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Gamechanger

Australian leadership for all-season air access to Antarctica

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There's growing international political and environmental interest in Antarctica.[1] Australia now has an opportunity to make a long-term investment that would bolster our leadership in Antarctica, where we claim 42% of the continent.

Next year, the Australian Government will decide on whether to commit funding for a proposed year-round, paved aerodrome near the Australian Davis research station in East Antarctica. It would be the only paved runway in Antarctica.

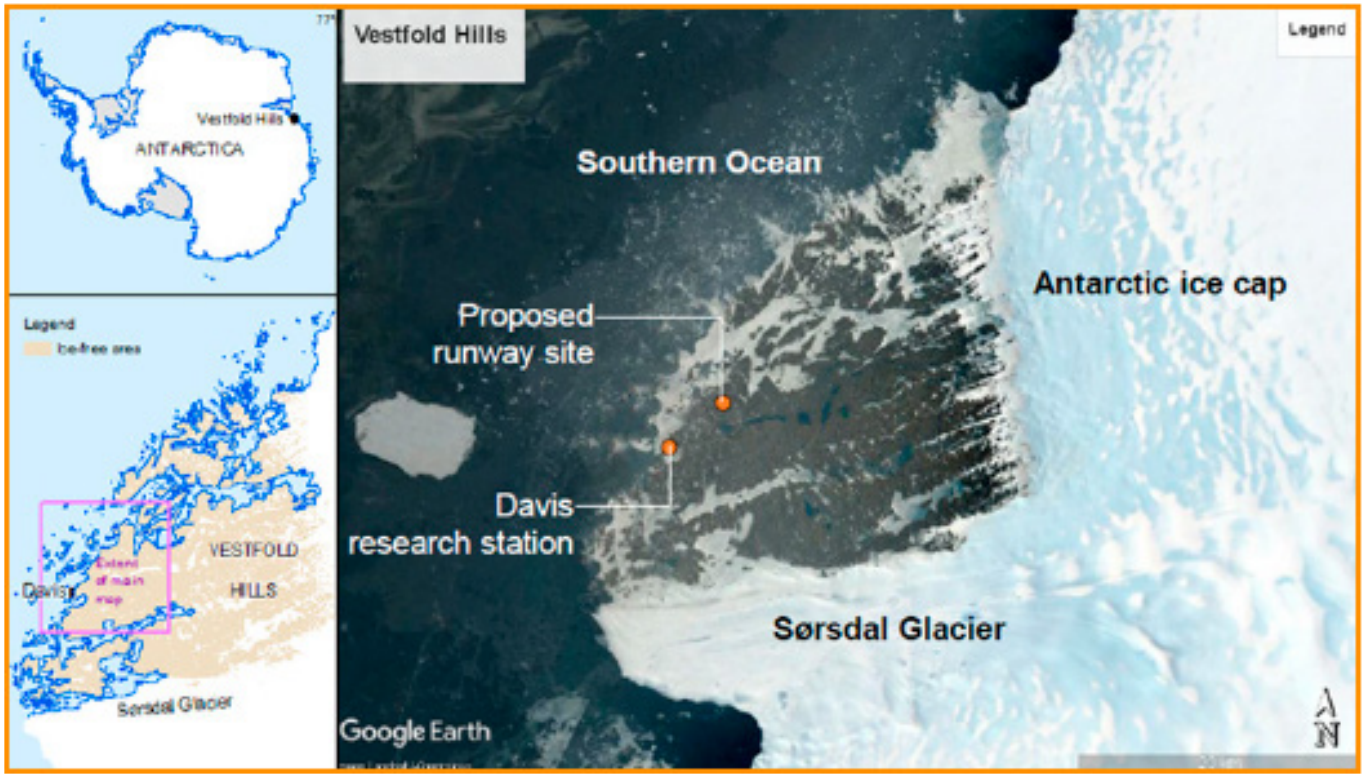
Background

The idea for an aerodrome near Davis Station was part of the *Australian Antarctic Strategy and 20 Year Action Plan*[2] that set out to guide decisions on the future of our Antarctic program. In 2018, the Australian Government announced that it intended to construct the runway, subject to necessary environmental and other approvals, but it didn't commit to the funding at that time.

Photo: Todor Iolovski, Australian Antarctic Program.

