea, air and ice), which will underpin both our occupation and the science program.
- A world-class science program is critical to achieving our strategic objectives, and the Government is committed to new and stable funding to support the Australian program.
- A new Antarctic Science Foundation is being established, by individuals from the private and philanthropic sectors, to augment Australian Antarctic science funding.
- Further development of Hobart’s role as an Antarctic Gateway, for both logistics and science, is an integral part of the strategy.

There are two impending developments that also provide critical context:

- The Antarctic Climate and Ecosystems CRC will conclude in June 2019, after 25 years of operation in various forms. The core members of the current CRC are the Australian Antarctic Division, Bureau of Meteorology, CSIRO and the University of Tasmania (through its Institute for Marine and Antarctic Studies - IMAS). The current ACE CRC funding is $5m per year.
- The Antarctic Gateway Partnership Special Research Initiative, an Australian Research Council program providing $8m per year over three years, will terminate in December 2018. The core members are UTas, AAD and CSIRO.

While not part of the Terms of Reference for the current review, Australian science stakeholders all raised concerns over the consequences of this change in funding. In the scenario where there is no replacement funding for the CRC and Gateway appropriations, and both entities are wound up at the completion of their funding, the...
AAD, University of Tasmania, CSIRO and the CRC have advised that there would be a significant impact on Antarctic science output, driven by the loss of around 38 research staff and 9 other staff.

The importance of the Antarctic program to the Tasmanian economy, including the role of the science program in Hobart, was also emphasized by many stakeholders. Analysis undertaken for the Tasmanian Polar Network indicates that the Antarctic and Southern Ocean sector in Tasmania was worth over $180 million in 2015-16, roughly 0.7 per cent of the gross state product. Employment in the sector represents 0.4 per cent of the Tasmanian job market, contributing 755 jobs.
3. Current Model

The current governance model for the Australian Antarctic Science Program (AASP) is outlined at Attachment B. This diagram shows the various lines of engagement between the institutions, from the perspective of a scientist participating in the program. It does not represent the relative size of the contributions (staff, funding, outputs) of the institutions.

A number of features of the current model are apparent, as outlined below.

a) The AAD fulfills multiple roles in the current model on behalf of Government. For the purposes of this review, the four key roles are:

- **Operator**: the AAD plans and manages the logistics operations and the staffing of the Australian research stations, RV Aurora Australis and aircraft. It is the access gatekeeper.
- **Science Leader**: the AAD Chief Scientist leads the AASP and Australia’s Antarctic science engagement internationally, and has primary responsibility for the drafting of the Australian Antarctic Science Strategic Plan and the assessment of science project proposals. The AAD also staffs the key ‘theme leader’ roles with scientists who plan and lead the major thematic programs.
- **Science Manager**: the AAD also employs scientists in two main areas – environmental protection, and glaciology relating to climate change. The first encompasses research that has a clear policy role for environmental protection, conservation and management, providing advice to support Australia’s position internationally in the Antarctic Treaty System, Commission for the Conservation of Marine Living Resources, Agreement on Albatrosses and Petrels and International Whaling Commission. The second is high-latitude climate and glaciological research particularly focused on addressing key gaps identified in the International Panel on Climate Change reports relating to Antarctica and the Southern Ocean.
- **Data Manager**: the Australian Antarctic Data Centre (AADC) is a key function within the AAD as it supports data access and enables compliance with Antarctic Treaty requirements on data availability.

b) AAD scientists lead about a third of all Australian Antarctic Science projects and also collaborate extensively on projects led by other institutions within the program. AAD scientists focus particularly on policy-critical research, manage many long term monitoring projects, and lead the delivery of the Antarctic chapter within Australia’s State of the Environment Report. However the majority of scientists who undertake research within the Australian Antarctic program come from institutions outside the AAD, including other Commonwealth agencies and Universities, with over 100 institutions currently represented from 23 countries. These scientists cover a diverse range of disciplines.

c) The AASP itself only refers to projects assessed and approved through the Australian Antarctic Application system as meeting the objectives of the Australian Antarctic Science Strategic Plan. These projects rely on some support from the Australian Antarctic Division (and provide their data to the AADC). The support can be in the form of grants and/or AAD logistics. Antarctic science, conducted by scientists in other Australian Government
agencies and universities outside of the AASP, is not captured under the Program. However all such science should comply with the Antarctic Treaty obligations regarding ‘free and open exchange of scientific results and observations’, but at present there is no mechanism to identify and report this science and the associated data.

