

Department of Infrastructure, Transport, Regional Development,  
Communications and the Arts

30 November 2023

To Whom It May Concern,

### **Review of the Australian Aviation White Paper: Submission from Griffith University**

I am Professor of Aviation within Griffith Aviation, housed within the School of Engineering & Built Environment.

Griffith University has a high level of expertise and experience in sustainable aviation. This stems from over 30 years graduating aviation students including what is now the largest aviation teaching unit in Australia for aviation management and a highly recognised pilot training program (Griffith Aviation), in addition to two world-leading research institutes and centres (GIFT: Griffith Institute for Tourism; Griffith Climate Action Beacon). Griffith University, therefore, has internationally leading research and consultancy capability across the areas of aviation, aviation management, pilot training, tourism and climate change. I have coordinated this response from across Griffith University including the relevant Schools, research institutes and centres.

We would also like to highlight the Griffith University Aviation Reimagined annual webinar series as a resource for your team developing the White Paper. Aviation Reimagined features industry leaders, policymakers and researchers sharing their insights about a transition to a low-carbon and climate ready future for the aviation sector. The most recent Aviation Reimagined webinar series, held in October 2023, had over 400 registrations and international speakers (see: <https://www.griffith.edu.au/institute-tourism/news-events/aviation-reimagined-2023> for more details).

We have reviewed the Aviation White paper and are providing a submission by the end of November 2023 as requested.

### **Overall response**

We agree with the Foreword, that it is timely for an Aviation White Paper in Australia. We are in a period of great change and upcoming uncertainty, particularly associated with environmental challenges and technology development, as articulated in the Green Paper. The call to maximise aviation's contribution to net zero and support associated research (pp. 6-7) in the Executive Summary is particularly welcome.

#### **Chapter 4. Regional and remote aviation services**

It is pleasing to see climate change adaptation covered in the Green Paper for airports (pp. 70-71), which will need to become more climate resilient. We consider that the climate change adaptation response will need to be broader and deeper in response. Climate risk assessments will be required across the industry, as it deals with the increasing climate impacts and associated societal changes when people adapt where they live and work, and how they travel.

There will also be specific requirements for the broader industry. For instance, many regional carriers tend to utilise newly licensed commercial pilots. These pilots typically have fewer flying hours than major commercial carriers and therefore represent a less experienced cohort and potential inherent risk. Given the shortage of pilots both in Australia and internationally, there is the potential for these pilots to be of a minimally competence performance standard, with major carriers attracting the higher performing pilots. These carriers may often be flying older aircraft, which also introduces the issue of newly licensed commercial pilots needing to learn how to operate these older aircraft, many of which have analogue instruments rather than glass cockpits. In addition to these risks, regional pilots also need to deal with more extreme weather systems which they may not have experienced during training, representing a further risk to operations. For these reasons, there are a number of additional risks which will be inherent in regional and remote aviation services in the future that need to be realised.

#### **Chapter 5. Maximising aviation's contribution to net zero**

We see an empowered and full-resourced Jet Zero Council as critical for the Australian aviation industry moving forward. It is encouraging to see emission reduction identified as a key focus. It is pleasing that sustainable aviation fuel (SAF) is promoted as well as other alternative fuel options, including hydrogen and electric solutions. Competition over resources, both biomass and renewable electricity, need to be considered carefully when planning future aviation activity within the context of the decarbonisation needs of other sectors. Furthermore, it remains crucial to thoroughly assess the sustainability of the various types of Sustainable Aviation Fuels, including their net savings in terms of GHG emissions (see <sup>1</sup> for further details).

An open mind is required when considering the best technology for SAF production in Australia, as early proposed biotechnology driven ethanol to Jet routes are inherently inefficient. Emerging thermochemical routes such as those being adopted by Air BP and Virent in the US for the historic Virgin Atlantic flight (<https://www.virgin.com/about-virgin/latest/virgin-atlantics-historic-net-zero-transatlantic-flight-closer-to-takeoff>; <https://www.virent.com/products/sustainable-aviation-fuel/>) do offer improved utilisation of biomass and overall process economics. There is a wealth of expertise in Australia in catalytic process development (including the Centre for Catalysis and Clean Energy at Griffith University) that could support establishment of such technology.

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<sup>1</sup> Becken, S., Mackey, B., & Lee, D.S. (2023). Implications of preferential access to land and clean energy for Sustainable Aviation Fuels, *Science of The Total Environment*, Vol 886, 163883. <https://www.sciencedirect.com/science/article/pii/S0048969723025044>

The high dependency on aviation for domestic services and access, especially for indigenous, remote and rural communities is appropriately acknowledged on page 88. The supply of alternative fuels to remote regions is a crucial element here.

