

Infrastructure and logistical support

- 4.1 Meeting Australia's international obligations and maintaining Australia's strategic and scientific interests in Antarctica is a significant undertaking. As such, the Australian Government, through its recent *Australian Antarctic Strategy and 20 Year Action Plan*, has signalled a clear intention to further these objectives, in part through the development of Australia's Antarctic infrastructure.
- 4.2 The operations of the Australian Antarctic Program (AAP) require a range of infrastructure and logistical support in both Tasmania and Antarctica. Antarctic infrastructure in particular is required to operate in a high risk environment and is expensive to build and maintain.¹ The Department of the Environment and Energy advised that that the majority of the Australian Antarctic Division's (AAD) assets are located in Antarctica and includes:
- 610 mechanical plant and equipment assets totalling \$66.7 million;
 - 736 science plant and equipment, including a unique cold-water krill aquarium, assets totalling \$23.5 million;
 - 66 corporate property assets totalling \$17.3 million; and
 - 648 telecommunications and information technology assets totalling \$16.2 million.²
- 4.3 With respect to Hobart, infrastructure is required to adequately administer and support the needs of the AAP, including the ability to respond to any critical issues that may arise for staff or equipment in Antarctica. Infrastructure in Antarctica, along with logistical arrangements, must also

1 Department of the Environment and Energy, *Submission 13*, p. 2.

2 Department of the Environment and Energy, *Submission 13*, p. 6.

be able to withstand the harsh climate and be appropriate to meet the objectives of the Program.

- 4.4 From a strategic perspective, Australia has the capacity to use its infrastructure investments in Antarctica to demonstrate leadership on the continent. As is highlighted in chapter 4, Australia's significant presence in Antarctica also underpins its international diplomatic and scientific engagement strategy and, as such, the development of infrastructure supports the national interest.³ Other nations Antarctic programs also have significant infrastructure assets in Antarctica, and while there are many opportunities to work collaboratively and share resources in Antarctica, it is helpful for Australia to understand the infrastructure assets of its Antarctic partners.⁴
- 4.5 This chapter considers evidence to the inquiry relating to the infrastructure and logistical support in both Hobart and Antarctica that contribute to the success of the AAP. In particular, it considers:
- Australia's assets in Antarctica;
 - transport and logistics capabilities, including intra-continental transport; and
 - infrastructure and assets in Hobart.

Infrastructure assets in Antarctica

- 4.6 Without its network of Antarctic stations, the support provided through the vast range of specialised equipment and highly skilled staff, the program's mandate to operate in such a harsh and remote environment would not be possible.⁵
- 4.7 The Committee received evidence which highlighted the breadth of assets under administration to support the AAD's work – some 3,300 assets 'ranging from buildings and boats to cranes and quad bikes.'⁶
- 4.8 Given the extensive Antarctic portfolio, the Antarctic infrastructure objectives outlined in the *Australian Antarctic Strategy and 20 Year Action*

3 Dr Nicholas Gales, Director, Australian Antarctic Division (AAD), Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 24.

4 Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Hobart, 10 November 2017, p. 47.

5 Department of the Environment and Energy, *Submission 13*, p. 6.

6 Department of the Environment and Energy, *Submission 13*, p. 2.

Plan form a substantial undertaking by the Australian Government. Antarctic infrastructure was brought into sharper focus as it was named a priority as part of the *2016 National Research Infrastructure Roadmap*.⁷ The roadmap outlines ‘the research infrastructure priorities essential for building Australian research excellence into the future.’⁸

- 4.9 The Plan highlights key infrastructure-related actions to be taken that support Australia’s national interests in Antarctica, including:
- a new world-class research and resupply Antarctic icebreaker;
 - new and stable funding to support an active AAP;
 - developing modern and flexible infrastructure, including:
 - ⇒ restoring traverse capabilities and establishing mobile stations in the Antarctic interior;
 - ⇒ further scoping options for expanded aviation capabilities to establish a year-round aviation capability between Hobart and Antarctica; and
 - ⇒ progressing options for more efficient and flexible use of existing research stations;
 - agreeing to priority proposals with industry to enhance Tasmania’s status as an Antarctic Gateway, including expanded infrastructure in Hobart for the new icebreaker; and
 - a major review on building research infrastructure in Hobart to establish Australia as the world’s leader in krill research.⁹
- 4.10 Inquiry contributors, including from Australian Government agencies, provided the Committee with insight into the range of issues concerning current and future infrastructure requirements.

Australia’s Antarctic stations

- 4.11 Australia currently maintains three year-round research stations in Antarctica. Australia’s oldest research station, Mawson, is located on the coast at the edge of the Antarctic plateau and has been continually

7 Department of Industry, Innovation and Science, *Submission 16*, p. 2.

8 The Hon. Arthur Sinodinos AO, Minister for Industry, Innovation and Science and Senator the Hon. Simon Birmingham, Minister for Education and Training, ‘National roadmap for research infrastructure shows the way’, *Media Release*, 12 May 2017.

9 Department of the Environment and Energy, *Australian Antarctic Strategy and 20 Year Action Plan*, 2016.

operating since 1954.¹⁰ Davis station, which is located on the coast near the ice-free Vestfold Hills was built in 1957.¹¹ Casey station, which is located in the Windmill Islands, just outside of the Antarctic Circle was built in 1969 to replace the nearby Wilkes station.¹²

4.12 Australia also maintains a year-round research station on the sub-Antarctic Macquarie Island.¹³ Macquarie Island station is in the Southern Ocean, and is situated approximately 1,500 km south south-east of Tasmania and 1,300 km north of Antarctica, it was built in 1948.¹⁴

Figure 4.1 Members of the Committee near Casey station



Source Supplied

10 Department of the Environment and Energy, *Submission 13*, p. 6.

11 AAD, Department of the Environment and Energy, 'Davis Station', 22 June 2016, <<http://www.antarctica.gov.au/living-and-working/stations/davis>>, viewed 26 July 2017.

12 Department of the Environment and Energy, *Submission 13*, p. 2.

13 Department of the Environment and Energy, *Submission 13*, p. 2.

14 Department of the Environment and Energy, 'World Heritage Places – Macquarie Island', <<http://www.environment.gov.au/heritage/places/world/macquarie-island>>, viewed 4 January 2018.

- 4.13 Australia's four year-round Antarctic stations consist of over 370 buildings.¹⁵ Each station houses a range of facilities including scientific equipment and laboratories, medical facilities, power generation, telecommunication and waste management facilities, as well as accommodation, kitchen and dining room, and recreational spaces for occupants.¹⁶
- 4.14 In addition to these year-round stations, there are a number of summer-only facilities, including Law Base in Larsemann Hills, Edgeworth David Camp in the Bunge Hills and a network of field-huts spanning outwards from Australia's year-round research stations.¹⁷ Wilkins Aerodrome, which also only operates in summer, serves as Australia's only inter-continental aviation access point into East Antarctica.¹⁸
- 4.15 The year-round stations house total populations of around 80 in winter and 200 in summer.¹⁹ The Department of the Environment and Energy highlighted that the stations were staffed by a broad range of personnel. Dr Nicholas Gales, Director of the AAD, advised that:
- Every season is an enormous logistics planning exercise because we have a certain number of beds on stations. We have a basic template of the number of people you need to safely run a station. You need your doctor, your plumber, your electrician – the basic trades. There are beds available for projects, some of which are non-science type projects. They might be rebuilding type projects and so forth on infrastructure and then there are all of the science beds.²⁰
- 4.16 Rather than increasing the number of buildings to increase the number of staff able to be housed, Dr Gales explained that paramount considerations were the safety of staff and ensuring the efficiency of capacity to balance the needs of Antarctic science and infrastructure development.²¹

15 Department of the Environment and Energy, *Submission 13*, p. 6.

16 AAD, Department of the Environment and Energy, 'Living and working in Antarctica', 14 October 2013, <<http://www.antarctica.gov.au/living-and-working>>, viewed 4 January 2018; see also: Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 10 November 2017, p. 49.

17 Department of the Environment and Energy, *Submission 13*, p. 8.

18 Department of the Environment and Energy, *Submission 13*, p. 7.

19 Department of the Environment and Energy, *Submission 13*, p. 6.

20 Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 10 November 2017, p. 49.

21 Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 10 November 2017, p. 50.

Efficient use of Australia's Antarctic research stations

- 4.17 Australia's Antarctic research stations form the core of Australia's scientific capabilities on the continent. Evidence to the inquiry drew attention to the fact that to support the Australian Government's significant infrastructure and scientific commitments in Antarctica necessitated a modernisation of this ageing asset base.
- 4.18 The Department of the Environment and Energy advised the Committee that the last major upgrade to infrastructure at the stations occurred in the 1980s, while 'minor upgrades and running repairs' have been conducted since that time.²² The Department expressed concerns that the asset base was ageing and that further investment in station infrastructure would be required.²³ Incidents, such as the collapse of part of a wind turbine in late 2017²⁴, highlight this need.
- 4.19 The *Australian Antarctic Strategy and 20 Year Action Plan* states that one of the Australian Government's key actions is to progress 'options for more efficient and flexible use of existing research stations'.²⁵ The Department of the Environment and Energy highlighted the Australian Government's plan, noting that a 10 year horizon is in place to 'implement an overhaul' to 'create a station network that is efficient, flexible and well-suited to our future needs.'²⁶ A modernisation project on Macquarie Island is currently underway to construct a new research station that will minimise the station's physical size, simplify and reduce long-term station maintenance, and incorporate new technologies.²⁷
- 4.20 It was noted however that, while some preliminary work was being done to assess the status of the Antarctic stations within the Department of Environment and Energy's existing funding, the upgrade of '... Antarctic station infrastructure is not an immediate priority for the Department and is currently an unfunded liability.'²⁸

22 Department of the Environment and Energy, *Submission 13*, p. 6.

23 Department of the Environment and Energy, *Submission 13*, p. 6.

24 Mr Matt Cahill, Acting Deputy Secretary, Strategy and Operations Group, Department of the Environment and Energy, *Committee Hansard*, Canberra, 10 November 2017, p. 47.