d) The Australian Antarctic Science Strategic Plan is a critical governing document. The Strategic Plan defines the priorities for the science program, with a focus on strategic relevance for policy together with scientific excellence and outreach. The plan outlines the themes of research, key research questions, existing and potential partnerships, capabilities required, and the assessment process for selecting science projects. The Strategic Plan is first drafted by AAD, based on consultation with all relevant Commonwealth agencies, and then released for public comment to stakeholders including the research community. A final draft is then submitted to the portfolio Minister for consideration and approval. The Strategic Plan is revised every 5 years, and is underpinned by more detailed implementation plans prepared by the AAD ‘theme leaders’ and the Chief Scientist, in consultation with stakeholders and with a public comment period.

e) There are multiple pathways for scientists to participate in the Australian Antarctic Science Program, with some overlapping. These include the ACE CRC, the Gateway Partnership, Universities via the Australian Research Council, Universities directly, the AAD’s Australian Antarctic Science Grants Program – available to Australian Universities and a few state-funded agencies such as museums, the AAD itself, and other Australian Government science agencies (CSIRO, Geoscience Australia, Bureau of Meteorology etc). Around one third of AAD-employed scientists work under the auspices of the CRC.

f) The AAD’s $1.05m grants program is designed to complement the ARC program, providing a dedicated pool of small funding to support or partially support projects focused on identified needs. It provides funding for costs needed to participate in the Antarctic program, such as medicals, freight, travel and accommodation prior to joining the expedition, together with salary costs for researchers, top-up scholarships and equipment, and also has options for co-funded post-doctoral fellowships and one prestigious award (the R.JL Hawke Post-Doctoral Fellowship). University scientists can also apply for an ARC research grant, where they are in competition with all other applicants in all ARC scientific disciplines (the total amount of ARC Antarctic funding therefore being entirely a function of scientific merit); or they can apply directly to the AASP without funding support to access logistics.

g) All science proposals, regardless of the pathway, are assessed by the AAD against three criteria: science excellence (60% of score), alignment with the Strategic Plan (40%), and logistics requirements. The AAD uses an independent peer review process for the science assessment, together with an assessment panel with two sub-groups of independent and government experts; one sub-group determines the final science score and the other sub-group of policy/end users assesses the strategic fit of the project. There is also a ‘non-science’ pathway within the Antarctic Program for some activities related to the science
program, such as hydrographic surveys and BoM forecasters.

h) The AAD is (for a number of proper reasons) the sole provider of logistic support for Australian Antarctic science south of the edge of the sea ice. This logistic support (ship, air, base, traverse) can be regarded as shared (competitively accessed) science infrastructure. Other shared science infrastructure relevant to both the AASP and the broader Australian Antarctic science effort include the Marine National Facility (*RV Investigator*, operated by CSIRO), and two NCRIS facilities – the Integrated Marine Observing System (led by the University of Tasmania) and the National Computing Infrastructure (led by the Australian National University).

i) The Australian Government is currently making major investments in the logistical infrastructure that underpins the AASP. This includes $1.9 billion to design, build, maintain and operate the new icebreaker *Nuyina*, $50 million for a new station on Macquarie Island, $45 million to re-establish Australia’s traverse capability and the first phase of work to establish year-round aviation access, and a $38 million contribution towards the runway expansion at Hobart Airport.

j) The model supports the pipeline of future Australian Antarctic scientists, at the undergraduate, post-graduate and post-doctoral level. On average there have been more than 100 students engaged in AASP projects each year since 2012-13 (327 individual students). Of these, 226 have been PhD students, 38 Masters students, 48 Honours students, and 15 ‘other’ degrees (including Graduate Diplomas). Since the 2012-13 season there has been an overall increase in the number of students engaged in AASP projects. The University of Tasmania plays a critical role in this function. All students in the CRC and Gateway are included in the UTAS column below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Students in AASP</th>
<th>International Students</th>
<th>Australian Students</th>
<th>UTAS students</th>
<th>Percentage of Students at UTAS</th>
</tr>
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<tbody>
<tr>
<td>2012-13</td>
<td>79</td>
<td>10</td>
<td>69</td>
<td>36</td>
<td>46</td>
</tr>
<tr>
<td>2013-14</td>
<td>152</td>
<td>18</td>
<td>134</td>
<td>63</td>
<td>41</td>
</tr>
<tr>
<td>2014-15</td>
<td>78</td>
<td>6</td>
<td>72</td>
<td>24</td>
<td>31</td>
</tr>
<tr>
<td>2015-16</td>
<td>121</td>
<td>15</td>
<td>106</td>
<td>51</td>
<td>42</td>
</tr>
<tr>
<td>2016-17</td>
<td>141</td>
<td>25</td>
<td>116</td>
<td>65</td>
<td>46</td>
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k) All scientists participating in the AASP must lodge their scientific outputs as data or metadata in the AAD’s Australian Antarctic Data Centre (AADC). The AADC operates a website for data discovery and access. This serves two related functions – enhancing visibility and accessibility of scientific data, and compliance with Antarctic Treaty obligations.