The proposal is for a 2.7-kilometre runway as well as aircraft hangars, a small terminal facility, storage buildings, fuel storage and other support services. The aerodrome and associated infrastructure would be located about 4.5 kilometres from Davis Station and occupy 2 square kilometres, or less than 0.5% of the Vestfold Hills. The Vestfold Hills is an unusually large ice-free area of over 400 square kilometres. The proposed location of the aerodrome is shown in Figure 1.

Figure 1: Location of proposed Davis Aerodrome



Source: Australian Antarctic Program, 'Davis Aerodrome Project: invitation for expressions of interest, Part A, General information and response requirements', 2020, 18, online.

An all-weather, year-round, paved runway near Davis would have huge positive impacts on Antarctic science and logistics in East Antarctica, where there are no equivalent facilities. It would act as both a destination for intercontinental science and logistics flights from Australia and a hub for distributing personnel and equipment, via intracontinental flights, to Australian and various other national research bases in East Antarctica. Through those bases, there would be links to the whole continent using the networks of other programs.

As the operator of the aerodrome, Australia would have the central role in controlling flights into Davis. We could manage the type and scale of activities for which the facility is used to ensure they're consistent with the broader commitments of the Antarctic Treaty parties to science and peaceful use.

The Davis aerodrome will provide a very significant upgrade in aviation capacity for the Australian Antarctic Program, which currently relies upon summer-only access to Australia's Wilkins aerodrome near Casey Station.

The development of the Davis aerodrome will overcome the constraints Australia's and other Antarctic programs face with climate change impacts on polar runways that use compressed snow or glacial 'blue ice'. Surface melt already disrupts the use of the Wilkins blue-ice runway and threatens its long-term reliability.

The new runway will be a game-changer in Australia's access to East Antarctica. It will increase our ability to collaborate with all countries active in that region. It would serve as the hub for air operations across the continent. Once operational, it would release our new ice-breaker RSV *Nuyina* to commit more days for year-round marine research.

Even though it won't become operational for more than a decade, the aerodrome project should be a high priority for Australia. We should send the strongest message that this country is determined to maintain a credible long-term leadership role in Antarctica in a responsible way.

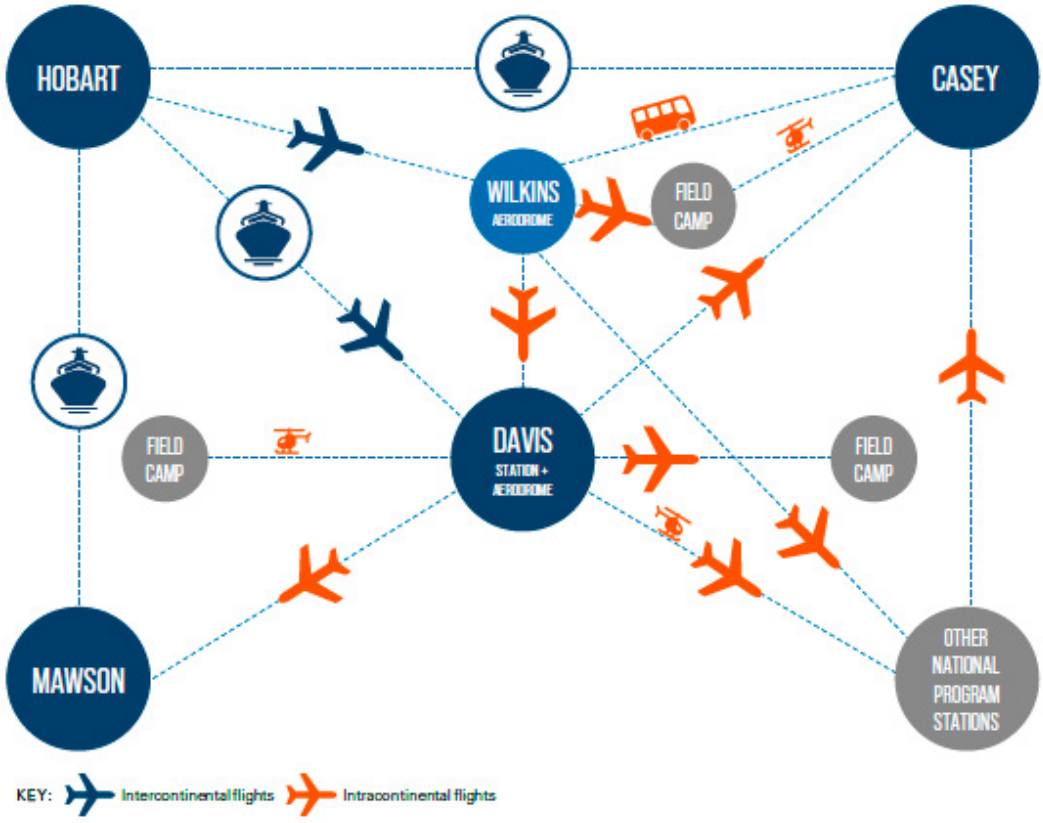
Costing of the project is under development,[3] so isn't available at this stage. It's expected, however, that the overall cost will be substantial, given the 15-year construction period. Much of it will be the transport costs of moving equipment, materials and personnel to the site. The 'expression of interest' document on the government's *AusTender* website notes both the model and procurement approach and reflects the scale and complexity of the project.[4]