25 Department of the Environment and Energy, *Australian Antarctic Strategy and 20 Year Action Plan*, 2016, p. 3.

26 Department of the Environment and Energy, *Submission 13*, p. 6.

27 AAD, Department of the Environment and Energy, 'Macquarie Island Modernisation Project', 18 August 2017, <<http://www.antarctica.gov.au/living-and-working/stations/macquarie-island/modernisation>>, viewed 31 October 2017.

28 Department of the Environment and Energy, *Submission 13*, p. 6.

Future modernisation of Australia's Antarctic stations

- 4.21 Inquiry contributors impressed upon the Committee that, when a broader modernisation program commences, there was a need to ensure that Australia's Antarctic stations were upgraded with regard to modern design and engineering principles.
- 4.22 The Tasmanian Polar Network, for example, advised the Committee that any modernisation program should be required to consider 'environmentally cutting edge design and technology is applied to all station and equipment renewal.'²⁹ It was further suggested that consideration be given to sustainability, use of renewable energy and a well thought out approach to station logistics.³⁰
- 4.23 The Australian Institute of Architects submitted that, while the extreme conditions in Antarctica must be accounted for, 'construction methods need to take into account the remote location, and minimise any effects on the pristine environment.'³¹ The Institute conveyed a recent observation that '...almost without exception, Antarctic stations are designed by engineers with minimal aesthetic regard for living conditions ...'³²
- 4.24 The Institute suggested that any future Australian Antarctic station modernisation program incorporate architecturally-informed design and construction methods, such as modular station buildings.³³ The Institute cited the design of Antarctic bases belonging to other countries including Britain, Belgium and the United States, as examples which provided:
- ... laboratories and residences that can both withstand the extreme conditions and provide the best planned and highest quality habitable environment possible for researchers and support staff.³⁴
- 4.25 It should be noted that, during the course of the Committee's inquiry, a number of other international Antarctic programs announced plans to upgrade their own Antarctic infrastructure.³⁵

29 Tasmanian Polar Network, *Submission 1*, p. 4.

30 Tasmanian Polar Network, *Submission 1*, p. 4.

31 Australian Institute of Architects, *Submission 24.1*, p. 1.

32 Australian Institute of Architects, *Submission 24.1*, p. 1.

33 Australian Institute of Architects *Submission 24.1*, p. 1.

34 Australian Institute of Architects, *Submission 24.1*, p. 1; Tasmanian Polar Network, *Submission 1*, p. 4.

35 For example, New Zealand: NZ City, 'Scott Base to undergo a makeover', 28 February 2018, <<http://home.nzcity.co.nz/news/article.aspx?id=264778>>, viewed 28 February 2018. See also Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 10 November 2017, p. 49.

Waste remediation

- 4.26 The *Australian Antarctic Strategy and 20 Year Action Plan* states that part of Australia's national interests with respect to Antarctica incorporates the capacity to demonstrate leadership in environmental stewardship in Antarctica.³⁶
- 4.27 Historically, waste remediation and management practices in Antarctica have had a negative impact on the environment.³⁷ Under the *Protocol on Environmental Protection to the Antarctic Treaty*, all nations operating in Antarctica are committed to comprehensive protection of the environment. The Protocol specifies that all newly generated waste should be removed from Antarctica and that member countries are obliged to remove legacy waste, unless removal will have a greater adverse environmental impact than leaving the waste where it is.³⁸ Despite this, past waste disposal practices continue to impact the region with contaminated sites at both occupied and abandoned research stations.³⁹
- 4.28 The Department of the Environment and Energy noted that Australia's commitment to the Antarctic environment includes the development of an Antarctic clean-up strategy for legacy waste.⁴⁰
- 4.29 WWF-Australia submitted to the Committee that, under the strict Antarctic governance regime, scientists and tourists are required to repatriate waste and ensure that it is not dumped in Antarctic waters.⁴¹ The exception to this protocol is untreated sewage.⁴² WWF-Australia highlighted research that found untreated sewage from research bases could introduce bacteria, such as *E. coli*, into the Antarctic ecosystem.⁴³ Other bacterial strains and antibiotic resistant genetic material commonly

36 Department of the Environment and Energy, *Australian Antarctic Strategy and 20 Year Action Plan*, 2016, p. 3.

37 AAD, Department of the Environment and Energy, 'Human impacts and remediation', 10 March 2016, <<http://www.antarctica.gov.au/science/human-impacts>>, viewed 22 February 2018.

38 AAD, Department of the Environment and Energy, 'Human impacts and remediation', 10 March 2016, <<http://www.antarctica.gov.au/science/human-impacts>>, viewed 22 February 2018.

39 AAD, Department of the Environment and Energy, 'Human impacts and remediation', 10 March 2016, <<http://www.antarctica.gov.au/science/human-impacts>>, viewed 22 February 2018.

40 Department of the Environment, *Submission 13*, p. 16.

41 WWF-Australia, *Submission 9*, p. 2.

42 WWF-Australia, *Submission 9*, p. 2.

43 WWF-Australia, *Submission 9*, p. 2.

found in humans has also been identified in Antarctic marine ecosystems and shellfish.⁴⁴

- 4.30 The Tasmanian Polar Network, citing a new Tasmanian waste facility that can receive high grade waste, suggested that the Australian Government ensures that Australian businesses, particularly those based in Tasmania be 'considered [to provide services] in the removal and repatriation of materials, waste and other items during the modernisation program.'⁴⁵

Transport and logistical capabilities

- 4.31 Antarctica is a vast continent and requires that the AAP is supported by timely and efficient transport and logistical capabilities. The AAP employs a combination of air, sea, inter-continental and intra-continental transport capabilities to carry out its functions in a broad range of marine, ice and aviation based research activities, personnel transfer, station operation and resupply, and waste management and removal.⁴⁶
- 4.32 Evidence to the Committee related to a broad range of these capabilities including aviation and marine capacity along with a reinvigorated overland traverse capacity. A variety of assets are deployed to assist the AAP which are operated either by the AAD or under a memorandum of understanding, such as that with Defence.
- 4.33 Many inquiry contributors supported improved Antarctic infrastructure, particularly with respect to air and port facilities.⁴⁷

Aviation capability and inter-continental air transport

- 4.34 Aviation is a crucial component of the AAP, and under the *Australian Antarctic Strategy and 20 Year Action Plan*, the Australian Government has outlined its plan to strengthen Australia's Antarctic aviation capabilities over the next two decades.⁴⁸

44 WWF-Australia, *Submission 9*, p. 2.

45 Tasmanian Polar Network, *Submission 1*, p. 4.

46 AAD, Department of the Environment and Energy, 'About us', <<http://www.antarctica.gov.au/about-us>>, viewed 22 February 2018.

47 For example: Tasmanian Polar Network, *Submission 1*, p. 2; Hobart Airport, *Submission 2*, p. 1; Geoscience Australia, *Submission 6*, p. 11; Institute for Marine and Antarctic Studies (IMAS) University of Tasmania, *Submission 8*, p. 3.

48 Australian Aviation, 'RAAF completes C-17 Antarctic trial flights', 22 February 2016, <<http://australianaviation.com.au/2016/02/raaf-completes-c-17-antarctic-trial-flights/>>, viewed 28 July 2017.

- 4.35 Currently, Antarctic aviation capabilities comprise both an inter-continental air service between Hobart Airport and the Wilkins Aerodrome near Casey research station, and intra-continental services within Antarctica.⁴⁹ Inter-continental flights are limited to between October and March each year, with a six week shutdown period during the height of summer due to runway melt.⁵⁰ This service, operated by an A319 aircraft under contract, facilitates the movement of personnel for both the Australian program and other national Antarctic programs, and carries approximately 250 passengers per summer season.⁵¹
- 4.36 The AAP is also supported by a range of small aircraft including helicopters and Twin Otter aircraft for intra-continental travel. Each summer season, Australia constructs ski ways from prepared ice or snow at its three bases for this purpose.⁵² In addition to accessing stations and field locations, aviation assets provide support to scientific research that utilise aerial sensing, data collection, and monitoring equipment.⁵³
- 4.37 The AAD also has a strong relationship with the Department of Defence, formalised through a memorandum of understanding on Antarctic cooperation and logistical support. Since 2016, Defence has operated up to six heavy-lift flights annually using C-17A Globemaster aircraft.⁵⁴ These arrangements are considered later in this chapter.