The primary unit of the Science Program is a ‘project’, each led by a Chief Investigator (CI) employed by a participating institution. In 2016-17 there were 100 projects, with CI’s from 26 institutions approved to commence. The distribution is shown in Figure 2 below, and the agency Antarctic science funding profile for 2016-17 is shown in Figure 3.
Figure 2 shows the distribution of CIs across states, Commonwealth agencies and international collaborators. The 26 institutions are University of Western Australia, University of Adelaide, Australian National University, University of Queensland, Griffith University, University of Melbourne, Monash University, RMIT, University of New South Wales, Macquarie University, University of Wollongong, University of New England, University of Newcastle, University of Tasmania, Department of Primary Industries, Parks, Water and Environment (Tasmania), ACE CRC, CSIRO, GA, Australian Nuclear Science and Technology Organisation, Australian Radiation Protection and Nuclear Safety Agency and institutions in the USA, Canada, New Zealand and Japan.

Figure 3 excludes contributions associated with supervision of students.
* Excludes contributions related to the Marine National Facility.
° Includes $8m in direct funding from the ARC Special Research Initiative for the Antarctic Gateway Partnership which will terminate in December 2018.
† Comprises $5m in direct funding to the ACE CRC, and an additional $14.9m of contributions leveraged from other national and international institutions. Direct funding will terminate in June 2019.
^ Shows logistics support contributions, including the Aurora Australis, valued at ~$70m.
In his 2014 strategic review, Dr Tony Press made several recommendations on the Antarctic science program, including on its funding. In terms of the overall model, Press recommended:

- Continuation of the hybrid system of supporting Antarctic science, with the AAD providing the core of researchers focused on delivering priority scientific advice to government, and national and international research institutions providing competitive-based research against Australia’s Antarctic Science Strategic Plan (Recommendation 15).

There is one notable feature missing from the current model, which existed until December 2014. Since 1985, the Australian Science Advisory Committee (ASAC) had provided independent advice to the Australian Government on priorities for Antarctic science. ASAC had comprised 8 independent eminent scientist members appointed by Government, and 10 ex-officio members from the Antarctic science institutions, including the Director of the AAD and the Chair of the Academy of Science’s Australian National Committee on Antarctic Research (ANCAR). The Secretariat was provided by the AAD.

ASAC was abolished in 2014 as part of the Government’s ‘smaller government’ review process. Since the abolition of ASAC, AAD has assumed responsibility for its functions. Similarly, the ARAC (Antarctic Research Advisory Committee), which undertook independent reviews of science proposals, was also abolished and its functions also subsumed into the AAD.
4. Findings

The following findings are based on an assessment of the key documents and discussions with numerous stakeholders. They provide the foundation for the recommendations in Section 5.

a) **Coherence**: The current governance model is moderately complex and opaque, with 8 institutions having key roles, and many others having some role. There are three long-term Hobart-based institutions with Antarctic (science) in their names and mandates: the AAD, the ACE CRC, and the University of Tasmania’s IMAS, creating tension in the branding of collaborative science outputs. It is hard enough for insiders to navigate around the system, let alone outsiders.

b) **Independence**: The abolition of ASAC has had an unintended consequence. While it has streamlined the administration of the science program, it has created (at least the perception) of a conflict between AAD’s roles as National Operator and Science Leader, and its role as an employer of some scientists. The AAD Chief Scientist is now in the invidious position of drafting the strategic plan, chairing the panel that assesses the applications made against the plan, and employing some of the staff who are making applications.

c) **Leadership**. The lack of coherence and of independent oversight of strategy and assessment has created leadership confusion, including internationally. The system as a whole lacks a single, transparent and authoritative science leadership structure. A revitalised governance model, combined with the major investments underway in logistic capability, will create the foundation for sustained Australian Antarctic science leadership.

d) **Collaboration**: The big Antarctic science questions all require collaboration between disciplines, institutions and nations. The Antarctic Treaty itself holds scientific collaboration in Antarctica as a key principle (Article III). The current model achieves this at the working science level, despite it forcing the AAD to treat every scientist (including their own staff) as an applicant. There is room to strengthen collaboration at the institutional level to a model based on partnership.

e) **Education**. The future model must continue to support the supply of well-educated graduate, post-graduate and post-doctoral scientists. This pipeline is critical to the long-term health of the science program.