The paper states that "However, there are a number of ways to reduce net aviation emissions including efficiency gains, new propulsion technologies, high-quality carbon offsets and sustainable aviation fuels (SAF)" (p6 – also outlined p 61). We would like to point out that carbon offsetting is not a decarbonisation strategy, nor is it accepted as part of making a net zero claim. Reputable standards such as those put forward through the Science-based Targets Initiative, ISO net zero guidelines or the UN Expert Group on net zero guidelines do not allow offsets to be used for interim carbon reduction targets. More specifically, the ISO guidelines elaborate a target of less than <5% of emissions (including scope 3 emissions) for net-zero targets by 2050 compared to 2020 emissions; in other words, offsets are only allowed for the very residual of emissions towards 2050 and after the absolute decarbonisation has been achieved. The way carbon offsets are portrayed as a strategy in this green paper is not compatible with these guidelines. For further information, see <sup>2</sup>.

Given the increasing urgency around climate change responses (particularly with the upcoming COP28, 30 November – 12 December 2023), there is a need to go further in commitments in this Chapter. There is a concern that the environmental requirements will make the White Paper quickly seem out-dated and that aviation in Australia will be slow to react to the climate challenge. It is good to see 'greenwashing' stated on page 84, which is a fear moving forward. Certainly there needs to be further investment in research and development to innovate and create market conditions for new and emerging technologies. This will minimise the risk and realise the opportunities for Australian aviation.

There is a need to deeply understand the science behind emissions and it is pleasing that non-CO<sub>2</sub> emissions (p. 78) and contrails (p. 82) are stated. There needs to be a concerted effort to understand these impacts more fully (also see the Aviation Reimagined session on Science and presentation by Prof. Lee, Manchester Metropolitan University) and to develop an Australian focused research base.

Surface transport flight alternatives to air travel, such as high-speed rail, are covered on page 76. It is acknowledged that Australia has not been able to develop high-speed rail historically, but on routes such as the J-curve and specifically the Sydney to Melbourne corridor, which is one of the most congested air routes globally, there should be a focus on the promotion of surface transport alternatives.

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<sup>2</sup> Becken, S. and Mackey, B. (2017). What role for offsetting aviation greenhouse gas emissions in a deep-cut carbon world? *Journal of Air Transport Management*, Vol. 63, pp. 71-83.  
<https://www.sciencedirect.com/science/article/pii/S0969699716302538>

The aviation industry needs to consider the growth ambitions and market mix for Australian aviation and explore ways of reducing aviation emissions before investing into alternative fuels such as SAF. Given the hard-to-abate nature of aviation, there will likely be pressure to avoid or reduce some air travel. Therefore, the value of aviation trips will have to be considered in the context of needs against alternative fuel availability. For example, battery and hydrogen electric is plausible only for short, regional trips.

In terms of hydrogen powered aviation (p. 87), clean hydrogen plays a crucial role in aviation decarbonisation, not only can it be used for direct combustion or used with fuel cells to power aircraft, but it is used in stages of standard jet fuel production, is used in SAF production pathways, and is a raw material in power-to-liquid fuels (synthetic fuels). The national hydrogen strategy recognises the opportunity for transportation and transitioning to net zero but does not recognise the critical role green hydrogen plays in the hard to abate sector of aviation. Achieving low-cost renewable generation of green hydrogen in Australia, at vast scale, in various forms including liquid hydrogen, is a necessity for decarbonising the aviation sector. Griffith University is a member of the Hydrogen Flight Alliance (HFA) which launched in June 2023 and is working collectively to create a collaborative environment to advance hydrogen electric flight in Australia.

Finally, from a national security there is a very strong military interest and applicability in the development of sustainable aviation fuels. With climate change formally designated as a national security issue in the 2023 Defence Strategic Review<sup>3</sup> (see Chapter 5), one of the key recommendations is ensuring a clean energy transition (which is also linked to the wider concerns for national energy resilience): “Defence should accelerate its transition to clean energy to increase our national resilience, with a plan to be presented to the Government by 2025” (p42).

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<sup>3</sup> Australian Government (2023). National Defence. Defence Strategic Review. Commonwealth of Australia.

## **Chapter 6. Airport development planning processes and consultation mechanisms**

Biodiversity and airport wildlife management are key components in the broader context of climate change mitigation and adaptation. They have been largely overlooked in the White Paper draft. With their expansive open spaces, airports have a unique opportunity to contribute to nature conservation and biodiversity preservation. By incorporating green spaces, wildlife habitats, and sustainable land use practices, airports can become critical players in biodiversity conservation. This approach enhances the natural environment and improves the quality of life for surrounding communities. Furthermore, well-managed airport ecosystems can serve as vital refuges for local wildlife, supporting species diversity and contributing to broader ecological networks. Airports across the country can, therefore, become significant participants in the emerging nature repair market. By adopting and implementing innovative wildlife management strategies, airports can mitigate their environmental impact and promote sustainability. These strategies include using non-invasive methods for wildlife control, creating habitats that support local flora and fauna, and integrating biodiversity considerations into airport planning and operations. Such initiatives position airports as leaders in environmental stewardship and demonstrate how aviation infrastructure can coexist harmoniously with natural ecosystems. The proactive engagement of airports in ecological conservation efforts not only aids in combating climate change but also sets a precedent for other industries to follow, driving broader societal shifts toward sustainability and environmental responsibility.

