



Australian Government

AVIATION GREEN PAPER

TOWARDS 2050

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Minister's foreword

A safe, efficient, sustainable, productive and competitive aviation sector is critical to the economy and the standard of living of all Australians. This Aviation Green Paper is an important step in developing an Aviation White Paper that sets the policy direction for the aviation sector out to 2050.

The Australian Government wants an aviation sector that maintains Australia's world leading safety standards. That provides secure jobs now and into the future, especially as we lead the transition into net-zero aviation operations. A sector that supports our nation's way of life, particularly in our regions, connects families, friends and communities with each other and the world, links businesses to markets, and underpins industries that are vital to our economy. These aviation services need to be reliable, competitive and affordable, supported by a robust consumer rights framework.

The last few years have been a challenging time for the aviation sector. The COVID-19 pandemic resulted in the largest shock the aviation industry has ever experienced, grounding passenger flights around the world and causing mass disruptions for aviation freight networks. I am pleased to see the positive signs suggesting the sector is on the way to recovery, with passenger numbers bouncing back to near pre-COVID levels domestically and internationally. However, disruptions to airline operations have showed potential weaknesses in our regulation of aviation and the aviation workforce.

The next challenge is decarbonisation. Emissions reduction is a key priority for both the Australian Government and the Australian aviation sector. We have committed to net zero emissions by 2050 and have implemented new reforms to the Safeguard Mechanism requiring annual emissions reductions for Australia's largest emitters, including our largest airlines. The Australian Government is committed to supporting the new skills and innovation that will deliver these targets and underpin a sector that is strong and sustainable.

Now is the time to develop the policy settings that guide the continued recovery of the sector, strengthen consumer rights, support the transition to net zero and support our vital aviation workforce.

It has been over 10 years since the last Aviation White Paper was produced and the Australian Government recognises the need to bring an end to the uncertainty facing the aviation sector. An Aviation White Paper will enable long-term investment, and the maintenance and improvement of our internationally enviable safety record, and articulate clear commitments to consumers and communities affected by aviation activity.

I encourage interested stakeholders to carefully consider the Green Paper and provide feedback to the Australian Government as we develop the Aviation White Paper.

Catherine King

September 2023

Executive summary

Sector overview

Australian communities depend on aviation. Domestic and regional aviation are critical for domestic connectivity and for community access to a range of essential services. International aviation offers a vital connection between Australia and the rest of the world.

Aviation underpins our national and international supply chains, and enables our tourism, mining, construction, manufacturing and higher education sectors. The visitor economy is particularly dependent on aviation, along with high value, low volume freight.

Prior to COVID-19, the aviation sector directly contributed around \$20 billion to the Australian economy and employed around 90,000 people. Airlines, airports, regional aviation, General Aviation (GA) and ancillary services such as ground handling are all key components of the sector.

Global aviation has seen a period of significant growth since the last Aviation White Paper in 2009. This growth has been underpinned by a range of factors including the ongoing liberalisation of air services arrangements, the rise of low-cost carriers, and a growing middle class in key markets. China's growth particularly benefitted Australia's international aviation sector, as the dominant inbound market pre-COVID.

The domestic aviation sector has changed significantly since deregulation in the 1990s helped drive significant growth, as airlines offered a much wider range of air fares and services.

The COVID-19 pandemic was a historic crisis. Governments around the world acted to protect the industry, in recognition of its importance. In Australia, the industry is on the way to recovery, although recovery is not complete.

Australia's domestic aviation market has structurally changed post-COVID. Virgin Australia is pursuing a revised business model, the low-cost airline Bonza has launched services connecting regional hubs to holiday destinations and Regional Express has expanded beyond its regional footprint, bringing increased competition to capital city routes. The competitive dynamic varies considerably between routes, with some key routes, especially in the regions, having been unable to support genuine competition.

Released on 16 December 2009, the National Aviation Policy, *Flight Path to the Future*, outlined more than 100 policy initiatives. Since the release of the policy, over 90 per cent of the initiatives have been implemented, with the majority of the remaining initiatives partially implemented. The 2024 Aviation White Paper offers an opportunity to consider our policy and regulatory settings for the future, and to foster the growth and development of the sector out to 2050.

Likely future directions out to 2050

The aviation sector is continually evolving and responding to new challenges and opportunities at global, national and local levels. The Australian Government understands that delivering a long-term strategy in an era of disruption requires a strong understanding of likely changes on the horizon.

To inform policy development and engage stakeholders in discussions around the future of Australia's aviation sector, the Department commissioned analysis on the key drivers of change in the aviation sector to 2050. This work looked at drivers of change and future industry scenarios over the short- (to 2030), medium- (2030–2040) and long-term (2040–2050).

The potential changes in the sector and the actions that might be needed today to prepare the industry for long-term growth relate to:

- maximising aviation's contribution to achieving net zero carbon emissions
- emerging aviation technologies
- workforce skills and training requirements
- ensuring resilience to future shocks.

Airlines, airports and passengers – competition, consumer protection and disability access settings

A competitive, informed and appropriately regulated aviation sector helps support lower prices, better quality services, and more choices. Airports are natural monopolies, and incumbent airlines have market power due to high barriers to entry in the sector. The Australian Government maintains an important role in overseeing competition to ensure aviation industry participants do not misuse their market power.

Through the Aviation White Paper, the Government will seek to protect consumers from unfair trading practices, improve accessibility for consumers living with disability and promote competition in the airline sector while securing Australian jobs.

Alongside the White Paper process, issues around competition in key industries such as aviation will be considered by the Competition Taskforce in Treasury, which has been established in 2023 to identify where reforms can be made to Australia's competition settings.

A competitive airline sector

The Australian domestic aviation market is highly concentrated and the market is experiencing structural change which may impact the competitive dynamic in the future. With airlines no longer competing 'head to head' and focussing on market niches, the Australian Government recognises a reduction in competitive tension could adversely impact consumers and businesses that rely on aviation, potentially leading to higher prices and lower service outcomes.

The Australian Government is actively seeking outcomes that deliver a more competitive aviation sector, while at the same time securing Australian jobs and is interested in stakeholder views on options to improve competition and market outcomes in the sector.

Some stakeholders have suggested the Australian Government consider introducing greater cabotage rights for foreign airlines, allowing them to operate on domestic routes. The Australian Government considers the existing 'case-by-case' approach to cabotage likely remains appropriate. The Australian Government proposes to publish, in consultation with industry, a decision-making framework and guide for short term cabotage dispensations to provide clarity on existing arrangements and provide an administrative framework to manage any future decision to implement a longer-term arrangement.

Consumer protections

COVID-19 and the challenges of increasing capacity have contributed to a sharp rise in consumer complaints about airlines. Australians are concerned about increased flight cancellations and delays, which remain above long-term trends. Stakeholders have also raised concerns about the terms and conditions for refunds and travel credits for flights cancelled during the COVID-19 pandemic.

The Australian Government proposes to act to improve complaint handling processes and strengthen consumer protections in the airline sector. The Australian Government is interested in stakeholder views on options to improve the effectiveness of consumer protection arrangements.

The Australian Government is seeking views on revising the governance arrangements for the Airline Customer Advocate, including expanding its remit to educate customers on their legal entitlements, and working with industry to introduce 'fixed payout' type insurance products which provide more certain compensation arrangements. The Australian Government is also seeking to understand whether options pursued in other jurisdictions – such as a Customer Rights Charter or a stronger ombudsman model – would deliver benefits to Australia's aviation sector.

Disability access

The Australian Government is committed to removing barriers to enable people with disability to exercise full choice and control over their lives, including accessing air travel.

Air travel is a heavily regulated form of transport, with specific safety and security requirements that can create additional challenges for passengers living with disabilities. Whilst the Disability Standards for Accessible Public Transport 2002 (Transport Standards) articulate specific responsibilities to remove discrimination from aviation services, people living with disability continue to encounter barriers when traveling by air.

The Australian Government expects the aviation sector to make substantial additional and ongoing investments to make services accessible and legally compliant with human rights obligations, including in relation to staff training, carriage of assistance animals and mobility aids, standardisation of processes for carrying lithium-ion wheelchair batteries on aircraft, complaints processes and provision of more accessible formats of communication and information dissemination.

The Australian Government seeks views on further improvements that can be made to the Transport Standards to accommodate air travel's unique requirements, improvements beyond the Transport Standards to improve aviation accessibility, specific challenges of people living with disability when travelling by air in regional and remote areas and how the Disability Access Facilitation Plans put in place by airlines and airports can be improved.

Economic regulation of Australian airports

Under the Commonwealth's long-term policy of 'light-touch' economic regulation of airports, investment at airports around Australia has increased over the previous decades. Within the framework of 'light-touch' regulation, each year the Australian Competition and Consumer Commission (ACCC) releases a report on its monitoring of airports. The ACCC is also active in investigating allegations of anti-competitive behaviour in the aviation sector and ensuring commercial relationships support competitive outcomes. In addition to ACCC monitoring, the Productivity Commission (PC) conducts periodic reviews into the economic regulation of airports. The Bureau of Infrastructure and Transport Research Economics (BITRE) also monitors domestic airfare prices and ontime performance and reports monthly on the outcomes. But there are indications our regulation is not delivering the best outcomes for consumers.

Airports and airlines negotiate commercially to agree aeronautical charges, such as movement charges and terminal usage fees. Both airports and large airlines have a high degree of market power and these negotiations can be intense and protracted, although the relative negotiating power of an airline and an airport varies in different locations. Negotiations occur within a framework of non-binding Aeronautical Pricing Principles established by the Australian Government in the early 2000s. The Australian Government considers that it may be worthwhile to review the Aeronautical Pricing Principles and how their implementation could be improved. The Australian Government seeks views on whether the aeronautical pricing principles are fit-for-purpose.

Stakeholders have noted difficulty accessing slots at airports has the potential to constrain competition in the aviation market, with some raising concerns about “slot hoarding” by some airlines. A number of Australian airports are slot-constrained, particularly during peak periods, presenting a further barrier for new entrants seeking to join the market, as well as limiting the expansion of some existing operators.

The Australian Government is interested in ensuring that Australian airports maximise their efficiency and deliver competitive outcomes. Australian airports operate within a global environment, they rely on the Worldwide Airport Slot Guidelines (WASG) as the foundation of the global slot coordination process. While most airports operate in accordance with the latest WASG, slot rules for Sydney Airport are part of the Sydney Airport Slot Management Scheme 2013, which has not kept pace with global developments.