f) **Excellent v. Strategic**: There is a tension between excellent science (of a standard that has or would attract an ARC research grant), and strategic, policy-critical research and long-term monitoring and mapping programs (such as fish stock assessment, geodetic observations, mapping and charting) that underpin some of the big science questions. All these forms of science are essential (and are not mutually exclusive), but the current model lacks a transparent way of managing the balance between them given the finite funding and logistics.

g) **Projects v. Campaigns**: Similarly, there is a tension between researcher-driven science projects, that may require relatively modest logistic support, and strategic (or policy-driven) science campaigns that may require years of planning and
logistic support. Again, both forms of science are essential, but the current model lacks a transparent way of managing the balance between the two given finite funding and logistics. This issue is exacerbated by the lack of a discrete line of funding for Antarctic science within the Department’s budget allocation, which means that the actual funding levels over the Budget period can be varied by external (non-science) decisions and events. (The UK has addressed this issue through an explicit funding allocation for Antarctic science, including monitoring and mapping).

h) Duplication. There are several clear areas of duplication and inefficiency. First, for University scientists dependent on ARC funding, both the ARC and AAD assess the scientific merit of their proposals. (The AAD then additionally assesses alignment with the Science Strategic Plan and logistics). This can result in a project being approved by the ARC, then subsequently being rejected by the AAD. Second, the timing of the AASP and small AAD grants program, which is open to Universities, is variable and not aligned with the ARC process. And third, for marine (ship-supported) science in the Southern Ocean, researchers can apply to either or both the AAD (for *Aurora* support) or the Marine National Facility (for *Investigator* support), in addition to the ARC.

i) Scope. The AAD has limited awareness of non-AASP science, particularly that done outside the CRC or Gateway programs. It is in Australia’s national interest for the AAD (and hence the Government) to have a comprehensive understanding of Australian science activities relating to Antarctica and the Southern Ocean, particularly those funded by the Commonwealth, for scientific, geopolitical and Treaty compliance purposes.

j) Data. The data function provided through the Australian Antarctic Data Centre is the minimum necessary to meet Australia’s Treaty obligations. However it falls well short of the functionality of a modern data-centered science program (such as the Integrated Marine Observing System). This is a product of resource allocations in a budget-constrained environment. The data capability of the Antarctic Science program should be treated as core science infrastructure, analogous to transport and research stations.

k) Stability. The current governance model has evolved over many years, with periodic disruptions. For the last 25 years however, a recurring question has been ‘will the CRC continue’? The CRC program was never intended to provide enduring and stable institutions (like a CSIRO or Geoscience Australia), but the ACE CRC has fulfilled a critical role in collaborative research despite the inevitable continuous uncertainty over its future. The future model should be established in a manner that promotes confidence in its stability.

l) Australian Antarctic Science Foundation. Stakeholders welcomed the development of the Foundation, as a potential new source of support for Australian Antarctic Science. The Foundation will however need to demonstrate that it is supporting science that would not otherwise be done under the AASP – and that it is not simply a means to make-up a shortfall in Government funding. The people engaged in developing the Foundation are very conscious of this matter, so no recommendations are made in this regard in this Review. It is noted
however that greater coherence in the science leadership structure is likely to assist the Foundation.

m) Tasmania (Hobart). Given the relatively small size of the Tasmanian economy, there is no doubt that the cluster of Antarctic logistics and science (mostly in Hobart) plays a significant role in the Tasmanian economy. The new IMAS building on the Hobart wharf (funded by the Commonwealth), which also houses the ACE CRC and the Gateway program, is adjacent to the CSIRO marine and climate science facilities (including the CSIRO Climate Science Center and Centre for Southern Hemisphere Oceans Research) and near the proposed Antarctic precinct. These are positive ‘precinct’ developments, which can be used to further advantage in a future governance model. (The majority of AAD-employed scientists, the Australian Antarctic Data Centre, science technical support and leadership are based at the AAD headquarters in Kingston, south of Hobart).

n) Impact. The science done under the AASP has impact in multiple areas. It supports Australia’s sovereignty claims, it contributes to global science in critical areas such as climate change, and it has commercial applications. The largest current commercial application is in fisheries management supporting Australia’s most valuable Commonwealth fishery, but the AAD, CRC, IMAS and CSIRO have also demonstrated that climate modeling expertise has significant commercial value to assist adaptation in many economic sectors. The AASP does not currently measure these broader impacts.
5. Recommendations

With the impending closure of the CRC and Gateway entities, and in considering other international models, three broad options may be identified for the future governance of the Australian Antarctic Science Program and related Australian Government funding of Antarctic science. These are:

- **AAD Science**: The AAD science capability could be further developed by absorbing the capabilities that are currently funded through the CRC and Gateway entities. This option could include all funding for Antarctic science (including ARC competitive grants, CRC grants and existing AAD science grants), all administered by the AAD. However this model would risk undermining collaboration and the key role that non-AAD research organisations play in the AASP. It would not be supported by non-AAD stakeholders.