Wilkins Aerodrome

- 4.38 Wilkins Aerodrome is currently Australia's only inter-continental aviation access point into East Antarctica from Hobart, and one of few such access points across all of Antarctica.⁵⁵ In 2017, the AAD marks a decade of service delivered by the Aerodrome.
- 4.39 Defence submitted to the inquiry that while the facilities at Wilkins are adequate for its current operations supporting the AAP, greater mission capability and mission assuredness could be achieved by implementing a number of additions and improvements.⁵⁶ The Department lists these as:

49 AAD, Department of the Environment, 'Australia's Antarctic aviation', 3 November 2015, <<http://www.antarctica.gov.au/living-and-working/travel-and-logistics/aviation>>, viewed 28 July 2017.

50 Department of the Environment and Energy, *Submission 13*, p. 9.

51 Department of the Environment and Energy, *Submission 13*, p. 7.

52 Department of the Environment and Energy, *Submission 13*, p. 9.

53 Department of the Environment and Energy, *Submission 13*, p. 8.

54 Department of the Environment and Energy, *Submission 13*, p. 7.

55 Department of the Environment and Energy, *Submission 13*, p. 7.

56 Department of Defence, *Submission 14*, p. 3.

- Aviation turbine fuel available for upload (increases payload to/from Antarctica);
- Provision of suitable ground support equipment including power carts, air carts and aircraft towing (negates the need to use aircraft payload to carry Defence ground support equipment to and from Wilkins);
- An aircraft de-ice capability;
- Additional accommodation/ passenger handling facilities (enables greater passenger loads);
- Airfield lighting;
- Airfield instrument approach;
- Hanger or storage facility to hold Air Drop Equipment.⁵⁷

Figure 4.2 Australian Defence Force delivering the new 'Priscilla' bus to Casey station using a C17-A Globemaster aircraft



Source Supplied

Proposal for year-round aviation access

4.40 As part of the *Australian Antarctic Strategy and 20 Year Action Plan*, the Australian Government has committed \$10 million to commence preliminary work towards a business case for a year-round runway in Antarctica which is currently being prepared by the AAD. The business

⁵⁷ Department of Defence, *Submission 14*, p. 3.

case, which will canvass a range of options to support different types of aircraft,⁵⁸ is designed to support an investment decision on a year round, hard surface runway to be located in the vicinity of Davis station – the only such facility in East Antarctica.⁵⁹ The allocation of funds for the project includes ensuring that the proposed runway is ‘in accordance with domestic and Antarctic Treaty System environmental approval requirements.’⁶⁰

4.41 The business case, according to Dr Gales, would encompass:

... important strategic and security discussions around what is in Australia’s best interest, and the way you would invest in such an asset – as to whether you wish to own the asset and operate it and allow other countries to use it, or whether you wish to go into an agreement with another country for them to co-fund it, as well.⁶¹

4.42 The development of the year-round aviation capacity was supported by a wide range of inquiry participants.⁶² The Department of the Environment and Energy, for example, outlined that one of the benefits of the proposed year-round runway would be to cement ‘Australia’s position as a leader in Antarctica and the logistics collaborator of choice in East Antarctica’.⁶³

4.43 Dr Gales underlined the strategic importance to Australia of the proposed runway, noting that it would allow Australia to further develop arrangements with other countries so that Australian aviation support can essentially be traded for operational support and assistance from other national Antarctic programs.⁶⁴

4.44 Defence supported the proposal to develop year-round aviation access,⁶⁵ noting that it would engage with the process following the development

58 Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Hobart, 10 November 2017, p. 50.

59 Department of the Environment and Energy, *Australian Antarctic Strategy and 20 Year Action Plan*, 2016, p. 1.

60 Department of the Environment and Energy, *Australian Antarctic Strategy and 20 Year Action Plan*, 2016, pp. 26–27.

61 Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 10 November 2017, p. 51.

62 See for example: IMAS University of Tasmania, *Submission 8*, p. 2; Department of Defence, *Submission 14*, p. 3; Geoscience Australia, *Submission 6*, p. 19.

63 Department of the Environment and Energy, *Submission 13*, p. 9.

64 Dr Gales, AAD, *Committee Hansard*, Hobart, 10 November 2017, p. 48.

65 Commodore Jaimie Hatcher, AM, RAN, Acting Head, Military Strategic Commitments, Department of Defence, *Committee Hansard*, Canberra, 19 October 2017, p. 2.

of the business case.⁶⁶ Defence stressed, however, that the proposed new runway would benefit from similar facilities as those it had previously suggested should be implemented at Wilkins Aerodrome.⁶⁷

4.45 Dr Tony Press, a former Director of the AAD, suggested the project would need to be supported across government. He said that the benefits of the runway included immense strategic and practical advantages for Australia as well as a 'platform for collaboration but also more security for Australia's Antarctic interests and for the people that work in Antarctica.'⁶⁸

4.46 Hobart Airport suggested that the development would further enable Hobart and Hobart Airport in particular to develop into an:

... international Antarctic aviation hub and offer opportunities for other national programs from China, India and others to operate their programs through Hobart.⁶⁹

4.47 As a comparison with similar facilities in Antarctica, Defence further advised that there were approximately 50 active airfields in Antarctica, of which many were small and medium airfields maintained by the many national Antarctic programs present on the continent.⁷⁰ Defence stated that there were 10 airfields that supported intra-continental flights which predominately operated during the summer months.⁷¹ The proposed year-round runway would be only one of four year-round airfields in Antarctica.⁷²

Aviation support from the Department of Defence

4.48 Despite the ban on militarisation in Antarctica, there is some scope for national defence programs to provide limited non-military support to national Antarctic programs.⁷³ Defence provides 'niche support to whole-of-government (WoG) efforts in Antarctica', through its Operation Southern Discovery.⁷⁴ As noted above, Defence contributes logistical

66 Commodore Hatcher, Department of Defence, *Committee Hansard*, Canberra, 19 October 2017, p. 4.

67 Department of Defence, *Submission 14*, p. 3.

68 Dr Anthony (Tony) Press, private capacity, *Committee Hansard*, Hobart, 10 November 2017, p. 42.

69 Hobart Airport, *Submission 1*, p. 1.

70 Department of Defence, *Submission 14.5*, p. 1.

71 Department of Defence, *Submission 14.5*, p. 1.

72 Department of Defence, *Submission 14.5*, p. 1.

73 Department of Defence, *Submission 14*, p. 1.

74 Department of Defence, *Submission 14*, pp. 1-2.

support to the AAP through a memorandum of understanding with the Department of the Environment and Energy.⁷⁵

- 4.49 As outlined in its submission, the Department of Defence's support efforts are niche but significant in the context of the AAP. Support provided includes air cargo equipment and support, assistance with search and rescue operations, aeromedical evacuation, as well as providing expert knowledge in areas such as meteorology, hydrography, and extreme climate operations.⁷⁶
- 4.50 The Department of the Environment and Energy commented on its relationship with Defence, submitting that the relationship is strong and underpinned by a memorandum of understanding.⁷⁷
- 4.51 One of the vital aspects of the support provided by Defence is through the provision of aviation support. While Defence's role in Antarctica is limited, it submitted that, as part of the Australian Government's commitments in the *Australian Antarctic Strategy and 20 Year Action Plan*, its operations utilising the C-17A Globemaster aircraft:
- ... allow the delivery of cargo and equipment and can potentially contribute to emergency responses in the region such as search and rescue and aeromedical evacuation incidents.⁷⁸
- 4.52 The Department of the Environment and Energy emphasised that the support provided through the C-17A Globemaster provides a significant heavy-lift cargo capability to both land at Wilkins Aerodrome and support 'deep field science projects with fuel, equipment and rations [which] is one of the major challenges for the AAP.'⁷⁹ The Institute for Marine and Antarctic Studies (IMAS) shared a similar sentiment, noting that the availability of the C-17A Globemaster aircraft in Antarctica provides significant opportunities for improving science capability.⁸⁰

Icebreaking and marine research capabilities

- 4.53 One of the key links to Australia's Antarctic and sub-Antarctic research stations is the Antarctic icebreaker *Aurora Australis*. It is due to be replaced by Australia's new icebreaker, the *RSV Nuyina* in 2020–21.

⁷⁵ Department of Defence, *Submission 14*, p. 1.

⁷⁶ Department of Defence, *Submission 14*, p. 1.

⁷⁷ Department of the Environment and Energy, *Submission 13*, p. 9.

⁷⁸ Department of Defence, *Submission 14*, p. 3.

⁷⁹ Department of the Environment and Energy, *Submission 13*, p. 9.

⁸⁰ IMAS University of Tasmania, *Submission 8*, p. 2.