The Australian Government is considering the recommendations from the Review of the Sydney Airport Demand Management Scheme, an independent review prepared by Mr. Peter Harris AO. The Government has recently concluded targeted consultation regarding potential changes to the Scheme, with a particular eye to modernising the slot allocation framework and strengthening compliance measures to ensure that slots are not being misused by airlines. We will have more announcements to make about these reforms in due course. The Government is also opening the Western Sydney International (Nancy-Bird Walton) Airport, which will increase airport capacity in the Sydney basin.

Regional and remote aviation services

Aviation contributes strongly to regional development, playing an important role servicing the needs of regional and remote communities. This includes access to a range of essential services such as health care and education. Aviation also helps address many Closing the Gap targets. Access to affordable air services are a key contributor to the liveability of regional Australia and it is essential that regional services remain viable.

There are a range of entities with responsibility for regulating regional air services, with responsibility for aircraft and air services shared between the Australian and state and territory governments. The Australian Government’s primary consideration in relation to aviation is the safety and security of air services and many elements of this policy and regulatory framework have implications for regional Australia and the regional aviation industry.

Assistance for regional airports has traditionally been provided by state and territory governments, with many operating grants schemes to finance upgrade works. In recent years, the Australian Government, as part of broader regional program funding has also provided some funding for particular regional airport upgrades.

The Australian Government recognises that now and over coming years, it will be critical to leverage the economic shifts underway across the world for the benefit of Australia’s regions, embracing and supporting productive and inclusive change, including the transformation to a net zero economy. Developments to support decarbonisation of aviation, including bioenergy feedstock production, and green hydrogen, have the potential to support regional economies and create jobs.

Over the long-term, it is possible that Advanced Air Mobility (AAM)¹ services will improve regional air connectivity and enable new point-to-point networks and on-demand air services for short air routes.

The characteristics of regional aviation present unique challenges for the sector to meet net zero targets. The adoption of electric and hydrogen fixed-wing aircraft may provide the regional aviation sector with a mechanism to achieve decarbonisation.

The vulnerability of Australia's airports to the impacts of a changing climate is an increasingly important issue. The capability of airport operators to assess climate risks and develop adaptation strategies varies. Regional council airport owners may lack sufficient resources to respond.

The Australian Government is seeking views on issues which are raised by the specific circumstances of the regional and remote aviation sector in the context of decarbonisation. The Australian Government is also seeking views on the challenges to the resilience of regional and remote aviation and airports posed by our changing climate.

Maximising aviation's contribution to net zero

The Australian Government has adopted emissions reduction targets of 43 per cent below 2005 levels by 2030 and net zero emissions by 2050. The Australian Government has established the Australian Jet Zero Council which brings together a cross-section of senior stakeholders from across the aviation industry and its supply chains to work with the sector to help inform the design of policy settings to encourage emissions reduction.

Opportunities and challenges in decarbonising aviation

Aviation is a 'hard to abate' sector in the global push to reach net zero. 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).

The Australian Government affirms all emitters in the aviation industry will need to contribute to net zero commitments – not just airlines.

To guide the transport sector's transition to net zero, the Australian Government will lead development of a Transport and Infrastructure Net Zero Roadmap. The Roadmap will coordinate our future emissions reduction efforts and accelerate decarbonisation across the transport and transport infrastructure sectors, including the aviation industry. It will offer policy clarity to support investment decisions in the decarbonisation of assets and fleets. In July 2023, the Australian Government announced the development of government-guided sectoral plans to support Australia's Net Zero 2050 plan. The Roadmap will form the Australian Government's sectoral emissions reduction plan for transport. The development of the Roadmap will support consideration of proposals to be considered in the Aviation White Paper.

The Australian Government is determined to work with industry to ensure a strong and sustainable aviation sector that supports emissions reduction targets on the path to net zero by 2050, while growing jobs and innovation. Australian Government is seeking industry views on options to achieve this.

¹ *International Civil Aviation Organization (2002), ICAO Advanced Air Mobility Advisory Group Working Paper.*

Sustainable aviation fuel

SAF provides one of the main levers to reduce aviation emissions in the immediate and longer term. However, SAF costs significantly more to produce than conventional jet fuel and demand far exceeds supply, further increasing price. Australia's lack of refining capacity limits opportunities to leverage feedstock advantages.

During consultations on the Aviation White Paper Terms of Reference, and at roundtable discussions on the design and establishment of the Australian Jet Zero Council, stakeholders raised a number of ideas for further supporting the push to net zero through the establishment of a domestic SAF industry including building social licence for SAF, building confidence in SAF integrity, exploring more flexible accounting arrangements to better recognise sustainable aviation fuel use, creating demand through government procurement, reviewing fuel excise arrangements, industry partnerships, and mandates, targets or low-carbon fuel subsidies.

The Jet Zero Council will provide a forum to help drive and coordinate investigation of possible measures to establish the 'building blocks' of a supportive regulatory and social environment.

Under the reformed Safeguard Mechanism, the emissions limits (or 'baselines') for Australia's largest airlines will reduce by 4.9 per cent per annum, creating demand for abatement options such as SAF, fleet renewal and the use of high-quality offsets. The Australian Government is seeking views on measures industry and government should consider to promote SAF uptake, and the current and future challenges in developing an Australian SAF production industry.

Electric and hydrogen powered aviation

Hydrogen powered aircraft are promising technologies, but unlikely to enter widespread deployment until earliest 2035, with 2040–2050 more likely. Electric powered aircraft technology is more advanced, with some manufacturers targeting 10+ seat capacity before 2030.² Broader deployment of electric powered aircraft is expected in the 2030s, subject to fleet renewal decisions.

A range of barriers need to be overcome to support the development and widespread adoption of these technologies. These include long fleet turnover times, large airport capital investment requirements, uncertain total ownership costs, as well as the successful development of technologies able to operate on a commercially viable scale, powering services on medium and long range routes and carrying larger passenger and freight quantities.

The Australian Government identifies these technologies as an opportunity to support decarbonisation of general and regional aviation in particular.

With uncertainty about viability and timeframes, further investigation and deployment of policy and regulatory options will be needed as the technologies mature to give industry certainty and ensure safety outcomes.

The Australian Government is seeking views on policy and regulatory settings to support research, development and subsequent investment in emerging low and zero emission technologies and the information and guidance needed to support regional aviation's net zero transition.

² L.E.K. Consulting (2023), *Aviation White Paper Scenario Analysis of the Future of Australian Aviation Final Report*, report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

Airport development planning processes and consultation mechanisms

Aviation is integral to Australia's economic and social landscape. However, aviation operations also generate a range of impacts on communities. Governments, planners, regulators, airports, airlines and air service providers all have a role to play in engaging with the communities impacted by their activities.

Noise

Airservices Australia's approach to aircraft noise management reflects the International Civil Aviation Organization's (ICAO) *Balanced Approach to Aircraft Noise Management*.

The best tool to manage aircraft noise is through effective land-use planning. The National Airport Safeguarding Framework (NASF) provides guidance on mitigating aircraft noise. Implementation of NASF is ongoing but inconsistent across jurisdictions.

There can be a long period of time between statutory approvals of new airports or runways, and those airports or runways becoming operational. This makes land use planning around the airport in the intervening years critical to managing the impact on the community.

The Australian Noise Exposure Forecast (ANEF) system has been a tool to guide land-use planning surrounding airports for almost 40 years. It is becoming increasingly recognised that relying solely on ANEF contours is insufficient for portraying noise and its impact. Stakeholder views are sought on options to improve noise metrics.

The Australian Government is also involved when airports propose a new flight path and airspace design when there is a significant project or major changes to flight paths and airspace around an airport, through the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Environment Impact Assessment process and the roles of the Civil Aviation Safety Authority (CASA) and Airservices Australia. The Australian Government is seeking views on how these processes could be improved.

The Australian Government is not considering imposing any additional constraints on airports such as curfews or movement caps.

Airport community consultation mechanisms

Airports conduct ongoing engagement on a range of issues, giving the community a level of involvement in planning for all new projects, aviation and non-aviation. Engagement on major new aeronautical infrastructure such as new runways is generally far more extensive, commencing from the early concept development. Non-aviation development such as construction of shopping precincts often generates more limited community impacts, potentially suggesting different levels of community consultation may be needed for different kinds of developments.

Under *the Airports Act 1996* (Cth), the Australian Government requires airports to develop a Master Plan to establish the strategic direction for efficient and economic development at airports and indicate to the public the intended use of the airport site. The Australian Government additionally requires an airport to develop a Major Development Plan for specific major developments at airports (new runways, works above a monetary threshold, works with significant stakeholder or environmental impacts). There may be opportunities to improve this regulatory framework to promote productivity, investment, efficiency and sustainability. The Australian Government is seeking stakeholder views on the ways in which this framework may be able to be improved to facilitate efficient planning and development while preventing environmental harm and ensuring continued access for aviation users.

Examples of areas for improvement may include consideration of flow on impacts of on-airport development for surrounding off-airport infrastructure; consideration of the climate resilience and emissions impacts of proposed developments and strengthening the requirements for community consultation around developments. It may also be possible to streamline regulation to promote efficiency by lifting the monetary threshold at which a Major Development Plan is required as well as aligning environmental and other regulation on airport with that off airport.

The historical use of per and poly-fluoroalkyl substances (PFAS) in firefighting foams and large industrial sites is a significant issue for the aviation sector. The Australian Government has committed \$130.5 million to investigate PFAS contamination at Australian airports where the Australian Government previously used PFAS-containing foam in firefighting activities.

Airports and other industry believe there is little integration of freight operations between airports and off-airport freight networks. Embedding outcomes and actions from the National Freight and Supply Chain Strategy and its National Action Plan and improving airfreight data may help improve coordination of freight movements on and off airports.

Activity is underway to remake the Airports (Environment Protection) Regulations, which are due to sunset in April 2025. This process is providing stakeholders with the opportunity to comment on the effectiveness of existing environment regulatory frameworks, and to implement the Australian Government's response to the review of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) conducted by Professor Graeme Samuel in December 2022.

First Nations peoples have unique cultural interests regarding impacts to Country and sky. The Australian Government considers there may be better ways of working together with First Nations peoples, from concept to implementation, to ensure a greater understanding of the impacts of design and delivery choices relating to aviation policies and regulations.

General Aviation

General Aviation (GA) is a diverse and evolving sector that plays a variety of important roles including servicing regional communities, delivering education and health services, regional freight and transport, tourism, recreation, agricultural mustering and spraying, instructional flying, sport and pleasure flying, and emergency services.