- **Non-AAD Science**: The AAD role could be pared back to that of the national Operator, and all science activities (except perhaps science policy) could be undertaken by a fully independent science institution, collaborating with other relevant institutions. However this model would risk loss of strategic control of the science program by the Government (through the AAD) and delivery of policy-driven science - the Government cannot outsource leadership and delivery of strategic science programs to institutions with competing agendas.

- **Hybrid Science**: As recommended by Dr Press in 2014, the existing hybrid system could be maintained in which the AAD provides the overall scientific leadership and staffing of some critical research areas, with the balance coming from other institutions on a competitive basis. This option is preferred, noting that its design and operation can be significantly improved.

The recommendations below are designed to improve the hybrid model, in the context of the impending completion of the ACE CRC and Gateway funding. Importantly, they maintain the key role of the AAD, including as the major employer of Antarctic scientists, but leverage the capabilities of the other institutions.

Helpfully, there are examples across the Commonwealth Government that allow for a CRC-like collaboration to be funded by a grant from stakeholders (as opposed to competitive funding from the CRC program appropriation). A relevant example is the Defence CRC program, which is based on the CRC program but includes aspects specific to the Department of Defence. The new CRC for developing Northern Australia, established under ministerial discretion, also provides a useful model for governance of a CRC with a policy-driven mandate. These examples have informed the institutional recommendations.

Some level of replacement funding is likely to be needed for the model recommended below to be successfully implemented, but that is beyond the scope of the current Review.
Recommendation 1: Science Program Governance Structure

The overall governance structure of Australian Antarctic science should be strengthened through three initiatives: establishment of a new science council to provide independent strategic advice; establishment of a new and enduring research body to institutionalise collaboration; and a joint approach being taken to the planning and delivery of the program.

1.1 Council. A new science Council be created to provide independent expert advice to the AAD and the Government on the AASP. The new ‘Australian Antarctic Science Council’ would be more streamlined than the former ASAC, and fully integrated into the overall governance model. It should comprise an independent Chair and two independent members (one each from the life and physical sciences) appointed by the Government, and around five ex-officio members including the Chair of ANCAR.

The AAD Chief Scientist should be the Executive Officer to the Council (much like the Australian Chief Scientist is Executive Officer to the Commonwealth Science Council). The key role is advising on strategy, through the preparation and review of the Australian Antarctic Science Strategic Plan and its subordinate documents. It would also provide oversight of science planning and quality assurance activities. The Council would sit between the Government (as represented by the AAD), and the Antarctic science community, providing independent and authoritative advice to the Chief Scientist.

1.2 Institute. A new institution be created in Hobart under the sector-funded CRC model to focus on the AASP. The core participants would be the AAD, UTas, CSIRO and BoM, as now, plus other participating Commonwealth agencies (including Geoscience Australia) and any other interested Australian Universities. The new body would differ from the ACE CRC in a number of critical ways: its core funding would come from the Department of the Environment and Energy, all Commonwealth agencies undertaking Antarctic science would be core members, and its scope would include both the AASP roles of the core members plus any other Antarctic-related science as the non-AAD participants may choose. All current AAD science staff would work within the new institution, on a similar basis to those currently working in the ACE CRC. A working title is the Australian National Antarctic Research Institute (ANARI).

ANARI is intended to institutionalise Australian Antarctic science collaboration, by forming an enduring partnership between the key Australian entities that is scalable and attractive to researchers in Australia and internationally. The core AAD functions of national operator and science leader are preserved at the AAD, but the science manager function is delivered by the more flexible ANARI, operating outside core government. Non-Australian research bodies, such as those currently participating in the ACE CRC, would be encouraged to affiliate or collaborate with ANARI.

The governance model of ANARI itself needs to strike a balance between the leadership function of the AAD, and the interests of the other participating entities. Both the incorporated and unincorporated joint venture models have advantages and
disadvantages, but in either case, the key control is the funding agreement administered by the Department. It is noted that the JV model appears to have worked well for the ACE CRC, and has lower overheads. The ANARI Board itself must not duplicate the function of the Science Council. A CEO would be appointed to manage the ANARI, with the ANARI Chief Scientist role being undertaken by the AAD Chief Scientist. This arrangement should avoid the tension over branding of current science outputs from the ACE CRC and Gateway – all outputs would be branded as ANARI, being ‘Australian National’ rather than ‘agency’.

The wide scope and inclusion of all key agencies is critical to the success of ANARI in maximising both collaboration and impact. ANARI must also continue to underpin the education of future researchers through its University participants, particularly UTas, and seek to maximise the impact of Australian Antarctic science for users outside the Australian Government. The AAD should continue to be the major employer of scientists working in policy-critical research programs, underpinning Australian Government priorities.