4.54 The *Aurora Australis* is supported by a range of watercraft in Antarctica for cargo operations, personnel transfer, and search and rescue operations.⁸¹ One of these is the research vessel, *Wyatt Earp*, which is due to be decommissioned in 2020.⁸² In addition, the Commonwealth Scientific and Industrial Research Organisation's (CSIRO) research ship *RV Investigator* contributes research in the Antarctic region.⁸³

Aurora Australis

4.55 Commissioned in 1989, the *Aurora Australis*, is the main link to Australia's Antarctic and subantarctic research stations from Hobart and provides essential access for Australia's Antarctic and Southern Ocean scientific research.⁸⁴ The ship's scientific work includes experiments in biological, oceanographic and meteorological science.⁸⁵ The capability of the *Aurora Australis* was based on a two-ship support model without any aviation support, and at almost 30 years old, it is reaching the end of its service life.⁸⁶

New icebreaker: *RSV Nuyina*

4.56 The Australian Government has recently invested \$1.9 billion to build a new Antarctic icebreaker, currently being constructed by the Australian company DMS Maritime Pty Ltd.⁸⁷ The company will also be responsible for the design, build, operation and maintenance of the ship over its expected 30 year life.⁸⁸ The new icebreaker will replace the *Aurora Australis* and be Australia's only icebreaking scientific research platform.⁸⁹ The new icebreaker will have greater icebreaking and cargo carrying capacity,

81 Department of the Environment and Energy, *Submission 13*, p. 8.

82 Geoscience Australia, *Submission 6*, p. 15.

83 Department of the Environment and Energy, *Submission 13*, p. 8.

84 AAD, Department of the Environment and Energy, 'Aurora Australis', 18 August 2010, <<http://www.antarctica.gov.au/living-and-working/travel-and-logistics/ships/aurora-australis>>, viewed 1 March 2018.

85 AAD, Department of the Environment and Energy, 'Aurora Australis', 18 August 2010, <<http://www.antarctica.gov.au/living-and-working/travel-and-logistics/ships/aurora-australis>>, viewed 1 March 2018.

86 Department of the Environment and Energy, *Submission 13*, p. 8.

87 AAD, Department of the Environment and Energy, 'New icebreaker contract signed', 7 June 2016, <<http://www.antarctica.gov.au/magazine/2016-2020/issue-30-june-2016/in-brief/new-icebreaker-contract-signed>>, viewed 28 July 2017.

88 AAD, Department of the Environment and Energy, 'Australia's new icebreaker', 7 July 2017, <<http://www.antarctica.gov.au/icebreaker>>, viewed 28 July 2017.

89 AAD, Department of the Environment and Energy, 'Australia's new icebreaker', 7 July 2017, <<http://www.antarctica.gov.au/icebreaker>>, viewed 28 July 2017.

increased endurance, higher environmental standards, and increased research, rescue and resupply capabilities.⁹⁰

- 4.57 The new icebreaker is faster through Antarctic ice, with an icebreaking rate of 1.65 metres at 3 knots, compared with the *Aurora Australis*' capability of 1.23 metres at 2.5 knots.⁹¹ It will have the ability to handle, stow and transport up to 1,200 tonnes of solid cargo and 1,900,000 litres of bulk liquid cargo (mainly the Special Antarctic Blend diesel that is used for station operations).⁹² This compares to a solid cargo capacity of 800 tonnes and a bulk liquid cargo capacity of 1,100,000 litres for the *Aurora Australis*. The new ship will also have a slightly increased capacity to carry 117 passengers, compared to 116.⁹³ Construction of the icebreaker began in June 2017 and it is expected to be operational in 2020–21.⁹⁴ Figure 4.1 illustrates some of the differences between the two ships.
- 4.58 A variety of inquiry contributors provided evidence of the opportunities that would become available as a result of the new icebreaker. Geoscience Australia, for example, submitted that the new icebreaker would have the capacity to provide increased marine geoscience capabilities including the ability to:
- ... map and sample the seafloor primarily along the Australian Antarctic Territory continental shelf and slope as well as the adjacent deep ocean abyssal basins.⁹⁵
- 4.59 Similarly, the Australian Academy of Science noted that an opportunity existed for the new icebreaker to provide an increased number of available research days for marine research when compared with the current funded availability of the *RV Investigator* (see below).⁹⁶

90 AAD, Department of the Environment and Energy, 'Australia's new icebreaker', 7 July 2017, <<http://www.antarctica.gov.au/icebreaker>>, viewed 28 July 2017.

91 AAD, Department of the Environment and Energy, 'Icebreaker specifications' 9 October 2017, <<http://www.antarctica.gov.au/icebreaker/about-the-ship/capability>>, viewed 27 April 2018.

92 AAD, Department of the Environment and Energy, 'Icebreaker specifications' 9 October 2017, <<http://www.antarctica.gov.au/icebreaker/about-the-ship/capability>>, viewed 27 April 2018.

93 AAD, Department of the Environment and Energy, 'Icebreaker specifications' 9 October 2017, <<http://www.antarctica.gov.au/icebreaker/about-the-ship/capability>>, viewed 27 April 2018.

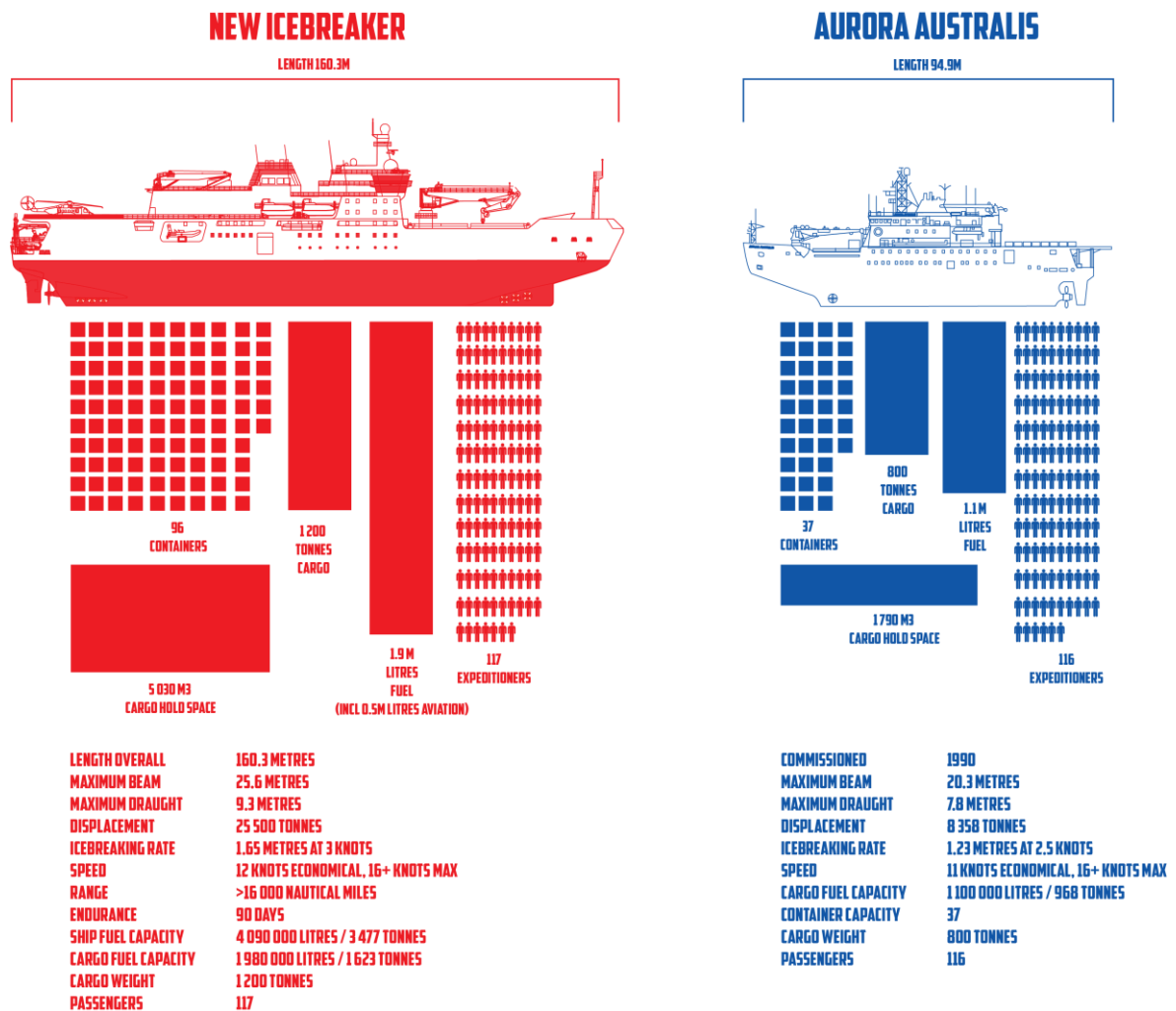
94 AAD, Department of the Environment and Energy, 'Construction of Australia's new icebreaker commences' 1 June 2017, <<http://www.antarctica.gov.au/news/2017/construction-of-australias-new-icebreaker-commences>>, viewed 2 May 2018.