There are emerging growth opportunities for Australia's GA sector. Remotely piloted aircraft systems (RPAS), or drones as they are referred to in this document, are an increasingly important part of the GA landscape, being used for agriculture, surveillance, search and rescue, disaster relief, media and construction. An expanded flight training industry presents significant growth potential for the GA sector.

Piston engine aircraft, typically used in GA, cannot currently use SAF to reduce emissions. Emerging propulsion technologies such as electric batteries are likely to be a key part of the transition of the GA sector to net zero and unlocking new benefits for GA.

BITRE is currently undertaking a study of the GA sector that is due to be completed in late-2023. The study will provide an overview of GA's contribution to Australia's economy.

Quantifying the value of the GA industry and its constituent sub-sectors will assist all stakeholders to understand the long-term drivers of economic activity in the GA sector, and help inform policy and regulation to support GA's growth.

The Australian Government is seeking views on whether policy and regulatory settings adequately facilitate the GA sector's evolving role in Australian aviation, including through protections at GA airports, as well as supporting the transition to a sustainable, net zero GA sector.

Fit for purpose agencies and regulations

Role of government and agencies

The role of government is to ensure safety, security, reliability and efficiency in the aviation system, which is unlikely to be effectively delivered by the market. For the Australian Government, it is also informed by its constitutional responsibilities and its interest in matters of national significance.

The core focus of the Australian Government is safety, security and environmental sustainability; ensuring markets operate efficiently and provide critical connectivity; and providing the leadership industry needs to innovate.

These activities are undertaken by departments and agencies with specialist knowledge and expertise across numerous portfolios.

The Australian Government considers existing government roles and arrangements appropriate and well adapted. However, roles and responsibilities need to evolve to respond to new challenges, new policy priorities, and changes in the industry.

Reaching net zero by 2050, for example, will require increased collaboration and a concerted effort across portfolios.

The Australian Government notes CASA is already required to consider economic and cost impacts, along with different risks associated with different sub-sectors, when developing regulations. The Australian Government is not proposing a change to the Australian Transport Safety Bureau's (ATSB) risk-based approach to investigation. The Australian Government's view is the approach to security regulation and the remit and frameworks of the Department of Home Affairs are appropriate to manage risks to aviation security, and are sufficiently robust to evolve to respond to new threats and new aviation technologies.

Safety regulation

CASA is reviewing its processes and approach to regulation with a view to implementing risk-based and outcomes-focussed regulation wherever possible, while avoiding prescriptive approaches and ensuring safety remains paramount.

Key elements of this process include the General Aviation Workplan³ and the Aviation Safety Advisory Panel (ASAP). The Australian Government is working towards mutual recognition of aviation regulation with foreign aeronautical authorities.

The Australian Government will closely monitor the outcome of current reform processes and expects these to be fully evaluated to determine their outcomes for key stakeholders and different aviation sectors. Industry is invited to provide suggestions to improve current reform processes.

3 Civil Aviation Safety Authority (n.d.), *General Aviation Workplan*, Civil Aviation Safety Authority website.

Airspace regulation and management

While Australia's airspace management is effective, there are potential productivity benefits associated with Satellite-Based Augmentation System (SBAS), Automatic Dependent Surveillance – Broadcast (ADS-B) and OneSKY, an Airservices Australia and Department of Defence Partnership to replace existing air traffic management systems with an advanced and integrated system. The Australian Government is seeking views on whether a mandate for ADS-B OUT should be required over the medium term to manage increasing airspace congestion.

The Australian Government is committed to providing long term leadership on airspace policy and regulation as aviation technologies evolve over the next 30 years, to ensure arrangements remain outcomes-focused, adaptable and flexible.

Agency funding and cost recovery approaches

The Australian Government is reviewing funding arrangements for CASA to ensure its activities are commensurate with safety risks and to identify sustainable and long-term funding models. The review will consider a range of matters, including issues associated with the aviation fuel excise, and cost recovery for drone regulation. The review also includes funding arrangements for the ATSB.

Planning is underway for the implementation of new services for drones and other emerging aviation technologies. As these services become available, new sources of revenue and charging models will need to be implemented to recover the costs of these services and the cost of establishing the supporting infrastructure. The initial costs of developing the physical and digital infrastructure to support these services is likely to be significant, and will need to support infrastructure for surveillance, safety assessments and safety promotion.

The departments and agencies that provide critical border security for aviation are largely funded through budget appropriations. Home Affairs collects the Passenger Movement Charge (PMC) which goes into consolidated revenue. The PMC was increased in the 2023–24 Budget.

'All hazards' regulatory approach

In the past, security legislation has primarily focused on 'unlawful interference to aviation' – the threat of people intending to harm aviation activities and general physical threats. However, in order to ensure our aviation systems are secure, it is appropriate to consider a wider range of threats, including espionage, foreign interference, cyber security attacks and climate change. This is the 'all hazards' approach.

The Australian Government is seeking to ensure the aviation sector, which comprises critical infrastructure entities, manages all hazard security risks, with a particular focus on cyber security risk, in line with the *Security of Critical Infrastructure Act 2018*.

The Australian Government will not be changing regional GA Aviation Security Identification Card (ASIC) requirements.

Security screening

The Australian Government is committed to ensuring security regulations are proportionate to threats and risks, to ensure the ongoing security of Australian aviation. It has been a longstanding policy that industry is responsible for the cost of security screening, including operating costs such as the employment and training of screening officers. In most cases, airport operators charge airlines for the cost of security screening through commercial arrangements. The Australian Government does not play a role in negotiating commercial arrangements between airports and airlines.

The Australian Government's risk-based airport categorisation model classifies airports into different tiers based on overall risk profile. This includes consideration of departing passenger numbers, aircraft size, individual airport operating environment and regional profiles.

Passenger facilitation

Aviation is critical to enhancing one of our significant national assets – the border. The border enables economic prosperity while keeping our community safe and is central to our national security, international competitiveness and economic resilience. Australian international airports, airlines and the aviation sector more broadly are key stakeholders in successfully managing and modernising our border to increase ongoing economic and security benefits for all Australians.

New technologies have the potential to support improved passenger facilitation at the border. While much of this technology is available in test environments, its practical application to thousands of passengers is more likely in the medium- to long-term. Australia's approach to facilitation is generally consistent with international standards and Australia participates actively in the ICAO Council and Facilitation Panel consideration of updates to these standards and recommended practices.

Modernised passenger facilitation arrangements will require collaboration across a range of Australian Government agencies and with airports and airlines. Close collaboration among international governments will also be necessary, with governments working closely through ICAO to settle details and standards for new arrangements as appropriate.

The Australian Government seeks views on specific initiatives that should be supported globally and regionally to continue improvement in international passenger facilitation.

Air cargo facilitation

Under the Australian Government's Simplified Trade System agenda, the Australian Border Force (ABF), in consultation with the Department of Agriculture, Fisheries and Forestry (DAFF), is proposing to re-engineer its cargo intervention model. This will improve the scalability, adaptability and security of intervention activities at Australia's high-volume airports, supporting faster facilitation of legitimate cargo and more secure supply chains.

Emerging aviation technologies: a leadership role for Australia

Emerging aviation technologies are expected to transform the aviation sector, although timing and pace of deployment is not certain. It is essential policy and regulatory settings are right to encourage adoption in Australia, and to exploit opportunities for Australian workers and economic growth.

Australia is positioning itself to be a leader in the uptake and development of emerging aviation technologies.

In Australia, drones are projected to deliver a \$14.5 billion benefit to Gross Domestic Product (GDP) and create 10,000 jobs over the next 20 years. The Australian Government is working towards reaching a target of 1.2 million tech-related jobs in Australia by 2030.⁴

⁴ E Husic, *Mapping out Australia's path to tech jobs future* [media release], Australian Government, 2 August 2022.

More broadly, emerging technology will primarily be electric battery powered, offering emissions reductions opportunities.

Australia could be a leader in emerging technology

Australia's aircraft manufacturing industry includes businesses focussed on commercial and military aircraft and parts; design and systems engineering; maintenance, repair and overhaul (MRO) services for airlines and manufacturers; and related training and research and development (R&D). The aircraft manufacturing and repair services industry was worth \$861 million to Australia's GDP in 2020-21, down from \$1.5 billion prior to the pandemic.⁵ Around 600 Australian companies participate in aerospace manufacturing through global supply chains.

Australia's aviation manufacturing industry has a reputation for high levels of safety and innovation.⁶ The nation is well positioned to take advantage of new aviation technologies and provide leadership in the development and manufacture of specialised, high-value added aviation technologies. While Australia's emerging aviation manufacturing market is relatively small, and labour costs are relatively high on a global scale, a range of metrics highlight Australia's competitive position.⁷

Emerging technologies will lead to significant changes in Australian airspace

Projections suggest that emerging technologies could see aircraft movements increase from 3 million per year to 8 or 9 million per year. This would lead to a significant change in the way Australian airspace is managed, as well as noise and amenity impacts felt by communities.

Work commissioned by the Department highlights the potential for crewed AAM to have entered service by 2030 and for public acceptance and use of the technology to grow rapidly through the 2030s (although the trajectory of the sector is difficult to predict).⁸

Careful consideration and planning will need to be implemented to ensure that social license is maintained for emerging technologies and to limit negative impacts on communities on the ground.

Enabling the manufacture and uptake of emerging technologies

The Australian Government is committed to growing our local aircraft manufacturing capabilities through support for the emerging aviation technology part of the manufacturing sector, and by facilitating growth in the emerging aviation technology market.

The Australian Government is already investing in emerging technology through programs including Maker Projects: Community STEM Engagement Grants, Cooperative Research Centres Projects and the Emerging Aviation Technology Partnerships Program. Once established, the \$15 billion National Reconstruction Fund (NRF) will be available to provide investment support to help create secure, well-paid jobs, future prosperity, and drive sustainable economic growth.

It will be important to identify the skills and training likely to be most critical as the sector evolves, and how the training system could be more responsive to need. Both industry and government have a role in identifying potential skills gaps and appropriate measures in response.

⁵ Australian Bureau of Statistics (2023), *Australian Industry*, Australian Bureau of Statistics website.

⁶ KPMG (2019), *Australia's aerospace industry capability*, report to the Department of Industry, Science and Resources, KPMG.

⁷ Department of Commerce (2022), *Australia – Country Commercial Guide*, International Trade Administration website.

⁸ L.E.K. Consulting (2023), *Aviation White Paper Scenario Analysis of the Future of Australian Aviation Final Report*, report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

The Australian Government is seeking views on how it can create an environment that fosters private investment in emerging aviation technologies along with the skills needed for the emerging aviation technology workforce.