1.3 Planning. The planning of the AASP, from strategy to delivery, to be undertaken jointly by AAD and the new Science Council.

While the AAD must be the final decision-maker on the program, given its policy, budget and logistic responsibilities, it is important that scientists and policy managers from all agencies and the broader science community are active participants at all stages. This joint approach should also ensure maximum leverage of the non-AASP science done within the Antarctic science community. As the largest research entity involved in the AASP, ANARI will obviously have a key role in this planning process.

Recommendation 2: Science Program Strategy

The Australian Antarctic science strategy should be strengthened in three areas: by specifying the policy-critical and strategic long term monitoring and mapping programs; by incorporating development of a data model of the Australian Antarctic Territory; and by engaging with the non-AASP Antarctic science community.

2.1 Strategic Science. The Australian Antarctic Science Strategic Plan to separately identify the policy-critical and strategic long term monitoring and mapping programs that are needed to underpin Government priorities and excellent science, and include mechanisms to better enable major science campaigns in designated priority locations and disciplines.

The new Science Council will have a key role in advising the Government on the balance between the policy-critical and strategic long-term monitoring and mapping science, and the researcher-driven excellent project science. Ideally, separate lines of funding would be identified for the science program to underpin planning and delivery of the long-term campaigns. At the least, the AAD should specify the planned funding profile for such science in its planning documents.

2.2 Data. The Strategic Plan to explicitly task ANARI with developing a comprehensive digital model of the Australian Antarctic Territory, building on
the Australian Antarctic Data Centre capability and that of the current CRC participants.

ANARI should aim to be a world-class centre for Antarctic data analytics, based on a federated data architecture. CSIRO’s Data61, the IMOS (based at UTas) and Geoscience Australia have the expertise to help establish such a capability, building on the AAD’s Data Centre. The AAT digital model would incorporate earth, physical, life, environmental and social science data for the AAT, with analytical capabilities to underpin Australian Antarctic science and support our Treaty interests and obligations.

2.3 Non-AASP Science. The AAD, through the Science Council and ANARI, to develop and maintain a comprehensive view of Australian Antarctic science beyond the AASP. A feature of this process could be an annual Australian Antarctic Science conference in Hobart and a comprehensive engagement strategy to help gain a greater knowledge of the total Australian Antarctic science effort.

The establishment of ANARI, with its comprehensive science program and data capabilities, and the linkages into the broader Antarctic science community through the Science Council, will underpin this recommendation. However the AAD must ‘own’ this issue, as it is the AAD that is responsible for advising the Australian Government on the totality of our national science effort, and for its representation in the Treaty system. An annual conference hosted by AAD, perhaps with modest funding to support travel from beyond Hobart, would provide an incentive for engagement.

Recommendation 3: Science Program Administration

The administration of the Australian Antarctic Science Program should be streamlined by integrating all ‘science excellence’ competitive grant assessments in the ARC process; and integrating access to marine research vessels in the Southern Ocean through the Marine National Facility process. A more comprehensive set of performance measures should be developed to assess the impact of the program and help guide the science assurance process.

3.1 Process Duplication. The AASP, ARC and AAD (cash and non-cash grant) processes to be integrated, eliminating duplication of competitive science excellence assessment and aligning the key dates.

The objectives here are simple – a single integrated process for assessing competitive science, leveraging the established expertise and independence of the ARC. This may include the ARC assuming responsibility for administering the science evaluation component of the current AAD cash and non-cash grants program, noting that these grants are only available to AASP science, whereas the ARC grants are applicable to both AASP and non-AASP Antarctic science. The integrated process must include mechanisms for assessment of the strategic alignment of proposals and integration with the logistics decision-making of the AAD. The design of this new process by the ARC and AAD should be guided by the new
Science Council. Consideration should also be given to the assessment of AASP science done by ANARI, but not dependent on grant funding, to ensure that it is of the highest standard. From an ARC perspective, it will be important to ensure that the integrated Antarctic process does not distort the core ARC processes which serve a much wider science community.

3.2 Marine Planning. The administrative processes of the AASP marine science component (as delivered by the Aurora and its replacement, RSV Nuyina) to be integrated with the Marine National Facility (Investigator) process. The new arrangement to enable a single application and assessment process to optimize the use of the two ships in their overlapping areas of tasking and capability in Southern Ocean research (between the convergence and sea ice edge).