Both the cost and time involved will be significant, but, given the distances involved and logistical challenges, there's no scope to do it cheaply or quickly (that's the problem for any major Antarctic infrastructure), and that's why long-term commitment is necessary. An early commitment and start to the project will provide much-needed long-term planning certainty for the Antarctic program, which is the key to implementing the government's 20-year action plan.

Flight time from Hobart to Davis is 6–7 hours. There'd be three intercontinental flights each month in summer, and up to monthly flights over winter.

The aerodrome would also support around 100 intracontinental flights to and from Davis each summer. This latter element will significantly contribute to the logistical flexibility of the Australian Antarctic Program and facilitate cooperation with other Antarctic programs. The expected aviation routes for the Davis aerodrome are shown in Figure 2.

Figure 2: Proposed aviation routes for Davis aerodrome



Source: Australian Antarctic Program, 'Davis Aerodrome Project: invitation for expressions of interest, Part A, general information and response requirements', 2020, 23, online.

Site selection

The ice-free Vestfold Hills site is particularly attractive for an aerodrome development. The proposed site will allow for construction of a paved concrete runway on rock, at low elevation, close to the sea, in a place with a benign climate, and with a runway alignment naturally suited to the prevailing winds: all factors that make it uniquely suitable in Antarctica for all-season air access.

Unlike other places, the site would allow a full-size 2.7-kilometre runway to accommodate large jet aircraft such as the Boeing 787, the Airbus 330 and the RAAF Boeing C17-A Globemaster III.

Those characteristics were recognised early. The idea of using the Vestfold Hills area near Davis as a rock runway was first suggested in the late 1950s by Dr Phillip Law. The idea has been repeatedly resurrected in Australian Antarctic Division planning, in which the site is identified as a potential aerodrome. The existing track to it has long been known as 'Airport Road'.

The option of using the Vestfold Hills site as an aerodrome has been examined multiple times by the Australian Government, but it's fallen over for lack of government commitment, in part driven by environmental and cost considerations, including a fear of an environmental backlash, such as experienced by France in the 1980s when it attempted such a project at a smaller scale at Dumont d'Urville—in that case by flattening islands and filling the space between them.

Aerodromes have long been cited as posing environmental challenges, in part because of the use of aircraft near wildlife and the need to store bulk fuel. Construction on exposed rock typically brings additional concerns because of the possible presence of sparse vegetation, or the presence of nesting birds. Such concerns need to be taken very seriously and the issues addressed. It needs to be 'done right'.

There are other major aerodrome facilities in Antarctica.[5] They include the ice or snow runways at the US McMurdo Station near the Ross Sea and at the South Pole, the Troll Station operated by Norway in Queen Maud Land, the Russian Molodezhnaya runway in East Antarctica, and Australia's Wilkins runway near Casey. The UK operates the modern gravel Rothera Air Facility on Adelaide Island near the Antarctic Peninsula, Chile operates the gravel runway at Rodolfo March Martin, Argentina operates one at Marambio and Italy one at Mario Zucchelli.

Runways are not unusual in Antarctica, but reliable year-round runways are. A paved concrete runway at Davis will provide significant advantages over gravel runways: better reliability, less maintenance, increased aircraft payloads and a longer operational lifespan.

Impacts on science and logistics

Greater access to the Antarctic continent will be important for future Antarctic science programs. A 2015 'horizon scan' of Antarctic science by the Scientific Committee on Antarctic Research found that 'Future research in Antarctica will require expanded year-round access to the continent and the Southern Ocean.'[6]

Similarly, a 2016 report on future Antarctic research requirements by the Council of Managers of National Antarctic Programs found that:

> Many scientific questions will require year-round continent- and ocean-wide access. High-priority areas for expanded access include coastal areas (including beneath ice of all kinds—floating and grounded), the interior of Antarctica (including deep field camps), and the Southern Ocean.[7]

Australia has a significant opportunity to contribute to this greater year-round access for Antarctic science.