Australia was an early adopter of drone regulation and our safety regulatory system for emerging aviation technology is well advanced. For example, Australia introduced legislation to govern the operation of drones as early as 2002. CASA continues to adjust the regulatory approach to ensure it is forward-focused and proportionate to risk.

Where possible, mutual recognition and international alignment of safety regulation can also foster sector growth.

The Australian Government has a role to play in providing coordination and leadership to all tiers of government to allow for the development and implementation of supporting infrastructure for emerging aviation technology.

Managing the introduction of drones and AAM and promoting further growth of this sector will require a greater level of intergovernmental coordination on aviation matters than has previously been the case. The Australian Government is seeking views on the regulatory roles stakeholders see as critical for the Australian Government to lead to enable advantages of new technologies while managing risks and how priorities of government agencies will evolve as uptake of emerging aviation technologies continues.

New aircraft technologies such as drones and AAM are expected to increase the volume and complexity of aviation activity. The Australian Government is leading the development of an Uncrewed Aircraft System Traffic Management (UTM) ecosystem through the establishment of an UTM Industry Working Group under the National Emerging Aviation Technologies Consultative Committee. Industry views on how an open commercial and competitive UTM market could operate would be welcome.

Security risks also need to be managed. Drones, AAM, and their supporting infrastructure can provide opportunities to threaten people and infrastructure – either by operators with ill-intent, or via a cyber-attack. Work is underway between Commonwealth, state and territory agencies on rules to manage a range of security and enforcement issues.

New aviation technologies will use airspace in very different ways to conventional aviation, especially in urban areas. There will be implications for both noise and privacy and need for airspace regulation to consider these in a manner that has not been needed in the regulation of traditional aircraft. If advanced technologies are to attain community acceptance, building social license will be essential.

The Australian Government will continue to encourage industry to engage with the broader community in order to limit negative impacts, help the community appreciate the benefits of new aviation technologies, and to build community support.

Future industry workforce

In Australia, approximately one-third of the aviation workforce left the sector during the pandemic. When restrictions began to lift and demand returned, the sector struggled to rebuild the workforce in a timely way. Growth over the coming decades is expected to drive demand for aviation skills at unprecedented levels.

Current challenges and outlook

Australian aviation is struggling to attract a range of personnel including pilots and aircraft engineers. Industry is responding by establishing training schools and programs.

In the long-term, new technologies may change skills requirements for the aviation sector. These skills will be necessary to respond to developments in net zero technologies, future fuels, automation and more advanced digitisation.

The Australian Government has established Jobs and Skills Australia (JSA) to provide independent advice on current, emerging, and future workforce, skills, and training needs.

The Australian Government is seeking views on opportunities to work with industry to help workers develop the skills necessary for emerging technologies and transition to net zero.

Addressing regulatory and cultural barriers

The Australian Government considers there may be opportunities to work with industry to help position aviation as an employer of choice.

The Australian Government seeks to encourage the sector to lead efforts to deliver improved representation of women in its workforce, including embedding cultural change in the sector. The Australian Government also notes there are opportunities for greater inclusion of First Nations people.

The Australian Government is committed to improving job security, getting wages moving and creating a fairer workplace relations system for all people working in Australia. The Australian Government has implemented legislative reforms to improve job security and pay equity, improve conditions and protections, and promote gender equality and fairness in our workplace relations system. The Australian Government is working to implement further reforms including to prevent bargained wages from being undercut by the use of labour hire arrangements. The Australian Government has also consulted on other reforms to improve workplace relations and work health and safety laws. This includes reforms to empower the Fair Work Commission to set minimum standards for workers in 'employee-like' forms of work, and to criminalise wage theft.

Improving aviation skills pathways will complement the forthcoming Employment White Paper, expected to be released by the end of September 2023.

There is a possibility to make Australian aviation training an export opportunity by expanding mutual recognition with foreign authorities through bilateral agreements, also increasing domestic supply of skilled pilots.

International aviation

Over the last 30 years, Australia has been at the forefront of international market deregulation and liberalisation. This approach has delivered more flights, lower prices and more innovation, and has helped facilitate substantial growth for our visitor economy.

Australia is significantly involved in helping to shape the international aviation regulatory framework through our active participation in the ICAO, and helping to promote improved safety, security, sustainability and connectivity outcomes in the Asia-Pacific region including through capacity and capability building programs and assistance.

Bilateral settings

The Australian Government negotiates bilaterally with foreign governments to agree access rights for international airlines. Through these negotiations, the Government seeks to advance Australia's national interest, including providing further opportunities for Australia's aviation, tourism and trade industries and providing connectivity and competition benefits for passengers.

The policy of successive governments has been to negotiate bilateral agreements that provide 'capacity ahead of demand' and balance our national interests. In a number of cases, Australia has secured an 'open-skies' style agreement with major aviation markets, which removes restrictions on flights.

The Government considers that the current approach to bilateral air services negotiations appears well adapted to supporting the national interest, but seeks stakeholder views on opportunities to improve the approach to international negotiations.

Foreign investment in Australian international airlines

There is little evidence to support changes to existing arrangements, noting the current foreign investment framework applying to Australian international airlines does not appear to be impeding Australian international airlines from accessing capital.

Aviation international engagement

Since the ICAO's inception in the 1940s, Australia has demonstrated strong commitment and leadership in the international civil aviation sector, working collaboratively globally, with our regional neighbours and industry on standards and recommended practices, guidance and advisory material.

It remains strategically important for Australia to maintain our active participation and leadership through ICAO fora. Australia has maintained a strong record of aviation leadership and is well regarded as a global leader that provides important, valued, and high-quality assistance to regional partners.

Australia also actively participates in the Asia-Pacific region where air travel is vital to economic development and social connectivity, working closely with our neighbours to provide aviation capacity and capability building assistance.

The Australian Government is focusing on opportunities to enhance its longer-term aviation support in the Pacific, including enhancing regional safety, connectivity and sustainability outcomes.

International airport designation and development

A sustainable network of international airports provides access to international tourism and trade markets for our major capital and regional cities and surrounding communities. Border agencies face increasing resourcing pressures to continue to provide services at all designated international airports.

The Australian Government is currently considering its policy approach in relation to the status of Western Sydney International Airport (WSI) for future bilateral air services negotiations.

Both countries under our bilateral air services agreements will need to agree on WSI's status where there are particular restrictions on available capacity under those agreements.

Overview of priorities for the Aviation White Paper

The White Paper will set out the Australian Government's policy agenda for the aviation sector out to 2050 to set the foundations for the Australian aviation sector we want – the safest aviation sector in the world, supporting an Australia open to the world, providing reliable services to passengers, including regional communities, protecting consumers and leading the transition to net zero. Many of our policy settings are already geared towards delivering these outcomes.

The Australian Government is now indicating its consideration of the following new key policy approaches and is seeking your views on these. While these policy approaches are not settled and will not be comprehensive of all outcomes of the White Paper process, we are providing these now to encourage feedback and create discussion.

Improving productivity and protecting consumers

In response to our concentrated market, the Australian Government will take action to deliver better outcomes for competition and consumers. The Australian Government is seeking stakeholder views on what should be included in a **Customer Rights Charter** for the aviation industry, as well as how the **Airline Consumer Advocate's role** could be strengthened to improve outcomes for consumers.

People living with disability experience challenges accessing air transport. To facilitate better access, the Australian Government is seeking views on an aviation-specific Disability Standard for Accessible Public Transport.

To position governments to respond to concerns about the ability of Australians living in regional areas to access appropriate reliable and affordable air services, the Government is considering the 2019 recommendation of the Senate Rural and Regional Affairs and Transport References Committee,⁹ that the Government direct the **Productivity Commission to undertake a standalone, public inquiry into the determinants of domestic airfares on routes to and between regional centres in Australia.**

Building on its commitment to First Nations Australians and Closing the Gap and consistent with the Regional Investment Framework announced in the 2023–24 Budget, the Australian Government intends to **continue providing targeted support for regional and remote aviation** through programs such as the Regional Aviation Access Program, complementing the schemes state and territory governments have in place to support airports and airlines within their jurisdiction.

⁸ Senate Rural and Regional Affairs and Transport References Committee (2019) *Operation, regulation and funding of air route service delivery to rural, regional and remote communities*, Commonwealth of Australia.

To improve the competitiveness and efficiency of the aviation sector, the Australian Government intends to **update and publish the Aeronautical Pricing Principles**, following consideration of whether the Aeronautical Pricing Principles remain fit-for-purpose. The Australian Government is considering mandating the Aeronautical Pricing Principles.

To improve the efficiency of the regulation of planning at leased federal airports, the Australian Government proposes to **lift the monetary threshold** for the requirement for an airport to undertake a Major Development Plan to \$50 million, as well as considering other, potentially more appropriate triggers for Major Development Plans.

To improve the management of noise complaints, the Australian Government is considering **increasing the independence of the Aircraft Noise Ombudsman**.

To improve information about aircraft noise available to the community, the Australian Government proposes to modernise aircraft noise measurement metrics for airspace and flight path changes, including the presentation of information in planning documentation such as leased federal airport (LFA) Master Plans and Major Development Plans (MDPs), and land-use planning at other airports, as well as improving community consultation requirements.

Reducing aviation emissions

The Australian Government has **established the Jet Zero Council to galvanise industry action** to reduce aviation emissions, as well as to provide industry views to government on policy approaches to reduce aviation emissions.

The Australian Government proposes to, in the White Paper, commit to **establish the 'building blocks' of the regulatory and social environment needed to develop an Australian sustainable aviation fuel (SAF) market** and build confidence for investment in the next generation of biorefineries – including through:

- robust certification arrangements to provide assurance of SAF environmental and safety credentials
- building industry literacy and social licence
- ensuring the benefits of SAF use can be accounted for, either through existing reporting mechanisms like the National Greenhouse and Energy Reporting (NGER) scheme or other arrangements.

The Australian Government is preparing a sector plan for the decarbonisation of transport, the **Transport and Infrastructure Net Zero Roadmap and Action Plan**. Stakeholder input is sought on what should be included in the plan for the aviation sector, including general aviation and airports – recognising all emitters need to play a role.

Emerging aviation technologies

To support the future aviation sector, and identify what additional training will be required to meet these needs, the Australian Government intends to undertake **analysis of the skills required of the workforce of the future**. This includes the future skills and workforce needs to support transition to the net zero economy (including future fuels).

The Australian Government will continue to pursue a national framework to manage the growth of emerging aviation technologies, and allow for collaboration and coordination across all levels of government on the development, management and enforcement of rules related to drones across jurisdictions.