In essence, the capacity (voyage time) of the Antarctic ship to undertake marine science should be integrated in the shared Southern Ocean component of the MNF infrastructure. In implementing this recommendation however, it must be recognized that the AAD vessel has a broader role than science, and its availability is therefore less predictable. (The demands and uncertainties of the annual logistic cycle, and emergencies, must take precedence). However an integrated approach will be simpler for science applicants, and enable optimal utilisation of the two vessels. As before, the Science Council should oversee the design work of the MNF and AAD.

3.3 Impact Measurement. The Science Council to recommend a more comprehensive set of impact (performance) measures for the AASP, for inclusion in the Strategic Plan and ANARI measurement and reporting.

The Science Council should review best-practice in science impact measurement, drawing on the experience of the ARC, CSIRO and other national Antarctic science programs such as the UK, NZ and USA. The scope of this work should include non-AASP Antarctic science. The new performance measures would be utilised by ANARI in their science management, and reported by AAD as part of their accountability obligations.

These recommended new governance arrangements are summarised in the diagram below (Figure 4).

A final comment on implementation. The recommendations in this report are necessarily at a more strategic than operational level, and if accepted, will need considerable work to develop the details and then implement. This process would be assisted by the early establishment of the new Australian Antarctic Science Council. With its independent Chair and membership from the core science entities, the Council would be ideally placed to serve as a steering committee for design and implementation.
Figure 4: Recommended Governance Model

Government/Minister
- Appoints Science Council
- Approves Australian Antarctic Science Strategy
- Allocates Antarctic budget

Department of the Environment and Energy
- Manage ANARI funding agreement

Australian Antarctic Science Council
- Independent Chair; two independent members
- Ex-officio members
- Advise on strategy
- Advise on program
- Science assurance

Australian Antarctic Division
- National operator
- Science leader (AAD Chief Scientist)
- International representation

Australian Antarctic Science Strategy
- Strategic priorities
- Long-term monitoring and mapping programs

Australian Antarctic Science Program*
- Science themes
- Science priorities
  - Short and long term
  - Policy and research driven

Annual Program*
- Logistics
- Personnel

Australian National Antarctic Research Institute
- Board and CEO
- AAD Chief Scientist
- Core members:
  - AAD, University of Tasmania, CSIRO, Geoscience Australia, Bureau of Meteorology
  - Other Australian and international members
  - Conduct AASP science

AAT Data Model
- Education of future Antarctic scientists
- Non-AASP science (including commercial impact)

Other research bodies
- Conduct AASP science
- Conduct non-AASP science

Consult and Develop

Appoint
Advise

Funding Agreement

*The AASP and the Annual Program are jointly planned by the AAD and Science Council, within the strategy framework

- Impact assessment (AASC)
- Annual conference (AAD/ANARI)
- Treaty reporting (AAD)
Attachment A

Review of the Australian Antarctic Program’s Governance and Funding Efficiency

Terms of Reference

Background

Antarctic science that is aligned with our policy interests and integrated with our operational capabilities is at the heart of the successful delivery of the Australian Antarctic Program. Australian and international scientists participate in the inclusive program to deliver world-class scientific research consistent with Australia’s Antarctic science strategic priorities.

As part of the 2016 Australian Antarctic Strategy and 20 Year Action Plan, the Australian Antarctic Division will implement a coordinated and effective Antarctic science funding model to increase Antarctic research by leading Australian institutions together with international and industry partners. Mr Drew Clarke AO will lead a Review to help inform the way in which this commitment is delivered.

Objective and Scope

The Review will provide recommendations and options to ensure the most efficient governance arrangements are delivering the best value for money for Australia’s national interests and scientific priorities in Antarctica. With the Antarctic Program already fully funded through a range of mechanisms, this Review will focus on improving the efficiency of existing funding arrangements.

Within the frameworks of the 2016 Australian Antarctic Strategy and 20 Year Action Plan the funding model will take account of:

• Leadership:
  o Australia’s prominence as a science, policy and operational leader in Antarctica.
  o The ongoing role of the Australian Antarctic Division, domestically and internationally, in leading Australia’s Antarctic Program, including in the context of other institutions engaged in Antarctic work.
  o The role of Tasmania as the leading international Antarctic research hub and logistics gateway for East Antarctica.

• Governance and Funding Pathways:
  o The functional governance arrangements in place through which the Department of Environment and Energy’s Australian Antarctic Division delivers the Australian Antarctic Program.
  o The range of other programs in place, outside the Environment and Energy portfolio, through which outcomes in Antarctica are delivered (particularly ACE CRC, Antarctic Gateway Partnership and ARC grants).
  o Integration with the soon to be established Antarctic Science Foundation which will provide opportunities for the private and philanthropic sectors to contribute to Antarctic research.

• Operations:
Options for improved integration of existing assets and activities such as the National Marine Facility, RV Investigator, and the Bureau of Meteorology.