Critics

As the funding decision draws nearer, there's already been some criticism of the Davis aerodrome proposal, particularly about the potential environmental impacts of constructing and operating the paved runway and improvements to the wharf at Davis Station to unload the materials and equipment for its construction. There would be extra personnel at Davis to construct the runway over a 15-year period.

Concerns have also been raised about the potential for negative impacts upon local petrel, penguin and seal populations and other local fauna.[8]

Some critics have suggested that the aerodrome would be inconsistent with our existing obligations under the Antarctic Treaty System (ATS) for environmental protection.[9] However, the ATS accepts developments that support the conduct of research and prescribes how they should be assessed for environmental impacts. Those processes allow options to be considered and, normally, for the lowest impact option to be adopted. The critical obligation in a project such as this is to demonstrate that any impacts are justified.

It's even been argued that the proposed aerodrome could trigger a geopolitical competition for other large infrastructure projects in Antarctica, new territorial claims or militarisation of the continent.[10]

One environmental organisation has already indicated that it will campaign on environmental grounds against Australia proceeding with the aerodrome.[11] Such opposition to the proposal has been advanced before any environmental impact assessment has been prepared and mitigating measures identified.

We believe that, with care, it should be possible to design, construct and operate a facility that satisfies both operational requirements and environmental obligations under the Madrid Protocol and relevant Australian legislation.

Four key reasons to approve the project

While we acknowledge that there are a range of valid concerns about the aerodrome proposal, there are also strong national interest grounds to proceed.

1. Strengthening Australian leadership in Antarctic science and diplomacy

There's an important argument for strengthening our historical position as a leader in Antarctic science and diplomacy.

Australian explorers were prominent in the heroic era of discovery voyages in Antarctica. Australia is one of the seven states with territorial claims in Antarctica and was one of the 12 original parties to the Antarctic Treaty in 1959.

Australia has shown significant diplomatic leadership within the ATS during the formation of the Antarctic Treaty, in the development of the Convention on the Conservation of Antarctic Marine Living Resources in the early 1980s (with its secretariat in Hobart), in meeting the developing world challenge to the ATS at the UN General Assembly in the 1980s, and in driving the shift from mining to environmental protection in the formation of the Madrid Protocol in the early 1990s.

The proposed Davis aerodrome would further demonstrate our maturity and influence in Antarctic science and diplomacy. The aerodrome would also provide Australia with a central role in Antarctic logistical supply chains for several national research bases in East Antarctic, such as the nearby Chinese, Russian and Indian bases. Australia would become the logistics country of choice for East Antarctica and a primary driver of scientific and logistical cooperation in the area immediately to Australia's south, in the vicinity of our existing Antarctic research programs.

The aerodrome would also serve as a hub for intracontinental flights and provide a strong vantage point for improved inspection processes under the Antarctic Treaty, or for aerial surveillance over the adjacent waters if that becomes necessary for fisheries patrols.

We have the technical capacity to proceed with the Davis aerodrome, after rigorous environmental assessment. If we choose not to proceed, other key polar powers would view us as reluctant to lead to significantly strengthen Antarctic science and logistics.

Under Article 4 of the Antarctic Treaty, any decision taken about whether to proceed with the Davis aerodrome will have no legal impact upon the strength or status of our territorial claims in Antarctica, at least regarding the 54 countries within the Antarctic Treaty.

So, from an international legal perspective, the criticism that Australia is proceeding with the aerodrome to somehow bolster our claim to the Vestfold Hills area completely misses the mark.

From a broader geopolitical perspective, high-quality Antarctic science and diplomatic strength in the ATS are significant Australian national interests.

Year-round aviation access at the Davis aerodrome will also allow Australia to better meet its search-and-rescue obligations in East Antarctica and the Southern Ocean, as required by the International Convention on Maritime Search and Rescue adopted in 1979.

Australia has a search-and-rescue area of 53 million square kilometres of ocean (1/10th of the Earth's surface), including a large segment of the Southern Ocean between southern Australia and East Antarctica.[12] We currently have very limited capability to provide search and rescue in the zone for which we've accepted responsibility.

When assistance is requested (including by Australians), Australia has a search-and-rescue coordination responsibility. But, due to lack of available assets in the Southern Ocean, we must often rely on the logistics and capacities of other states.[13] The all-weather, year-round aerodrome will provide strong support to Australia's search-and-rescue capability.