Fit-for-purpose agencies and regulations

To better protect the community from incompatible developments around airports, the Australian Government plans to work with other levels of government to **strengthen the adoption and application of the National Airport Safeguarding Framework** in state and territory government planning frameworks.

The Australian Government is reviewing the funding arrangements for the Civil Aviation Safety Authority and Australian Transport Safety Bureau to **ensure the agencies are fit for purpose** and support a productive aviation sector and maintain Australia's high safety standards.

The Australian Government is considering changes to **the Framework for designating international airports** and associated resourcing issues.

Next steps

The Australian Government invites comments on the Green Paper to be considered in the development of the White Paper. Comment is sought in particular in response to the questions posed throughout the Green Paper, and summarised in Appendix A – Summary of questions.

Submissions on the Green Paper are now open and can be made by visiting the Department's 'Have Your Say' page on our website.

Submissions may also be provided by mail to:

Director, Aviation White Paper Project Office

Aviation White Paper

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

GPO Box 594

Canberra ACT 2601

or by emailing aviationgreenpaper@infrastructure.gov.au.

We are seeking your views by Thursday 30 November 2023.

In addition, the Australian Government will engage with stakeholders through a series of roundtable sessions in October and November 2023. You can register to receive updates on the public consultation events by emailing aviationgreenpaper@infrastructure.gov.au.

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Sector overview





Australian communities depend on aviation. As the world's sixth largest country by area, with a highly dispersed population, domestic and regional aviation are critical for domestic connectivity and for community access to a range of critical services. As a vast island nation, aviation offers a vital connection between Australia and the rest of the world. A strong aviation sector is also a key plank of the national economy. This is why the Australian Government is working towards an Aviation White Paper that will guide the next generation of growth and innovation in the aviation sector out to 2050.

The connectivity offered by aviation underpins our national supply chains, providing essential services to regional and remote communities, and enables the tourism, mining, construction, manufacturing and higher education sectors. Aviation is also an important industry sector in its own right. In 2018, prior to the COVID-19 pandemic, the aviation sector directly contributed around \$20 billion to the economy (1 per cent of Gross Domestic Product (GDP)), and employed around 90,000 people.¹⁰

The COVID-19 pandemic was a historic crisis that imposed an unprecedented challenge on the aviation sector. Governments around the world acted to protect the industry, in recognition of its importance.

In Australia, the industry is well on the way to recovery, although recovery is not complete. Domestic passenger numbers continued to recover from the impacts of the COVID-19 pandemic through the calendar year 2022, but were still 18.2 per cent below year ending December 2019 levels.¹¹ By mid-2023 the Qantas Group's domestic capacity had increased to 103 per cent of pre-COVID levels.¹²

The COVID-19 pandemic was a particular shock to Australia's international aviation industry, with international passenger movements in 2020–21 almost 85 per cent lower than in 2018–19. Australia's international travel market is recovering, albeit at a slower pace than the domestic market. For example, Qantas Group's international capacity increased to 81 per cent of pre-COVID levels by mid-2023, and the Group expects it will reach 100 per cent during 2024.¹³

In the longer term, the industry will need to grapple with a wide range of challenges and opportunities that will drive structural changes in the industry. Geopolitical uncertainty (Russia's invasion of Ukraine, and rising tensions between states with overlapping claims in the South China Sea) may affect both international and domestic aviation development and freight routes going forward. The transition to net zero carbon emissions by 2050 and the rapid pace of technological change in the sector both may change the structure of our aviation industry. The last Aviation White Paper was released in 2009, and these issues highlight why it is now time to chart the opportunities for the future and ensure the sector is appropriately positioned to deliver aviation services for the Australian public out to 2050.

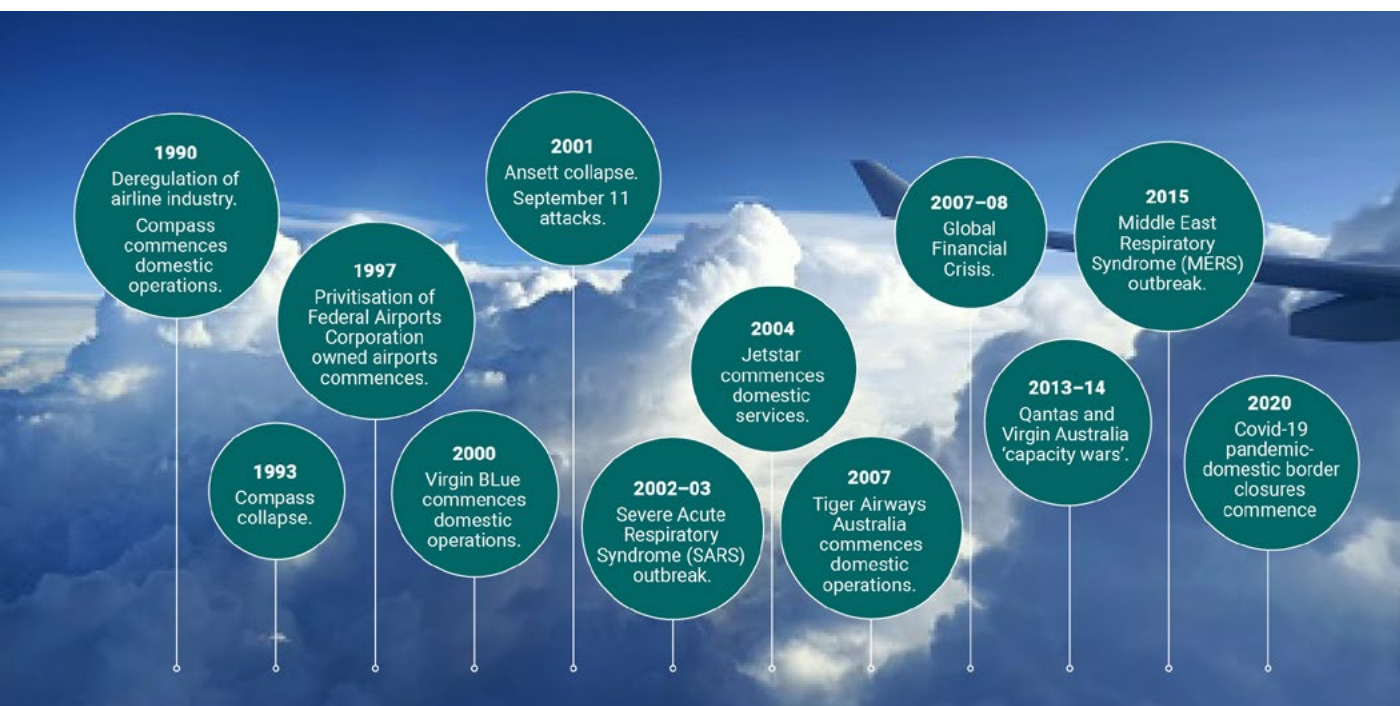
10 Department of Infrastructure, Transport, Regional Development and Communications (2020) *The Future of Australia's Aviation Sector Issues Paper*.

11 Bureau of Infrastructure and Transport Research Economics, 2023, *Australian Domestic Airline Activity—time series* [data set], bitre.gov.au.

12 Qantas Group (24 August 2023) *Qantas Group posts first full year profit since COVID* [media release], Qantas Group.

13 Qantas Group (24 August 2023) *Qantas Group posts first full year profit since COVID* [media release], Qantas Group.

Figure 1: Timeline of major developments impacting the aviation industry



Deregulation has underpinned domestic aviation growth

Since the 1990s the domestic aviation sector has changed significantly, with the deregulation of routes and the end of the two-airline policy, the privatisation of Australia's major airports, and the transfer of responsibility for regional and local aerodromes to state and local governments. Deregulation opened the door for new airlines to operate domestically and to compete on price, expanded destination offerings and customer segments.

Australia now has one of the most open aviation markets in the world. Australian registered airlines may fly any domestic route (except for some low volume regional routes regulated by state governments), subject to meeting safety and security regulations. Foreign investors are able to, and do, own Australian domestic airlines.

After airline deregulation, passenger volume growth increased substantially as carriers responded to growing demand for air travel. Airlines offered a much wider range of air fares and routes, and access to air travel for passengers expanded substantially.

The collapse of Ansett in 2001 had a significant impact on the domestic market. Regional Express emerged to take over Ansett's regional operations, and Virgin Blue was able to expand quickly on major routes. The Qantas Group launched Jetstar as a low-cost carrier in 2004, and another low-cost carrier, Tiger Airways, was launched by Singaporean interests in 2007.

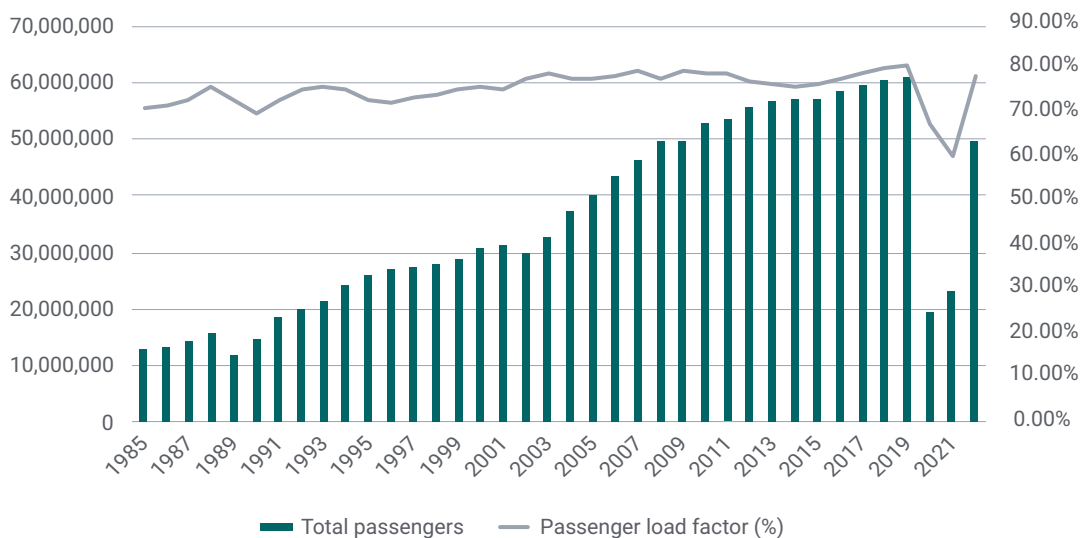
In the early 2010s Virgin Blue rebranded as Virgin Australia, and sought to compete directly with the Qantas Group. This transition involved increasing service standards on Virgin aircraft, and the acquisitions of Skywest (which became Virgin Australia Regional Airlines) and Tiger Airways in the low-cost segment.