Ensuring alignment with new Antarctic infrastructure coming on line over the next few years, such as the new Icebreaker, new ice traverse capabilities, and the new station on Macquarie Island.

**Consultation**

A key element of the Review will be close consultation with interested portfolios across the Commonwealth and Tasmanian governments, and with stakeholders from the corporate, scientific, academic and philanthropic sectors.

**Out of scope**

The current priorities for Antarctic science will not be included as part of the Review. These are being considered separately as part of the review of the *Australian Antarctic Science Strategic Plan 2011-2021*.

**Review timing and process**

The Department of Environment and Energy will provide administrative support for the Review.

The Review will commence in August 2017 and is expected to be submitted to Government for consideration early in 2018.
Australian Antarctic Science Governance

Scientists
Australian and International; Government and non-Government

**Australian Antarctic Science Program**

Grant funding $1.05m p.a.

AAD Science Applications
AAD-run, open, competitive, peer-reviewed application process that assesses a project’s alignment with the Australian Antarctic Science Strategic Plan, research context and methods, planning and feasibility and other factors.

**Australian Antarctic Science Program**

Science delivered under four themes, each led by AAD scientists:
- Climate Processes and Change
- Terrestrial and Nearshore Ecosystems
- Southern Ocean Ecosystems
- Frontier Science

Science Outcomes, Publications, Data

**AAD Antarctic Science Program**

Grant funding $1.05m p.a.

- Research under four AASP themes ~ $17m p.a. (Science)

**Other Universities & research institutions**

~100 bodies

**Bureau of Meteorology**

**Geoscience Australia**

**CSIRO**

**Other Aust Gov Agencies**

- ANSTO
- ARPANSA
- Defence

**Non – AASP Antarctic Science**

Organisations fund science that forms part of the AASP, and science outside of the AASP (all entities above except AAD)

**Reporting**

Reporting of science outcomes under the Antarctic Treaty System, International agreements and statutory requirements.

**AAD Antarctic Science Program**

Grant funding $5m p.a. to Jun 2019

Key participants:
- AAD
- UTAS
- CSIRO
- IMAS
- BoM

**ARC SRI Gateway Partnership**

Grant funding: $6m p.a. to Dec 2018

Key participants:
- AAD
- UTAS
- CSIRO
- IMAS
- BoM

**ARC**

Grant funding: $5m p.a. to Antarctic research
- $2m p.a. to AASP projects

**ARC Grant funding**

$5m p.a. to Jun 2019

Key participants:
- AAD
- UTAS
- CSIRO

**ACE CRC**

CRC Grant funding
- $6m p.a. to Jun 2019

Key participants:
- AAD
- UTAS
- CSIRO
- IMAS
- BoM

**Bureau of Meteorology**

**Geoscience Australia**

**CSIRO**

**Other Aust Gov Agencies**

- ANSTO
- ARPANSA
- Defence

**Other Universities & research institutions**

~100 bodies

**Integration**

Integrated Marine Observing System NCRIS

Marine National Facility – RV Investigator

National Computational Infrastructure NCI

**Shared Marine Infrastructure**

Non – AASP Antarctic Science
Organisations fund science that forms part of the AASP, and science outside of the AASP (all entities above except AAD)

Inclusion requires visibility and data

**Australian Antarctic Science Program**

- Value of enabling infrastructure and logistics support - $70m p.a.
- AAD investing in expanded capability – icebreaker, aviation and traverse.

**AASP Field Program – Delivered by AAD**

- Short and long term projects and campaigns

**Reporting**

Reporting of science outcomes under the Antarctic Treaty System, International agreements and statutory requirements.

**Key**

- Australian and international institutions
- Funded by DIIS
- Other Australian Government Agencies
- Funded by DET
- Non-AAD marine infrastructure
- Funded by DEE
Attachment C

Consultation Meetings

Consultation meetings were held with staff from the following organisations:

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<thead>
<tr>
<th>Organisation</th>
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<tr>
<td>Antarctic Climate and Ecosystems CRC</td>
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<td>Antarctic Science Foundation</td>
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<td>Antarctica New Zealand</td>
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<td>Department of Industry, Innovation and Science</td>
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<td>Department of Premier and Cabinet (Tasmania)</td>
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<td>Department of State Growth (Tasmania)</td>
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<td>Department of the Environment and Energy</td>
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<tr>
<td>Geoscience Australia</td>
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<tr>
<td>Institute for Marine and Antarctic Studies (UTas)</td>
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<tr>
<td>Integrated Marine Observing System (UTas)</td>
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<tr>
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<tr>
<td>RMIT University</td>
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<tr>
<td>Tasmanian Polar Network</td>
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