## **Chapter 7. General Aviation**

It is pleasing to see that General Aviation is covered, particularly around the opportunities of new technologies associated with decarbonisation and we look forward to the study of General Aviation sector to be completed shortly (late-2023). We also support the comment around the potential for Australia to be at the forefront of international General Aviation flight training (p. 122).

We would like to see more emphasis and support in terms of training and development for individuals coming into the aviation industry via General Aviation. Much of the financial burden for pilot training falls on the individual rather than industry due to the limited number of airline-based cadetships (as with some other roles within the industry albeit to a lesser extent). Through Griffith Aviation we have seen too many talented aviation students putting off or having to withdraw from pilot-training due to the costs, which when undertaken in conjunction with an undergraduate Bachelor degree exceed the Commonwealth Government combined HELP loan limit.

## **Chapter 9. Emerging aviation technology**

It is valuable to have a focus on Advanced Air Mobility opportunities, including drones, remotely piloted aviation systems/unmanned aircraft and eVTOL, and other associated rapidly emerging technologies. Two further points are relevant from a university perspective. Firstly, new higher education courses/programs and content for existing programs will be needed to meet the need of emerging technologies in aviation including electric and hydrogen-electric fixed wing aircraft, the transition to one-to-many UAVs. This should include the development of micro-credentials and short courses to enable industry to gain valuable insight into these new technologies as they are developed. Secondly, start-ups and innovators in emerging aviation technologies in Australia need access to government funding and support. Investors actively encourage a move to the US to enable access to non-dilutive funding sources, markets, and a regulatory environment that is being developed to actively support emerging technology roll out.

There should also be more coverage on the developments for fixed wing aircraft, in terms of new aircraft designs and new powertrain technologies. Electric, hydrogen-electric, hydrogen direct combustion and hybrid powertrain technologies and emerging new aircraft (fixed wing) deserve further attention. In addition, developments in terms of single pilot operations and the impact that this will have in on consumers, such as the flying public, should also be assessed.

## **Chapter 10. Future industry workforce**

Griffith Aviation educates and trains the future aviation industry workforce. We concur workforce capability is critical to a successful low carbon transition and across all parts of the industry. Finance is an issue (see comment under Chapter 7). Given aviation is an international industry, there is a need to promote and train domestically for the future aviation workforce. Where required though, there should be further international recruitment, including pathways through aviation units at universities, to help with some of these gaps.

An associated problem is that Australian citizens can be enticed overseas for aviation jobs. This was evidenced in the immediate period post-COVID when many Australian qualified pilots took jobs for US airlines, however the problem has emerged as a global issue. Therefore, pay and conditions for the aviation industry workforce in Australia need to be appropriate to retain and further develop skilled personnel.

At the same time, there also exists an industry pressure to transition to single pilot operations, and indeed pilotless aircraft, the impacts of this on pilots and the flying public need to be considered. For example, assessments of the impact that this will have on current pilots with respect to their motivation and job satisfaction needs to be considered. In addition, the impact of this change on the flying public needs to be considered, due to the impact that this may have on the profitability of Australian aviation. Universities can assist with assessing the risks and human factors impacts of these technologies to help with risk modelling.

The 2023 Defence Strategic Review<sup>4</sup> highlights significant workforce challenges for Defence (see Chapter 11). Griffith University's contribution to the future aviation industry workforce includes building Defence's aviation workforce and the education of Veterans. Griffith University is co-located in Southeast Queensland where significant portions of the Royal Australian Air Force and Army Aviation Command are located and Veterans retire from service<sup>5</sup>.

### Other comments

There is one mention of the Brisbane 2032 Olympics (p28), associated with new terminal development at Brisbane Airport. The 2032 Olympics, with a climate positive goal and potential eVTOL prototype opportunity, should be more prominent in the White Paper as a real opportunity for aviation in Australia to be a global showpiece.

We trust that this is the information you require. Feel free to get back to me if you have any questions or would like further clarification about any of the details presented in this submission. We wish you the very best with White Paper development.

Yours faithfully,



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<sup>4</sup> Australian Government (2023). National Defence. Defence Strategic Review. Commonwealth of Australia.

<sup>5</sup> Also see Griffith University's growing Veterans' Education Program: <https://www.griffith.edu.au/apply/veterans>