95 Geoscience Australia, *Submission 6*, p. 16.

96 Australian Academy of Science, *Submission 4*, p. 5.

4.60 While the new icebreaker will provide Australia with a range of new and enhanced scientific capabilities, some concerns were raised about the need to ensure that skilled staff were available to operate some of the more complex on board equipment, such as multibeam sonar. This is addressed further in chapter 5.⁹⁷

Figure 4.3 Differences between RSV Nuyina and Aurora Australis



Source Australian Antarctic Division

Polar Code

4.61 Evidence to the Committee suggested that both the *Aurora Australis* and the new icebreaker, the *RSV Nuyina*, are subject to the International Maritime Organisation’s Polar Code which came into force on 1 January 2018. The mandatory Polar Code is designed:

97 Geoscience Australia, *Submission 6*, p. 16.

... to increase the safety of vessel operations and mitigate the impact of shipping on the people and environment in the isolated waters in both the Arctic and Antarctic regions.⁹⁸

4.62 As part of transition arrangements under the Polar Code, the Australian Maritime Safety Authority advised the Committee that vessels built before 1 January 2017:

... including the *Aurora Australis*, will have to comply with all requirements of the Polar Code by the first intermediate or renewal survey whichever comes first after 1 January 2018. This may mean that there could be a period between the delivery of the new vessel and the completion of one of the above mentioned surveys where the vessel will be required to comply with the Polar Code.⁹⁹

4.63 The AAD advised the Committee that the ship was currently compliant with the Polar Code as per its charter arrangement and was expected to remain compliant until it is replaced.¹⁰⁰

CSIRO's *RV Investigator*

4.64 The research ship *RV Investigator*, operated by CSIRO's Marine National Facility, was commissioned in 2009 to replace the outgoing *Southern Surveyor*.¹⁰¹ The ship is capable of spending up to 300 days a year at sea, can accommodate up to 40 scientists and support staff, and can go to sea for up to 60 days at a time, covering some 10,000 nautical miles.¹⁰²

4.65 The *RV Investigator* contributes to research in the Antarctic region but does not provide the AAD with any resupply capacity.¹⁰³ Its work includes geoscience, atmospheric, biological and oceanographic research.¹⁰⁴

98 Australian Maritime Safety Authority (AMSA), *Submission 19*, p. 1.

99 AMSA, *Submission 19*, p. 2.

100 Mr Robert Bryson, Program Manager, Modernisation Taskforce, AAD, Department of the Environment and Energy, *Committee Hansard*, Hobart, 10 November 2017, p. 48.

101 Commonwealth Scientific Industrial Research Organisation (CSIRO), 'Research vessel: Investigator', <<https://www.csiro.au/en/Research/Facilities/Marine-National-Facility/RV-Investigator>>, viewed 22 March 2018.

102 Commonwealth Scientific Industrial Research Organisation (CSIRO), 'Research vessel: Investigator', <<https://www.csiro.au/en/Research/Facilities/Marine-National-Facility/RV-Investigator>>, viewed 22 March 2018.

103 Dr Jodie Smith, Marine Geoscientists, Geoscience Australia, *Committee Hansard*, Canberra, 19 October 2017, p. 17.

104 Commonwealth Scientific Industrial Research Organisation (CSIRO), 'Research vessel: Investigator', <<https://www.csiro.au/en/Research/Facilities/Marine-National-Facility/RV-Investigator>>, viewed 22 March 2018.

- 4.66 Dr Anthony Worby of CSIRO advised the Committee that while *RV Investigator* conducts marine research around Australia, it is also able to complement the capability of the *Aurora Australis* in Southern Ocean research. An independent and competitive process is conducted for scientists wishing to conduct research during the vessel's available research time.¹⁰⁵
- 4.67 In its submission to the inquiry, Geoscience Australia advised that:
- The *RV Investigator* conducted its maiden voyage to Antarctica in early 2017 ... However, it is worth noting that the *RV Investigator* has had its research expedition time cut from 300 days to 180 days per year, limiting opportunities available to scientist[s] to utilise its facilities ...¹⁰⁶
- 4.68 The Committee was interested to learn more about the reasons for why the *RV Investigator* had its marine research operating time reduced. Dr Stuart Minchin of Geoscience Australia advised that the Marine National Facility was only funded for the vessel to operate for 180 days – and not exclusively in Antarctica.¹⁰⁷ The *RV Investigator*, according to Geoscience Australia:
- ... was never funded for the full 300 days. There is spare capacity on the Investigator that could be used for a range of marine survey purposes, but the Marine National Facility has funding to support operations only for around half its available capacity.¹⁰⁸
- 4.69 CSIRO further clarified the issue of availability, noting that while there was 180 days of government funding available for the ship's operation, access is open to all Australian marine researchers and their international collaborators. Access to the ship's 180 day annual research program was oversubscribed, with some 700 days worth of applications received.¹⁰⁹
- 4.70 Outside the 180 days of funded operation, the Committee was advised that the vessel was available for commercial use.¹¹⁰ Ms Toni Moate, Director, National Collections and Marine Infrastructure at CSIRO, advised the Committee that CSIRO looked for opportunities to collaborate

105 Dr Anthony Worby, Director, Oceans and Atmosphere, CSIRO, *Committee Hansard*, Hobart, 10 November 2017, p. 26.

106 Geoscience Australia, *Submission 6*, p. 15.

107 Dr Stuart Minchin, Chief of Division, Environmental Geoscience Division, Geoscience Australia, *Committee Hansard*, Canberra, 19 October 2017, pp. 16, 18.

108 Dr Minchin, Geoscience Australia, *Committee Hansard*, Canberra, 19 October 2017, p. 16.

109 Ms Toni Moate, Director, National Collections and Marine Infrastructure, CSIRO, *Committee Hansard*, Hobart, 10 November 2017, p. 32.

110 Dr Smith, Geoscience Australia, *Committee Hansard*, Canberra, 19 October 2017, p. 17.

with research partners through industry. She noted that, for example, CSIRO:

... have had a contract that was signed with CSIRO Oceans and Atmosphere and also with CSIRO Energy, where they partnered, through their normal research activities, with industry partners.¹¹¹

Overland traverse capabilities

- 4.71 A traverse is a major over-snow transport train comprising tractors, vehicles, sledges and living accommodation.¹¹² Due to the shift in Australia's focus to shipping and aviation capacity in Antarctica, Australia's traverse capability has not been funded for some years.¹¹³ The *Australian Antarctic Strategy and 20 Year Action Plan* signalled the Australian Government's interest in reinvigorating this capability through a \$45 million investment to build an over-snow science traverse, a modular mobile inland research station, and a deep ice drilling capacity.¹¹⁴
- 4.72 An increased overland traverse capacity was supported by Geoscience Australia.¹¹⁵ The Department of the Environment and Energy advised that the new traverse capability would 'include the ability to prepare field landing sites to provide a scientific and logistics aviation link.'¹¹⁶ It would also further the international search for a million-year ice core (discussed in chapter 4) and the ability to conduct site inspections as discussed in chapter 3.¹¹⁷
- 4.73 The Tasmanian Polar Network submitted that a modern, well equipped traverse capability, as well as the development of relevant support such as storage capacity, would 'enable Australia to successfully engage in international collaboration in ice core research, among other science areas'.¹¹⁸
- 4.74 Ms Karen Rees of the Tasmanian Department of State Growth, advised that a number of countries such as France and Italy have well developed

111 Ms Moate, CSIRO, *Committee Hansard*, Hobart, 10 November 2017, p. 32.

112 Department of the Environment and Energy, *Submission 13*, p. 9.

113 Ms Karen Rees, Director, Antarctic Tasmania and Maritime Industries, Tasmanian Department of State Growth, *Committee Hansard*, Hobart, 10 November 2017, p. 18.

114 Department of the Environment and Energy, *Submission 13*, p. 9.

115 For example: Geoscience Australia, *Submission 6*, p. 19.

116 Department of the Environment and Energy, *Submission 13*, p. 9.

117 Department of the Environment and Energy, *Submission 13*, p. 10.

118 Tasmanian Polar Network, *Submission 1*, p. 3.

traverse capabilities.¹¹⁹ According to Ms Rees, these programs rely on infrastructure such as tractors and other equipment that are engineered in Tasmania specifically for Antarctic traverse.¹²⁰ As such, the state has developed a highly specialised industry with companies such as William Adams and Elphinstone Engineering having provided modified and engineered products to various national Antarctic programs.¹²¹

Infrastructure and assets in Hobart

- 4.75 Hobart is well-positioned as a key gateway to Antarctica and this notion is strengthened by the Australian Government's commitment under the *Australian Antarctic Strategy and 20 Year Action Plan*. The Plan aims to 'build Tasmania's status as a global Antarctic research hub', with Hobart being its centrepiece.
- 4.76 Hobart's location and emerging infrastructure capacity makes it a major international hub for Antarctic science (as discussed in chapter 5) and also allows for the city to capitalise on the economic opportunities that its location brings (see chapter 6).
- 4.77 In catering for the growth in the Antarctic sector, evidence to the Committee discussed how a range of new infrastructure initiatives could bring together Hobart's Antarctic capacity in a way not previously contemplated.
- 4.78 Evidence to the Committee canvassed the framework and resources available to the AAD to manage its operations particularly in relation to its asset management capacity. The supporting role played by Hobart airport was also discussed.

Australian Antarctic Division facilities

- 4.79 The AAD maintains extensive administrative, scientific and maintenance facilities in Hobart, most notably at its premises in Kingston.¹²² As part of the inquiry, a range of matters were raised with respect to the ability of the

119 Ms Rees, Tasmanian Department of State Growth, *Committee Hansard*, Hobart, 10 November 2017, p. 18.

120 Ms Rees, Tasmanian Department of State Growth, *Committee Hansard*, Hobart, 10 November 2017, p. 18.

121 Ms Rees, Tasmanian Department of State Growth, *Committee Hansard*, Hobart, 10 November 2017, p. 18.

122 Department of the Environment and Energy, *Submission 13*, p. 6.

AAD to continue its work in the most efficient and effective manner possible. The Committee received evidence on matters including:

- governance and funding of the AAD;
- asset management capacity; and
- the possibility of the AAD relocating its offices to the new Macquarie Point Development.