2. If Australia doesn't proceed, another country may

The Vestfold Hills area is one of the few ice-free areas in the whole Antarctic continent that's suitable for constructing a major aerodrome. It's therefore prime real estate for major transport infrastructure development.

Although the site is adjacent to Australia's Davis Station, there's nothing to stop any other party to the Antarctic Treaty using the site to develop its own station or construct its own runway. Provided that the facilities are for peaceful use and support scientific research, the Antarctic Treaty parties are free to conduct their activities anywhere in Antarctica.

The fact that the Vestfold Hills are in the Australian Antarctic Territory is irrelevant. Given that the Vestfold Hills area is very large and, in summer, easily accessible by sea, it might be considered surprising that there aren't already multiple research stations in the region, as has occurred at King George Island and the Larsemann Hills.

Given that the site has long been recognised as technically suitable for air facilities, it might be expected that other states will have an interest in using the Vestfold Hills for access to Antarctica. If Australia doesn't proceed with the Davis aerodrome proposal (whether for environmental, financial, or other reasons), there's nothing in the Antarctic Treaty or Madrid Protocol that would prevent another Antarctic country proceeding with a proposal of its own.

We know that other states are interested in developing air access to East Antarctica. For example, in 2018, China indicated it has plans to build a permanent 1.5-kilometre ice runway in the nearby Larsemann Hills area, near its Zhongshan research station. If Australia decides to not proceed, there'd be no legal barrier to China (or any other Antarctic country) putting forward a new aerodrome proposal for the Vestfold Hills and doing it on rock.

In that situation, access to the facilities would be controlled by another country and constructed to the environmental and operational standards of that state. Australia would be put in the position of having to negotiate, and possibly pay for, access to a facility adjacent to its own station.

If the Vestfold Hills area is to be used for year-round air access, we argue that it's preferable for Australia to construct it to meet strict Australian environmental standards. We would then also be able to control access and the uses to which it can be put. For example, we could use the enhanced airlift capacity to facilitate cooperative research programs that benefit Australian research priorities.

Importantly, we'd also be able to prevent inappropriate uses by other potential operators, such as using the aerodrome to support permanent tourist facilities in the region. Tourist use of the aerodrome has been ruled out by Australia, but it might be attractive to another country if that country built and operated the aerodrome, particularly to help recoup its construction costs. It's inevitable that, once there's all-season access, there'd be pressure on that country for commercial access.

3. Australia has well-established legislative environmental impact assessment processes

If an aerodrome proposal proceeds for the Vestfold Hills area (or any other location in Antarctica), it's in our interest, and the interest of all other Antarctic Treaty countries, that such major infrastructure be designed, constructed and operated so as to minimise the environmental impacts.

Australia has a track record of environmental leadership in Antarctica to protect. We were a key driver in the formation of the 1991 Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol), which provides a comprehensive environmental protection regime for the region.

Australian representatives have served two terms as the chair of the Committee for Environmental Protection (CEP), which is the key forum on environmental matters established under the Madrid Protocol. It's expected that a comprehensive environmental evaluation of the aerodrome proposal will be prepared and submitted to the CEP for its comment and recommendations.

But the CEP isn't the decision-making body on whether the proposal will proceed. Australia is obliged to consider the comments and recommendations of the CEP and other parties in deciding whether to proceed with the aerodrome proposal and, if so, on what terms. However, as the Australian Government is the proponent of the project, the decision to proceed (or not) will ultimately rest with it.

It's therefore vital that countries that are active in Antarctica have robust national legislation to govern their activities there, including the construction of new infrastructure. But, sadly, not all major Antarctic countries have equivalent legislation to govern their activities on the continent.

That's not the case with Australia. We already have in place specific and longstanding domestic legislation: the *Antarctic Treaty (Environment Protection) Act 1980* and the *Environment Protection and Biodiversity Conservation Act 1999*. The Acts provide detailed rules for environmental assessments of all significant Australian activities in Antarctica, including inviting public submissions and heeding expert advice.

That legislation provides confidence that the environmental evaluation required by the Madrid Protocol will be carried out in a rigorous manner under Australian rules and processes, and subject to domestic and international scrutiny. The environmental assessment produced by the Australian Government is likely to be more rigorous than that produced by any other party to the Antarctic Treaty.