The early to mid-2010s also saw a period of intense competition between Qantas and Virgin in what has been referred to as the ‘capacity wars’ – where both airlines increased capacity and reduced ticket prices to attract customers, with Qantas publicly stating its intent at the time to defend a market share of 65 per cent. The 2013–14 financial year saw both airlines report losses before Qantas announced it would stop adding capacity in the 2014–15 financial year.¹⁴

Total passengers on all domestic routes increased from around 13 million in 1985 to around 61 million in 2019. Domestic passengers grew at an average annual rate of 4.7 per cent – much faster than the population growth rate which averaged 1.4 per cent over the period.

The number of domestic passengers carried experienced two distinct periods of growth between 1985 and 2019: rapid growth between 1985 and 2008 (approximately 6 per cent a year) and slower growth between 2009 and 2019 (approximately 2 per cent a year).¹⁵ The average annual growth rate of domestic passengers (1.3 per cent) was lower than population growth (1.6 per cent) in the period from 2012 to 2019.¹⁶ Flights have also been getting fuller, with average passenger load factors steadily increasing over these periods.

Figure 2: Total revenue domestic passengers (millions) and passenger load factor (percentage)¹⁷



Prior to deregulation of the industry in the 1990s, there were over 270 Regular Public Transport (RPT) airports operating; in 2020 there were 157, a number that has remained broadly stable for over a decade. The four largest airports (Sydney, Melbourne, Brisbane and Perth) dominate Australian passenger movements, comprising almost 65 per cent of domestic passenger movements in 2019. All of the 44 most popular domestic routes in 2019 involved one or more of these airports. With more than 9 million passengers, the Sydney-Melbourne route alone comprised 15 per cent of all domestic passengers.

¹⁴ W Ma, Q Wang, H Yang and Y Zhang (2019) ‘An analysis of price competition and price wars in Australia’s domestic airline market’, *Transport Policy*.

¹⁵ Bureau of Infrastructure and Transport Research Economics (2023) *Domestic airline industry annual summaries 1984 to 2022 and 1984–85 to 2021–22* [data set], bitre.gov.au.

¹⁶ Bureau of Infrastructure and Transport Research Economics (2023) *Domestic airline industry annual summaries 1984 to 2022 and 1984–85 to 2021–22* [data set].

¹⁷ Bureau of Infrastructure and Transport Research Economics (2023) *Domestic airline industry annual summaries 1984 to 2022 and 1984–85 to 2021–22* [data set].

The 2009 National Aviation Policy White Paper provided a comprehensive forward-looking framework to guide future growth

Released on 16 December 2009, the National Aviation Policy (2009 White Paper), *Flight Path to the Future*, outlined more than 100 policy initiatives.

The White Paper identified the Australian Government's number one priority in aviation as safety and security and outlined measures to strengthen baggage and passenger screening requirements, tighten the Aviation Security Identification Card (ASIC) Scheme, improve security screening standards and training programs and modernise air traffic management (ATM), including the use of satellite technology. It also provided further funding to the Civil Aviation Safety Authority (CASA) and introduced long term funding principles to strengthen CASA's regulatory oversight and operations. In addition, the 2009 White Paper covered major issues related to economic growth, passenger benefits and consumer protections, community engagement, climate change, regional and remote aviation, General Aviation (GA) and industry skills and productivity.

Since the release of the 2009 White Paper, over 90 per cent of the initiatives have been implemented. The implementation of the majority of the remaining initiatives is underway.



Domestic industry structure

Australia's domestic aviation sector is highly concentrated, with few market participants. In January 2023, the Qantas Group controlled 61.7 per cent of the domestic market, and Virgin Australia 33.4 per cent. Combined, the two groups control 95.1 per cent of the Australian domestic market. Australia's concentrated market is not unique. For example, prior to COVID-19, about 85 per cent of the market in Canada was dominated by two airlines (Air Canada and West Jet).¹⁸

But while there are few major airlines operating domestically in Australia, there is evidence they do compete on price and services when there are multiple operators on routes. This mirrors mature aviation markets internationally, such as in the United States, which are characterised by competition despite having few major domestic players.

There is evidence the market has structurally changed post-COVID. Virgin Australia is pursuing a revised 'mid-market' business model, the low-cost airline Bonza has launched services connecting regional hubs to holiday destinations and Regional Express has expanded beyond its regional footprint, bringing increased competition to capital city routes. Competitive dynamics vary considerably between routes. However, total demand for air travel is much lower in regional areas, with the average regional route carrying about five per cent of the annual passengers on an average metro route. Due to thin markets, regional routes typically have fewer services, less competition, and higher fares.

Virgin Australia has indicated it will 'be a mid-market carrier appealing to customers who are after a great value air fare and better service'.¹⁹ This approach diverges from its previous strategy, where it sought to compete directly with Qantas for premium passengers, and with Jetstar, through its Tigerair Australia subsidiary, in the low-cost carrier segment.

Regional Express is now operating to Adelaide, Melbourne, Canberra, Sydney, Gold Coast and Brisbane with Boeing 737 aircraft, providing increased competition with the Qantas Group and Virgin Australia on a range of routes. Its regional network (operated with Saab 340 aircraft) continues to evolve, with service reductions on nine routes in response to workforce shortages announced on 21 April 2023.²⁰

Bonza launched services on 31 January 2023, and initially introduced flights to 17 destinations across 27 routes which are predominantly unserved by other airlines.²¹

Australia's aviation policy settings seek to promote competition, although the Australian Government acknowledges that in the domestic market there is a high degree of concentration. The policy of 'investment cabotage', whereby any foreign investor (airline or other) wishing to operate domestic air services within Australia can do so by establishing an Australian-based subsidiary (subject to Foreign Investment Review Board (FIRB) consideration), facilitated start-ups such as Virgin Blue and Tigerair Australia, which challenged incumbents with new aviation products and different business models. More recently, foreign capital has supported Regional Express to expand and Bonza to enter the market (see Chapter 3 'Airlines, airports and passengers – competition, consumer protection and disability access settings').

18 CAPA – Centre for Aviation (2019) *Canada domestic market: ULCCs work to break market dominance*.

19 Virgin Australia (2020) *'Ready for take-off: Virgin Australia Group soars out of administration, unveils future direction'* [media release], Virgin Australia.

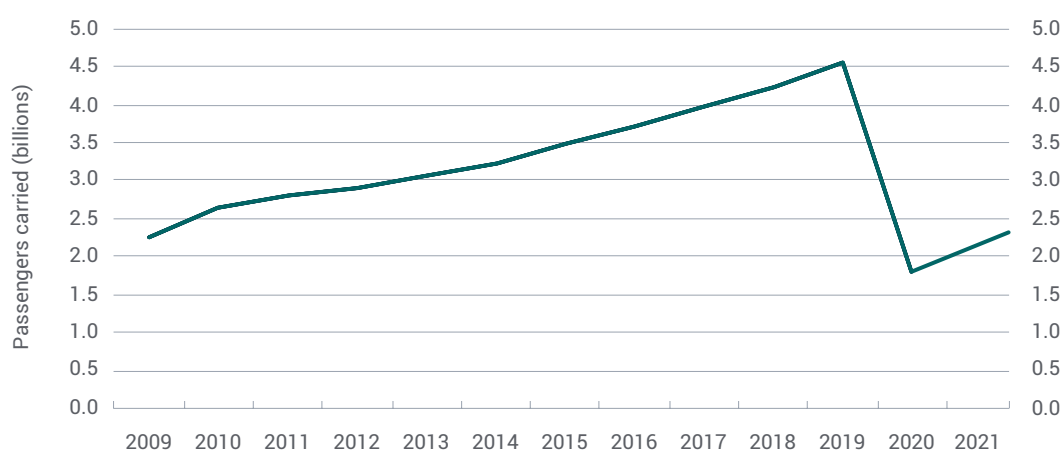
20 Regional Express (2023) *Rex adjusts Regional Network* [media release], Regional Express, accessed 9 May 2023.

21 Bonza (2023) *Bonza's first customers and invited community members, boarded Bonza's first ever flight today* [media release], Bonza.

International travel is recovering more slowly

Global aviation has seen significant growth since the last Aviation White Paper in 2009. The number of scheduled passengers carried by the global airline industry increased from approximately 2.2 billion in 2009 to its peak of 4.6 billion in 2019, prior to the pandemic. This growth was underpinned by a range of factors including the ongoing liberalisation of air services arrangements, the rise of low-cost carriers, and a growing middle class in key markets. China's growth particularly benefited Australia's international aviation sector, as the dominant inbound market pre-COVID.

Figure 3: Passengers carried globally (billions)²²



This growth has also led to a significant increase in airlines, with over 5,000 airlines having International Civil Aviation Organization (ICAO) codes, although there has been a significant trend of consolidation among larger airlines. The emergence of low-cost carriers, which primarily compete on price, has contributed to growth in the market.

Hub-and-spoke network carriers have continued to grow, leveraging demand and cost advantages by exploiting better economies of density by funnelling passengers with a broad range of origins and destinations through a single hub airport. The international components of Australian airlines have generally struggled to generate strong long-term profits. They have been subject to a range of international economic forces impacting on demand (global and Asia-Pacific recessions, and pandemics) and costs (such as aviation fuel), and are operating in many highly competitive markets.

Australian international traffic continued to see strong demand in the lead up to the pandemic, with total passenger numbers growing from approximately 24 million in 2009, peaking at 42 million passengers carried in 2019. Of these, the Qantas Group accounted for 26.1 per cent of the market, with Virgin Australia at 6.7 per cent.

Total inbound and outbound passenger numbers on international flights increased at an annualised 4.4 per cent over the two years through 2018–19. Increases in the number of inbound tourists from Asia, particularly China, India and Japan, has driven the growth in international visitors to Australia. Globally, the International Air Transport Association (IATA) is expecting passenger travel to return to the 2019 level of activity in 2024 and to expand substantially over the next two decades. IATA is forecasting annualised growth of 3.3 per cent for global air passenger numbers out to 2040, supported by growth in the Asia-Pacific region of 4.5 per cent.

²² World Bank (n.d.) *Air transport, passengers carried*, World Bank website.

Aerodromes

Australian airports are significant contributors to employment, economic development, national productivity and social connectivity. Most sectors of the Australian economy rely directly or indirectly on the efficient movement of people and freight through airports.