Current facilities

4.80 The AAD is located in Kingston which is around 13 kilometres from the Hobart CBD. The Division employs over 300 permanent and temporary staff which includes 'operational, policy, science, and administrative and other support personnel, based at Kingston ...'¹²³

4.81 The facilities at Kingston, which are leased by the Australian Government until 30 June 2024¹²⁴ house:

- laboratories for science;
- electronics and electron microscopy;
- mechanical and instrument workshops;
- a krill research aquarium;
- equipment stores;
- communications and other operational and support facilities.¹²⁵

4.82 With the lease of the AAD's current premises expiring in 2024, there is an opportunity to consider the location of its operations. While no commitment has been entered into regarding the possible relocation of the AAD into the new precinct, Dr Gales advised the Committee that the Division is actively engaged in discussions relating to Macquarie Point and the proposed Antarctic precinct. He noted that discussions relating to the type of presence the AAD may have at the precinct is an important discussion in which the AAD is engaged.¹²⁶

123 AAD, Department of the Environment and Energy, 'About us', <<http://www.antarctica.gov.au/about-us>>, viewed 1 February 2018.

124 Department of the Environment and Energy, *Submission 13.2*, p. 1.

125 AAD, Department of the Environment and Energy, 'About us', <<http://www.antarctica.gov.au/about-us>>, viewed 1 February 2018.

126 Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Hobart, 10 November 2017, p. 51.

- 4.83 The proposed Macquarie Point Development is discussed further at chapter 6 of this report.

Governance and funding

- 4.84 Capital and operating costs relating to the work the AAD comprises a significant portion of the resources of the Department of the Environment and Energy.¹²⁷ As part of the *Australian Antarctic Strategy and 20 Year Action Plan*, the Australian Government has committed \$200 million over 10 years in additional funding for the AAD's operations. However, the need to ensure that the AAP is appropriately resourced through asset and infrastructure investment is also an issue that has been raised in previous inquiries conducted by the Commonwealth Parliament, including by this Committee.¹²⁸
- 4.85 In describing the nature of the operating costs incurred by the AAD, its former Director, Dr Tony Press, said that during his time with the Division:
- ... about 85 per cent of the Antarctic Division's budget was actually fixed in the sense that you have to have people on station, you have to maintain the stations, you have to pay for the ship, you have to buy fuel and you have to do all the provisioning of what are basically three or four small towns. That means that the 15 per cent of your budget that is flexible, which you put towards science and outreach activities, is the first bit that starts to get eroded with efficiency dividends.¹²⁹
- 4.86 Dr Press suggested that, due to the nature of the work conducted by the AAD, there was a need to ensure that there was certainty with respect to the way that the Division was funded.¹³⁰ As such, he argued that the agency should be treated like other Australian Government agencies of a strategic nature and which are not subject to efficiency dividends.¹³¹ The AAD also noted that it was subject to the efficiency dividend as a result of it being administered via a Department of state, unlike a number of

127 Mr Cahill, Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 23.

128 See for example, Senate Foreign Affairs, Defence and Trade References Committee, *Australia's future activities and responsibilities in the Southern Ocean and Antarctic waters*, 29 October 2014, p. 61.

129 Dr Press, private capacity, *Committee Hansard*, Hobart, 10 November 2017, p. 41.

130 Dr Press, private capacity, *Committee Hansard*, Hobart, 10 November 2017, p. 45.

131 Dr Press, private capacity, *Committee Hansard*, Hobart, 10 November 2017, p. 45.

standalone agencies such as the Australian Nuclear Science and Technology Organisation and CSIRO.¹³²

- 4.87 Dr Tony Press told the Committee that his understanding was that the efficiency dividend had a significant impact on the AAD's capital expenditure. Financial impacts were also felt by the AAD because its 'small but proportionally fixed budget' was also required to be used in the long-term management of its extensive asset portfolio.¹³³

Asset management and replacement

- 4.88 The assets utilised by the AAD in its work are required to operate in some of the most extreme conditions on the planet. As such, matters such as ensuring that assets are either maintained or replaced as required is not a trivial matter and in some circumstances could be considered a safety issue.¹³⁴

- 4.89 The requirements of the AAD are not insignificant in the context of the Department of the Environment and Energy's capital budget. The Committee was advised that the capital expenditure of the AAD comprised around half of the Department's approximately \$25 million capital budget.¹³⁵

- 4.90 The Department advised that the asset base had a total replacement value of some \$880 million, but that total replacement of Australia's Antarctic asset base 'would take nearly 61 years at the current rate of investment.'¹³⁶ With respect to the assets solely at the four year-round research stations, the Department advised that there was a total replacement cost in the order of \$650 million (making up 73.8 per cent of total assets).¹³⁷

- 4.91 The Department commented on the remaining life of its assets, stating that:

... 48.5 per cent of the Australian Antarctic Division's assets (1,600 assets) have a net value of \$168 million with no remaining

132 Mr Cahill, Department of the Environment and Energy, *Committee Hansard*, Hobart, 10 November 2017, p. 53.

133 Dr Press, private capacity, *Committee Hansard*, Hobart, 10 November 2017, p. 45.

134 Mr Cahill, Department of the Environment and Energy, *Committee Hansard*, Hobart, 10 November 2017, p. 52.

135 Mr Cahill, Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 23.

136 Department of the Environment and Energy, *Submission 13*, p. 6.

137 Department of the Environment and Energy, *Submission 13*, p. 6.

asset life, and a further 16 per cent have three years or less of their asset life remaining.¹³⁸

- 4.92 Of the assets with no remaining asset life, the Department advised the Committee that the replacement cost of those assets would be \$139.4 million. Importantly, the Department notes that the assets with no remaining asset life 'are still in use, so they do have an economic value, but are being used beyond their normal economic life.'¹³⁹
- 4.93 In line with the ageing Antarctic asset base, the Australian National Audit Office advised the Committee of its 2015-16 audit, *Supporting the Australian Antarctic Program*, which recommended:
- ... to underpin an effective approach to the management of Antarctic Program assets, the Department of the Environment develop a fit-for-purpose strategic asset management policy supported by asset management plans and procedures that are regularly reviewed and updated.¹⁴⁰
- 4.94 The Department of the Environment and Energy's submission to the inquiry suggests that the Australian Government has begun to develop longer term asset management plans to counter the effect of the ageing Antarctic asset base and particularly recognises the longer time frames required in the management of Antarctic infrastructure.¹⁴¹
- 4.95 Evidence to the Committee highlighted that, in terms of Antarctica, there are limitations to any asset replacement program in the Antarctic context. This includes:
- ... freight capacity on the ship or heavy lift aircraft, numbers of beds on station for capital labour, inclement weather which restricts capital works achievable in any one year, and a 4-5 month construction window a year for all outside works.'¹⁴²
- 4.96 The Department of Environment and Energy highlighted that the cost of asset management in Antarctica – in terms of logistics, staffing and the time to manage an asset – is amplified simply because it is located in Antarctica.¹⁴³

138 Department of the Environment and Energy, *Submission 13*, p. 6.

139 Department of the Environment and Energy, *Submission 13.1*, p. 2.

140 Australian National Audit Office, *Submission 3*, p. 3.

141 Department of the Environment and Energy, *Submission 13*, p. 6.

142 Department of the Environment and Energy, *Submission 13*, p. 6.

143 Mr Bryson, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 25.

- 4.97 In assessing its asset replacement requirements, the Department advised the Committee that a 'capital budget review committee' has been established to examine the asset management plans and approach to the priority placed on the replacement of assets. This process will also assist in the development of a forward budget to inform the Australian Government of requirements.¹⁴⁴
- 4.98 Furthermore, an external consultancy has been engaged to 'develop a framework for strategic management of the whole life of those Antarctic assets.'¹⁴⁵ The Department highlighted that the work of this external consultancy would be to:
- ... go through and help us with an evaluation of whatever our asset base is looking like, from a best practice point of view. That's the first stage that we're going through. And then they're going to help us establish a framework and a prioritisation process to help us to keep that asset base working.¹⁴⁶

The process of replacing Antarctic assets

- 4.99 The Committee heard that the Department of Finance regularly engages with the Department of the Environment and Energy to establish an awareness of issues, such as the need for assets to be replaced and other possible financial requirements.¹⁴⁷ The Department of Finance advised that its role was to assist the Department of the Environment and Energy to:
- ... help them develop and put forward new policy proposals and new spending proposals and we assist them with their reporting and all matters relating to the budget and general good governance ...¹⁴⁸
- 4.100 Evidence to the Committee detailed some of the process by which Antarctic asset replacement should occur. Following an Australian Government commissioned review, asset replacement processes had changed. At present, the Department of Finance advised the Committee that two mechanisms existed for this process.