A possible outcome of the environmental assessment being undertaken by Australia (to be completed later next year) is that the impacts identified may make proceeding with the aerodrome proposal either significantly more difficult or more expensive than expected. It may also lead to a finding that the environmental risks are not acceptable or are disproportionate to the likely benefits.

Such a result might have the effect of 'taking the area off the table' for any future similar development by Australia. But it wouldn't necessarily take the Vestfold Hills 'off the table' for aerodrome proposals by other Antarctic states. Another Antarctic state could make its own proposal for an aerodrome in the Vestfold Hills and might adopt a quicker, less costly approach to construction that carries increased environmental risk.

As decisions on activities subject to comprehensive environmental evaluations belong to the sponsoring state, it would be possible for another country to pursue a new environmental assessment under its own domestic processes, but that might fall well short of the rigour required by our legislation.

The CEP would again have a role in providing advice and recommendations on such new proposals, but, as already noted, it would be the decision of the proponent country as to whether to proceed.

Having Australia as the proponent for an aerodrome therefore has significant advantages in the level and quality of environmental assessment that can be expected and in compliance with any operating conditions imposed.

4. Developing Australia's Antarctic gateway

The *Australian Antarctic Strategy and 20 Year Action Plan* contains the goal of developing and promoting Tasmania as the leading international research hub and logistics gateway for East Antarctica.[14]

While Hobart has the advantage of geographical proximity to East Antarctica and is home to the Australian Antarctic Program, other Antarctic gateway cities act as important logistical hubs for Antarctic research, as Christchurch does for the Italian, New Zealand and US programs.

Hobart will be the base for all intercontinental flights to and from the Davis aerodrome, whether they're transporting Australia's or other programs' equipment and personnel. The Davis aerodrome will therefore boost the position of Hobart as a centre of Antarctic logistics and science and make it the pre-eminent gateway city to East Antarctica. That will build and solidify Australia's diplomatic and scientific influence in the region.

The way ahead

Given the expenditure involved, the lengthy timeline to completion in the late 2030s and the environmental concerns that must be met, the decision to proceed with the Davis aerodrome will be a difficult one. Such factors have contributed to Australia's unwillingness to commit to such a proposal over previous decades. Now, however, we have the necessary engineering capacity, the marine logistics to support its construction and the aircraft capable of making best use of it. Importantly, Australia now has an even greater strategic imperative to act.

As with any major piece of infrastructure development, there'll be inevitable environmental impacts from the construction and operation of the Davis aerodrome. The threshold question will be whether the project's substantial benefits justify its likely environmental impacts.

But, if we don't proceed with the aerodrome, another country may step into our shoes and take a similar proposal forward. It might be a country with lower standards of environmental assessment and a lesser track record of environmental protection in Antarctica.

There's nothing unusual about making an investment decision subject to environmental approval. It's common in large infrastructure projects. In recent years, the federal government made a multibillion-dollar investment commitment for Snowy Hydro 2.0 subject to final environmental consideration. It also made a significant commitment to the Western Sydney airport prior to NSW's environmental approval.

For Australia to contribute to the effort for greater year-round access and maintain its position of leadership in Antarctic science and diplomacy, investments in major logistic infrastructure are required. Australian construction and control of the Davis aerodrome will give us a prominent leadership role in East Antarctica, including by acting as a hub for intracontinental logistics and science.

The Davis aerodrome will future-proof our Antarctic science program for decades: there's a direct correlation between an expanded logistics network and a significant expansion of science programs in Antarctica (examples include the US National Science Foundation / US Antarctic Program modernisation, New Zealand's Scott Base redevelopment and the British Antarctic Survey's Rothera development).

Science is the currency of influence in Antarctica: investing in Antarctic logistics is the most effective way to advance our long-term Antarctic interests.

The Davis aerodrome project requires long-term funding and political commitment. Failing to proceed with the proposal would weaken our influence in Antarctica: it would allow other states to take advantage of the opportunity for logistical and scientific leadership in East Antarctica.

It would be easy to again put off a hard decision about strengthening our capacity in the region south of Australia, but, as international interest in Antarctica increases, this is no time for complacency. The commissioning of a new ship is only half of the story of modernising Australia's Antarctic science and logistics capacity. The development of an all-weather, year-round, paved runway at Davis will complete that vision and will be a game-changer for the Australian Antarctic Program and increase our strategic weight in the cold continent.

Notes

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Acronyms and abbreviations

ATS Antarctic Treaty System
CEP Committee for Environmental Protection
RAAF Royal Australian Air Force

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