There are 333 Australian aerodromes certified by CASA.²³ This network is supported by almost 2,000 airstrips that support a broad and diverse range of tasks such as aerial mustering, spraying and surveying for agriculture, and access for emergency and aeromedical services.

Twenty-one federal airports were privatised between 1997 and 2003, by selling long-term leases over the airport sites to private sector operators. Privatisation helped unleash investment and development, with new infrastructure constructed, without government support, to accommodate new aircraft technologies and new airline business models. Major airport capacity will significantly increase out to 2050, as new runways are planned in Melbourne, Perth and Western Sydney. This expansion will need to be accompanied by appropriate engagement with the community about the impacts of airport operations on them.

Expansion of commercially operated airports is underpinned by their ability to draw income from non-aeronautical commercial development. This development further enables investment in aviation infrastructure and provides a necessary return on investment for the airports. It is important that a balanced approach between aviation and non-aviation development is undertaken to sustain the growth and development of the aviation sector over the long term.

Airservices Australia data show that in the year ending December 2019 (pre-COVID), Australia experienced 3.3 million aircraft movements at its 31 busiest aerodromes. There were 2.8 million movements in the year ending December 2022.²⁴ Data from Bureau of Infrastructure and Transport Research Economics (BITRE) show that in the year to November 2019, Australia's top 20 RPT airports handled 1.5 million domestic, regional and international aircraft movements and 164 million passenger movements. There were 1.2 million aircraft movements and 118 million passenger movements in the year to December 2022.

Major airports and the airlines that operate at them also rely on the provision of ancillary services such as ground handling (for example, baggage handling and catering). These sectors have experienced significant structural changes in recent years, as airlines have increasingly outsourced functions to lower cost suppliers. The quest to lower operating costs is expected to continue as airlines compete for price and value conscious passengers.

Upgraded airport infrastructure will help drive competition and productivity

In response to growing demand for aviation services, key cities across Australia will benefit from significant upgrades to airport infrastructure in the coming years.

These include:

- Sydney, with the planned opening of Western Sydney Airport in 2026
- Brisbane, which is investing in a new terminal ahead of the 2032 Olympics
- Perth Airport which is planning a new terminal and runway, and
- Hobart Airport, which is planning terminal and runway upgrades to accommodate larger aircraft.

²³ Certification allows aircraft to land with instrument flight procedures in weather conditions with reduced visibility.

²⁴ Airservices Australia (n.d.) *Movements at Australian Airports*, Airservices Australia website.

This may also include Melbourne (Tullamarine), which has proposed a third runway.

This infrastructure comes on top of the recently completed new runway at Brisbane Airport.

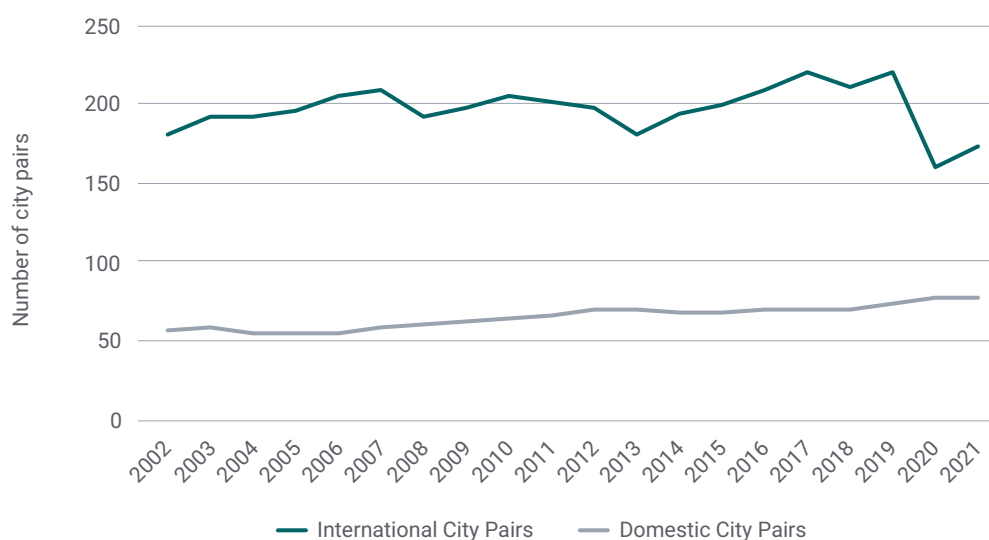
Capacity constraints at airports can hinder competition by creating barriers to entry for new and expanding operators. Slot management schemes currently operate at airports in Sydney, Melbourne, Brisbane and Perth reflecting the need to coordinate the high demand from airlines, particularly during peak periods. The new infrastructure at these airports can be expected to help drive more competition in the coming years (see Chapter 3).

Aviation connects us to the world

Aviation plays a vital role in connecting Australia to international visitor and freight markets. Air connectivity offers passengers and cargo shippers fast and seamless international linkages, supporting trade, investment and tourism. Air connectivity has a positive link with economic productivity, and can generate improved competitiveness, enhanced employment and economic growth opportunities, such as better access to capital markets and human resources.²⁵

The number of domestic city pairs has steadily increased since the early 2000s, highlighting increasing connectivity. The number of international city pairs has been subject to more fluctuation but has remained broadly consistent over the past 20 years.

Figure 4: Number of city pairs²⁶



In December 2022, Australia had a total of 173 connections between Australian cities and international cities (international city pairs). The top five international city pairs for passengers carried were Sydney-Singapore, Melbourne-Singapore, Sydney-Auckland, Perth-Singapore and Melbourne-Auckland. For freight, the top five city pairs (tonnes carried) were Sydney-Singapore, Melbourne-Singapore, Sydney-Auckland, Sydney-Honolulu, and Sydney-Hong Kong.

²⁵ International Air Transport Association (2020) *Air Connectivity Measuring the connections that drive economic growth*, International Air Transport Association website.

²⁶ Bureau of Infrastructure and Transport Research Economics (2023), custom graph generated from International Airline Activity and Domestic Airline Activity time series data.

The visitor economy is particularly dependent on aviation

A strong and competitive aviation industry is a prerequisite for growing Australia's visitor economy, which is vital for Australia's national prosperity. The visitor economy is defined as including anyone who provides or promotes services to Australia's domestic and international visitors, and includes a diverse set of businesses that span several industry sectors.

Domestic and international visitation generates jobs, investment, and growth in communities throughout Australia. Prior to COVID-19, the visitor economy contributed over \$166 billion to our economy, was our fourth largest export sector and, directly and indirectly, supported over 1 million jobs.

The updated Reimagined Visitor Economy (THRIVE 2030) Strategy and its Action Plan was released in March 2023 by the Minister for Trade and Tourism, Senator the Hon Don Farrell. THRIVE 2030 addresses some of the challenges and opportunities presented to the visitor economy and includes targets for total visitor expenditure of \$195 billion to \$270 billion by 2030, with a focus on achieving \$230 billion, with regional Australia capturing \$100 billion, or 44 per cent of this spend.

The THRIVE 2030 Strategy will be reviewed in 2024 to check progress against the targets set and the action plan, and to design the priority actions for the future consolidation and growth phases of the strategy.



Aviation is important for the movement of high value, low volume freight

Australia's freight supply chains are typically vast and diverse and play an essential role in ensuring the supply of goods and enabling our overseas trade. Aviation is integral to many supply chains and is dominated by high value, low volume freight, such as mail, small parcels and high-value perishables. Aviation also plays an essential role in delivering supplies to remote and isolated regions in Australia, particularly where weather conditions prevent the use of road and rail transport. Aviation freight supply chains suffered during the COVID-19 pandemic but, post-pandemic, are expected to continue to grow. Freight may be an early commercial opportunity for AAM.

The COVID-19 pandemic highlighted the dependence of airfreight on passenger movements. Necessary travel restrictions imposed in response to the COVID-19 pandemic resulted in an initial reduction of more than 90 per cent of passenger flights in and out of Australia, with immediate consequential impacts on Australia's ability to airfreight goods. The International Freight Assistance Mechanism (IFAM) was a temporary, targeted, emergency support measure put in place by the Australian Government to keep global air links open in response to the COVID-19 pandemic. Australian exporters were hit with the complete loss of airfreight capacity on many routes, along with airfreight price increases up to 13 times pre-COVID rates. IFAM played a key role in underwriting business confidence by stabilising export markets, enabling primary producers to make ongoing investments in capacity.

The program offered support through three policy levers – charters, blocks and grants, to respond to the negative impacts in the airfreight environment. As international borders were opened from late 2021, international flight numbers gradually increased, restoring the ability of exporters to utilise the belly space of passenger planes to move freight. IFAM was allowed to taper as more international routes became operational, with the program ceasing as at 30 June 2022.

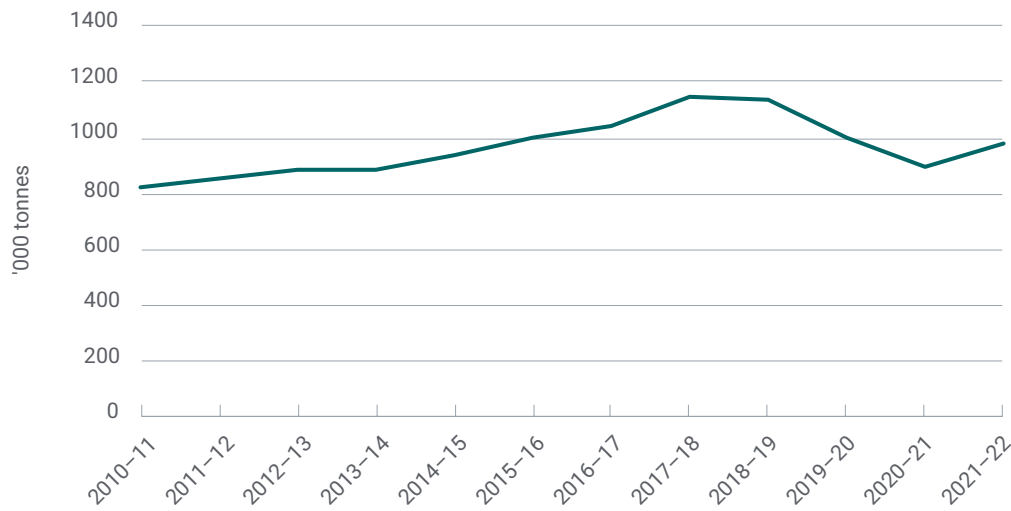
E-commerce trends have led to unprecedented demand for airfreight, which has experienced significant growth since 2016, most notably during COVID-19. This has in turn led to the growth in use of high capacity dedicated freighters (on time and express delivery), in addition to freight moved in the holds of passenger aircraft as 'belly freight' that is reliant upon the availability of belly space (and timetables) of passenger aircraft. While representing a small proportion of Australia's international freight task by volume (0.1 per cent), airfreight comprises about 21 per cent of total international trade value.²⁷

Volumes of international freight traffic into and out of Australia have been increasing in the last 10 years prior to the COVID-19 pandemic. Approximately 80 per cent of airfreight is as 'belly freight', with the remainder moved via dedicated freighters.²⁸ In 2019, Australia benefited from over 1 million tonnes of combined imports and exports of high value airfreight.²⁹

27 Transport and Infrastructure Council (2019) *National Freight and Supply Chain Strategy*, Freight Australia website.

28 Infrastructure Partnerships Australia (2019) *2019 International Airfreight Indicator*, Infrastructure Partnerships Australia website.