144 Mr Cahill, Department of the Environment and Energy, *Committee Hansard*, Hobart, 10 November 2017, p. 47.

145 Mr Cahill, Department of the Environment and Energy, *Committee Hansard*, Hobart, 10 November 2017, p. 47.

146 Mr Bryson, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 10 November 2017, p. 53.

147 Ms Chris Schweizer, Assistant Secretary, Department of Finance, *Committee Hansard*, Canberra, 15 February 2018, p. 15.

148 Ms Schweizer, Department of Finance, *Committee Hansard*, Canberra, 15 February 2018, p. 14.

4.101 For 'minor assets' – those valued at \$10 million or less – the Committee was advised that agencies could fund such projects from within their current budget appropriations.¹⁴⁹ The second mechanism – which applied to assets which were valued at above that threshold amount – would need to meet the requirements for a new spending policy proposal and would need to go through the ordinary budget processes and comply with all the budget process rules.¹⁵⁰

4.102 The Department of the Environment and Energy expressed a concern that:

The problem we have with Antarctica assets is, of our 3,300 assets, most are below the \$10 million threshold and that is the practical effect of that. In essence, if you think over four years, that can amount to \$80 to \$100 million of capital funding that hasn't been available to manage those assets because of the difference in the depreciation funding. It's the cumulative effect of your ability to maintain minor assets.¹⁵¹

4.103 In terms of the Department of the Environment and Energy's internal processes to identify its priorities for asset replacement, the Committee was advised that the AAD participated in the wider internal budget bidding process conducted within the Department.¹⁵² The AAD advised that it maintained a list of its asset replacement priorities in the order in which replacement was required. Urgent asset replacement was undertaken within the Division's capital budget.¹⁵³

4.104 It was stressed that, consistent with the Department of Finance's processes, funding for minor projects required an offset within the Department's existing budget.¹⁵⁴ The Department of Finance noted however that, as part of the budget process, Ministers were also able to determine relevant priorities within their portfolios. These priorities were:

... choices that individual ministers and portfolios make in any budget as to which is their greatest priority and what the minister

149 Ms Amanda Lee, First Assistant Secretary, Department of Finance, *Committee Hansard*, Canberra, 15 February 2018, p. 14.

150 Ms Lee, Department of Finance, *Committee Hansard*, Canberra, 15 February 2018, p. 14.

151 Mr Cahill, Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 23.

152 Mr Cahill, Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 23.

153 Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 23.

154 Mr Cahill, Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 23.

then decides to put forward in the budget process, and it may or may not be asset replacement at that time.¹⁵⁵

- 4.105 From a more strategic perspective, the AAD noted that, apart from the Department's engagement with the Department of Finance to manage its asset replacement requirements it has used the *Australian Antarctic Strategy and 20 Year Action Plan* to assess its stations and provide the Australian Government with an assessment of modernisation and refurbishment requirements.¹⁵⁶ Since the commencement of the inquiry, the AAD advised that this process had taken a 'system-level approach' to ensure that analysis could be conducted to assess when it was likely that assets may fail.¹⁵⁷

Hobart Airport

- 4.106 In addition to Hobart's port facilities, which are discussed in chapter 6, Hobart Airport is one of the key international gateways into Antarctica from Australia. The airport is a key element of the AAP's aviation capacity. The *Australian Antarctic Strategy and 20 Year Action Plan* states that the Australian Government has previously committed:

Funding of \$38 million to extend the runway at Hobart International Airport to stimulate international engagement, growth in Tasmania's Antarctic sector, and support for the Australian Antarctic programme.¹⁵⁸

- 4.107 While the Committee was advised that the runway extension would be completed in March 2018¹⁵⁹, the project was actually completed in February 2018.¹⁶⁰
- 4.108 Mr Matthew Cocker from Hobart International Airport advised that Hobart Airport was building facilities to accommodate both the capacity for cargo freight facilities and Defence's ongoing C-17A Globemaster

155 Ms Schweizer, Department of Finance, *Committee Hansard*, Canberra, 15 February 2018, p. 16.

156 Dr Gales, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 24.

157 Mr Bryson, AAD, Department of the Environment and Energy, *Committee Hansard*, Canberra, 15 February 2018, p. 25.

158 Department of the Environment and Energy, *Australian Antarctic Strategy and 20 Year Action Plan*, 2016, p. 25; and Hobart Airport, *Submission 2*, p. 1.

159 Mr Matthew Cocker, Interim Chief Executive Officer, Hobart International Airport, *Committee Hansard*, Hobart, 10 November 2017, p. 2.

160 The Hon. Paul Fletcher MP, Minister for Urban Infrastructure and Cities, 'Hobart Airport to soar thanks to \$40 million runway extension', *Media release PF012/2018*, 21 February 2018.

operations.¹⁶¹ In addition, Hobart Airport was conducting a feasibility study regarding how its services could be supported and also be made attractive to other countries.¹⁶²

4.109 Mr Cocker told the Committee that the airport had a strong relationship with the AAD. The airport had seen an increase in aviation activity as a result of the aviation support provided to the AAP through use of both the C-17A Globemaster and A319.¹⁶³

4.110 The appeal of Hobart Airport's capacity to support Antarctic activity was supported by a variety of inquiry stakeholders. IMAS noted that further development at Hobart Airport would:

... provide important opportunities to enhance collaboration with traditional partners such as France, but also open up potential logistic arrangements with other Antarctic programs active in East Antarctica (including China and India).¹⁶⁴

4.111 The Tasmanian Polar Network also suggested that commercial opportunities for aviation tourism into East Antarctica should be explored along with related infrastructure assets that would be required, 'without impacting on the operational capacity of the AAD.'¹⁶⁵

Committee comment

4.112 Australia's Antarctic stations and the overall AAP form the core of Australia's international and scientific engagement in Antarctica. This engagement is underpinned first and foremost by the committed Australians whose work supports the objectives outlined in the *Australian Antarctic Strategy and 20 Year Action Plan*.

4.113 The *Australian Antarctic Strategy and 20 Year Action Plan* forms part of the Australian Government's significant investment in its Antarctic science engagement and infrastructure assets and the Committee is pleased to see that there is a clear intention to enhance both of these sectors.

161 Mr Cocker, Hobart International Airport, *Committee Hansard*, Hobart, 10 November 2017, p. 2.

162 Mr Cocker, Hobart International Airport, *Committee Hansard*, Hobart, 10 November 2017, p. 7.

163 Mr Cocker, Hobart International Airport, *Committee Hansard*, Hobart, 10 November 2017, p. 2.

164 IMAS University of Tasmania, *Submission 8*, p. 2.

165 Tasmanian Polar Network, *Submission 1*, p. 4.

- 4.114 Australia maintains a significant base of Antarctic assets which include its four major Antarctic stations, a broad range of transport and logistical capabilities and, science, policy and administration facilities in Hobart.

Infrastructure assets in Antarctica

- 4.115 Australia's four major Antarctic stations – Davis, Casey, Mawson and Wilkins Aerodrome – provide the AAP with a strong base from which to further its scientific and international engagement.
- 4.116 The Committee acknowledges observations from the AAD that highlight the need for stations to be safe and efficient. The Committee also notes that Australia's Antarctic stations are ageing, with the last major works having been conducted some 20 years ago.
- 4.117 While the Committee commends the Australian Government for undertaking a much needed overhaul of the facilities at Macquarie Island, and for stating its intention to upgrade key Antarctic stations, detailed planning for the modernisation of the other facilities needs to begin now. This is particularly important in the Antarctic context because of the long timeframes required due to the conditions on the continent.
- 4.118 Members of the Committee were fortunate to have had the opportunity to visit the stations at Wilkins Aerodrome and at Casey during the inquiry. The visit allowed a unique opportunity for the Committee to keenly understand the extreme temperatures, isolation and logistical issues experienced by personnel supporting the AAP, and to appreciate how these factors contribute to a difficult working and operational environment. The Committee was struck by the scale of the efforts required to support the AAP, and was impressed by the clear commitment and dedication of staff supporting the Program.
- 4.119 In the Committee's view, there is an urgent need to ensure that Australia's Antarctic scientists and infrastructure specialists are able to work in safe and modern facilities – such plans have already been progressed by a number of other national Antarctic programs. As such, the Australian Government must give more immediate consideration to planning the Antarctic station modernisation program.
- 4.120 In developing plans to modernise the Antarctic stations, the Australian Government should consider a broad range of design, environmental and occupational health and safety principles with broad consultation of architectural and engineering professionals. Any construction activity should be consistent with international best practice and make the most efficient and effective use of Commonwealth funds. Consideration should

be given to opportunities to innovate, such as through building modular station facilities in Australia.

Recommendation 4

The Committee recommends that the Department of the Environment and Energy, consistent with its commitments in the *Australian Antarctic Strategy and 20 Year Action Plan*, prepare a detailed plan and a timeline for the upgrade and modernisation of Australia's Antarctic research stations.

Waste remediation

4.121 The Committee notes the Australian Government's commitments relating to waste remediation under the *Australian Antarctic Strategy and 20 Year Action Plan*. The Committee considers that the proposed development of a clean-up strategy for legacy waste should be completed in a timely manner. Waste remediation should also be considered as part of the future modernisation program for Australia's Antarctic stations. Where appropriate, the Australian Government should work with the Tasmanian Government to provide Tasmanian businesses with access to the economic opportunities that may arise as a result of waste repatriation from Antarctica.

Recommendation 5

The Committee recommends that the Department of the Environment and Energy prioritise waste remediation once the new icebreaker is operational, given the increased capacity to carry material including waste.

Transport and logistical capabilities

4.122 The distances that are required to be covered both from Australia to Antarctica and within the continent itself are immense. The Committee is pleased to have received evidence that highlights Australia's strong and growing capacity in Antarctic aviation. In particular, some members of the Committee had the opportunity to fly to and inspect the facilities at

Wilkins Aerodrome. The visit provided the Committee with an opportunity to see first-hand some of the infrastructure that is available to the AAP and importantly, to meet the dedicated staff without whom, Australia's aviation capacity would not be possible. It should also be acknowledged that without the support of both commercial and Defence aviation capabilities, that many of the science and infrastructure projects along with staffing movements in Antarctica would be very difficult.

- 4.123 With respect to Wilkins Aerodrome, the Committee notes evidence provided by Defence that a number of improvements to the Aerodrome would provide greater mission capability and mission assuredness. As part of its program to assess the needs of Australia's Antarctic stations, the Department of the Environment and Energy should consider these proposals and work with the Department of Defence to implement these in a timely manner. The Australian Government should also consider how aviation assets in Tasmania, such as Hobart Airport, can continue to provide strategic value for the Commonwealth.

Proposal for year-round aviation access

- 4.124 The Committee strongly endorses the Australian Government's commitment to developing a business case for year-round aviation capacity in Antarctica. The proposal was met with enthusiasm by inquiry participants and in the Committee's view would bring the AAP's aviation capacity in line with that of other major international Antarctic programs.
- 4.125 The Committee acknowledges that development of a year-round runway in such a remote and hostile location would come at a significant cost, beyond what might be considered appropriate on the mainland. Nevertheless, the Committee considers this an exceptional opportunity that has both practical and strategic benefits, particularly when other nations might be considering bolstering their capabilities in East Antarctica. Consequently, the Committee considers that as a matter of priority the Australian Government should provide the Department of the Environment and Energy with an enhanced capacity to develop the business case for a year-round runway, along with a detailed strategic case to underpin the proposal.
- 4.126 It should be noted that the Committee has concerns about the term 'business case' as it is used in the context of the proposal for the year-round runway in Antarctica. Given the naturally higher cost of infrastructure projects in Antarctica, as discussed above, such costs may exceed the expected benefits as assessed under a standard 'business case'. The Committee is concerned that the vital strategic considerations may not

be appropriately factored into a traditional business case process, and therefore calls for a 'strategic case' to be prepared. Such business and strategic cases must also consider the activities of other countries in East Antarctica, and how this may affect Australia's strategic interests and opportunities to cooperate. Following the development of these cases, the investment decision should be expedited.

Recommendation 6

The Committee recommends that the Australian Government provide the Department of Environment and Energy with an enhanced capacity to develop a business and strategic case for year-round aviation in Antarctic. The Committee further recommends that the investment decision be made by December 2019 at the latest.

Icebreaking and marine research capabilities

- 4.127 Icebreaking and marine research capability are a major strength of the AAP. The Committee is pleased to note that the AAD's new icebreaker, *RSV Nuyina*, will be in service in 2020–21 and notes that it will provide the AAP with significantly enhanced icebreaking and marine research capabilities. Until that time, the Australian Government must ensure that the current icebreaker, the *Aurora Australis*, remains compliant with the International Maritime Organisation's Polar Code and any other international instruments as required.
- 4.128 While the Committee welcomes the development of *RSV Nuyina*, it is mindful that a range of other factors must be considered in order to ensure that the benefits of this new capability are fully realised. This includes ensuring that staff are trained to use the new capabilities that the ship will bring, increasing data management capabilities to store the data that it will collect, and ensuring that supporting infrastructure – such as port facilities – are able to meet the ships requirements. More broadly, accommodation and facilities in Antarctica will need to be re-examined as more staff are able to access the continent. These factors are considered in further detail throughout this report, and each should be considered a matter of priority to enable full utilisation of *RSV Nuyina* when it becomes operational.
- 4.129 During the course of the inquiry, the Committee raised concerns with CSIRO and others about the availability of CSIRO's research vessel, the *RV Investigator*. In particular, the Committee is concerned that, while

designed to be operated for up to 300 days, the vessel was currently only funded by the Australian Government to operate for 180 days. The Committee considers that this is a significant gap in Australia's marine research capabilities and believes that the Australian Government should take steps to ensure that the vessel is operating at full capacity or seek to ensure that appropriate commercial arrangements are made. Consideration should be given as to how this may be encouraged – such as through matching the financial commitments of any non-government funding arrangements that are made.

Recommendation 7

The Committee recommends that CSIRO explore further opportunities to ensure that the *RV Investigator* is able to operate at its full capacity. Consideration should be given to whether incentives can be developed to encourage non-government marine research activities using the vessel.

Overland traverse capabilities

4.130 The Committee notes the Australian Government's commitment to restoring its overland traverse capability to enhance its scientific research activities in Antarctica. As part of its visit to Tasmania in November 2017, the Committee visited the premises of William Adams Pty Ltd, a company that specialises in the customising of vehicles used for Antarctic overland traverse capability. The Committee was advised that William Adams had supplied a range of such vehicles to a number of national Antarctic programs, including the AAP. While this matter is addressed in more detail in chapter 6, the Committee supports the importance of this capacity in terms of its usefulness in Antarctica and also as an economic development opportunity within Tasmania.

Infrastructure assets in Hobart

- 4.131 Hobart is strategically located as an international Antarctic gateway. While the economic opportunities available to the city are addressed later in this report, there are a number of issues which pertain to the infrastructure assets of the AAP that are considered here.
- 4.132 The AAD's facilities in Kingston provide key science, policy and maintenance capacity for the AAP. The Committee considers that the AAD's location, some 13 kilometres from the Hobart CBD, presents

challenges in engaging with key stakeholders, efficient operations and effective community education, and outreach and tourism opportunities.

- 4.133 The Committee notes evidence from the AAD that its lease in Kingston is due to expire in 2024. The Committee understands that a dedicated Antarctic science hub can be developed at the Macquarie Point Precinct adjacent to the Hobart CBD and port. To facilitate this, the Committee considers that the AAD should pursue the lease of new facilities at Macquarie Point for some of their operations. In the Committee's view, relocation of some functions could create a range of synergies with other Antarctic stakeholders and Hobart's growing Antarctic infrastructure capabilities. It could also positively impact Antarctic tourism from Australia, and provide the AAD with more engaging public facing facilities. The development of a business case should be commenced at the earliest opportunity so to minimise any disruption to the operations of the AAP.

Recommendation 8

The Committee recommends that the Australian Government examine options for the co-location of relevant institutions in the proposed Macquarie Point Antarctic Precinct, including the relocation of CSIRO, CCAMLR, the Tasmanian Polar Network, part of the Bureau of Meteorology, and components of the Australian Antarctic Division.

Governance and funding

- 4.134 The AAD's important operations come at a significant cost to the Commonwealth, and the Committee acknowledges the substantial additional commitment to be made by the Australian Government as part of the *Australian Antarctic Strategy and 20 Year Action Plan*. However, the Committee notes that this commitment is necessary to meet Australia's national and strategic interests.
- 4.135 Evidence to the inquiry suggests that there may be a need to consider how the strategic value of the AAD to the Commonwealth is captured. The Committee is concerned that current business cases relating to the AAP do not adequately account for the strategic value of continued operations within the region. For example, there may be benefit in formalising input from the Department of Foreign Affairs regarding the AAD's contribution to Australia's strategic interests. Mechanisms to provide the Division with enhanced budget certainty given the longer term horizon of its work and

capital requirements may also be required. This could include reconsidering the application of efficiency dividends to the AAD's portion of the broader Department of the Environment and Energy budget.

Recommendation 9

The Committee recommends that the Australian Government consider how the strategic value of the Australian Antarctic Division to the Commonwealth is captured, and develop mechanisms to provide the Australian Antarctic Division with enhanced budget certainty and funding, in light of its work and capital requirements.

Asset management and replacement

- 4.136 Australia's Antarctic asset base is significant and evidence to the Committee suggests that there are significant proportions of this base that have either reached or will reach the end of its usability over the coming years. In particular, the Committee was concerned at the Department of Environment and Energy's contention that its current asset replacement trajectory would take some 61 years to complete at the current rate.
- 4.137 The Committee notes the work that the Department of the Environment and Energy has begun to conduct in the assessment of the life of these assets. The Committee also appreciates the engagement of the Department of Finance with the inquiry to clarify the process by which Antarctic asset replacement can occur. In the Committee's view, there is a paramount need for the Department's assessment of its ageing asset base to be completed and where necessary, appropriate business cases prepared for replacement assets. This is particularly important where a case needs to be made for new spending proposals through the Australian Government's budget process.

Recommendation 10

The Committee recommends that the Department of the Environment and Energy work to complete its assessment of Australia's ageing Antarctic asset base, separate from Australia's Antarctic stations, as soon as practicable. Where appropriate, relevant business cases should be developed, particularly where a new spending proposal is required to be managed through the Australian Government's budget processes.