29 Bureau of Infrastructure, Transport and Regional Economics, (n.d.), *Freight Performance Dashboard*, Freight Australia website.

Figure 5: International freight volumes³⁰

Over the medium and long term, increased capacity at airports may structurally shift the operation of Australia's airfreight sector. The Western Sydney International (Nancy-Bird Walton) Airport (WSI) is due to commence operations in 2026 and will play an important role in the airfreight supply chain, with proximity to freight precincts and intermodal facilities in Western Sydney and the ability to operate 24 hours a day, 7 days a week servicing the Sydney basin. Emerging aviation technologies, such as delivery drones and larger AAM have potential to provide new modes to support an evolving freight task. For example, by 2030–2040 AAM is predicted to be able to transport up to 500kg or 2–5 passengers within a radius of up to 70km.³¹

The National Freight and Supply Chain Strategy, released in 2019, sets an agenda for coordinated and well-planned government and industry action across all freight modes, including aviation, over the next 20 years and beyond. It sets a national vision for freight systems and supply chains to contribute to a strong and prosperous Australia. Relevant to airfreight, the Strategy notes the importance of integration between the transport modes, and between transport and land planning across and between jurisdiction boundaries. The Strategy includes an action to provide regional and remote Australia with infrastructure capable of connecting regions and communities to major gateways, through land links, regional airports and coastal shipping. To ensure this strategy remains relevant and fit-for-purpose, it includes five-yearly review points. The first five-year review of the Strategy has been brought forward to 2023.

The review of the strategy will be undertaken in conjunction with state and territory governments and will consider the needs and priorities of all freight modes, including airfreight, in meeting Australia's growing freight task. The review will take into consideration this Green Paper and its subsequent White Paper as well as other recent reviews that have been undertaken.

30 Bureau of Infrastructure and Transport Research Economics (2023) *Annual totals-flights, passengers, freight and mail International airline activity totals* [data set], bitre.gov.au.

31 L.E.K. Consulting (2023), 'Aviation White Paper: Scenario Analysis of the Future of Australian Aviation', report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

A diverse General Aviation sector

GA is a term applied broadly to virtually all operations other than major international and domestic passenger and freight services. It includes regional, flight training, business, agricultural, sport and recreational aviation and, more recently, drone and AAM operations – including operations often serving regional and remote areas of Australia. GA underpins delivery of critical education and health services, emergency response services, and economically important activities such as flight training, tourism, agricultural mustering and spraying.

GA is growing and experiencing significant disruption as new technologies challenge traditional aircraft operators with more efficient, remotely piloted aircraft. Disruption is already bringing changes to sectors such as aerial photography and surveying and is likely to continue into others – such as aerial applications and some delivery services. Changes in the demand for, cost and supply of GA aircraft and personnel will continue to create opportunities and challenges for different parts of the GA sector (see Chapter 7).



Likely future directions out to 2050





The aviation sector is continually evolving and responding to new challenges and opportunities at global, national and local levels. The Australian Government understands delivering a long-term strategy in an era of disruption requires a strong understanding of likely changes on the horizon to respond to future opportunities and challenges. This Green Paper provides an opportunity for the Australian Government to engage with all stakeholders to understand the impacts these changes are likely to have for them.

To inform policy development and engage stakeholders in discussions around the future of Australia's aviation sector, the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (the Department) commissioned work on the key drivers of change in the aviation sector to 2050. This work looked at drivers of change and future industry scenarios over the short- (to 2030), medium- (2030–2040) and long-term (2040–2050).

Drivers of change to 2050

The most significant drivers of change were identified based on their extent and breadth of impact on aviation and related industries, and included:

- **Demand side drivers** likely to shape the demand for aviation services
- **Supply side drivers** likely to shape how the aviation industry will supply services to the market, and
- **Sustainability drivers** of change impacting the sector's long-term decarbonisation.

Demand side drivers



- Real GDP growth in Australia and inbound passenger markets (including emerging markets such as India, Indonesia and Vietnam) will remain the key driver of aviation activity over the long-term.
- International leisure aviation is likely to continue growing but there could be reduced demand in the long-term due to concerns around the environmental impact of aviation.
- COVID-19 accelerated the use of remote working, virtual collaboration and videoconferencing. This is likely to have had a structural impact on domestic business travel – potentially a 10 to 25 per cent reduction in demand. International business travel is likely to be more resilient as it enables high-value in-person interactions. However, demand may be dampened over the longer-term by corporate carbon emission reductions.
- Regional aviation demand for passengers and freight is likely to continue in line with historical trends.
- Real air fares are currently higher than recent historical averages but are expected to decrease as the industry recovers from COVID-19. In the medium- to long-term, there is the potential for a structural increase in air fares as airlines implement actions towards net zero (e.g. adoption of SAF), depending on how quickly global SAF production is able to scale up to meet current demand. Sustained increases in real air fares could suppress demand.

- Underlying GA demand is likely to continue to grow with population and real GDP in the short- to medium-term.
- The adoption of AAM in Australia could lead to a substantial increase in aircraft movements in the long-term, the nature of which will depend on range and payload. In an unconstrained policy environment, Aircraft movements could increase from 3 million per year to 8 or 9 million per year. Aside from AAM, the proliferation of drones could significantly increase movements in low altitude airspace. In short, our skies will become busier.

Supply side drivers



- Domestic airline competition could be a material driver of change. Increasing GDP, population growth and capacity at key airports have the potential to support the operations of more than two significant airline groups.
- Expected international aviation and freight capacity is likely to be able to support long-term growth.
- The need to replace parts of Australia's ageing regional turboprop fleet in the medium-term may lead to changes in regional market dynamics. Fleet replacement could involve the use of larger aircraft or the uptake of electric-powered aircraft. These changes may also require regional airport infrastructure upgrades.
- Australia is likely to have sufficient airport capacity to meet growth ambitions with new runways and terminals opening at Australia's largest airports from the mid-2020s.
- Enduring labour shortages could constrain aviation activity in the short-medium term.

Sustainability drivers



- SAF will be essential to decarbonisation of the industry, especially for medium and long-haul international flights on larger aircraft for which, at this stage, there is no clean technology alternative in the period to 2050.
- Fleet renewal and the gradual introduction of improved, more fuel-efficient aircraft, will deliver incremental sustainability gains in the short-medium term. New aircraft can be 15 to 25 per cent more fuel efficient than the planes they replace.
- Electric, hydrogen-electric, and hydrogen aircraft are considered the most attractive long-term (post-2050) solution for industry decarbonisation. These aircraft may enter the fleet in the medium-long term and would primarily replace regional turboprops and small jets due to range and payload constraints. However, without a step-change in technology, these aircraft are unlikely to comprise a material portion of the Australian commercial aviation fleet by 2050.
- ATM will likely play a small but important role in increasing aviation sustainability in the short-medium term by supporting more flexible, fuel efficient flight paths.



Maximising aviation's contribution to achieving net zero carbon emissions



- Analysis makes clear that aviation is a hard-to-abate sector, multiple solutions will be needed to reduce emissions and high-quality offsets are also likely to be needed to reach net zero.
- Industry decarbonisation will require a combination of SAF and emerging propulsion systems (electric, hybrid-electric or hydrogen aircraft) in order to substantively reduce emissions. This will involve a significant transformation of the industry over the next 27 years.

Emerging aviation technologies



- Emerging technologies like AAM (including electric vertical take-off and landing (eVTOL) aircraft), alongside the use of drones, will potentially lead to a significant increase in aircraft movements, and changes in passenger and freight mobility.
- As our skies become busier and autonomous technologies become available, new ways of regulating and managing airspace, air traffic, and aviation safety and security will be needed.

Workforce skills and training requirements



- Securing critical skills, in particular pilots and engineers, in the face of sustained global shortages is an ongoing challenge for the sector.
- This is both an immediate and enduring challenge. The growth of new technologies could also present new opportunities for skills, employment and manufacturing.



Key objectives for the aviation sector

Through the forthcoming White Paper, the Australian Government will promote an efficient, safe, sustainable and competitive Australian aviation sector that is critical to the economy and the standard of living of all Australians. The Australian Government intends to outline in the White Paper the key objectives that will underpin our aviation sector, covering:

- maintaining Australia's high standards of safety and security
- minimising the environmental impacts of aircraft operations, including aircraft noise and emissions, and achieving our national commitment to net zero by 2050
- promoting sustainable competition, workforce and productivity growth, and
- ensuring appropriate consumer protection and access arrangements for passengers and other aircraft users.



The Australian Government's intended key objectives for the Aviation White Paper are maintaining Australia's high standards of safety and security; minimising the environmental impacts of aircraft operations including aircraft noise and emissions, and achieving our national commitment to net zero by 2050; promoting sustainable competition, workforce and productivity growth; and ensuring appropriate consumer protection and access arrangements for passengers and other aircraft users.

- What emphasis should the Australian Government place on these trends to help guide the future of the sector? Are there any other trends the Australian Government could add?



Airlines, airports and passengers – competition, consumer protection and disability access settings





Airlines, airports and passengers – competition, consumer protection and disability access settings



Australia relies on the aviation sector to enable many other sectors of the economy. A competitive and appropriately regulated aviation sector helps support lower prices, better quality services, and more choices for all Australians. The Australian Government maintains an important role in protecting consumers from unfair trading practices, improving accessibility for consumers living with disability and promoting competition in the airline sector. This Chapter considers whether these settings are fit for purpose, now and out to 2050.

Key issues

- Australia's airline sector is highly concentrated, with Australia's small population relative to its large size making an airline industry that can support more than two major players difficult to sustain.
- There is clear evidence airlines and airports are not delivering the services consumers expect, nor enabling appropriate access to services for people living with disability.
- Competitive dynamics vary across international domestic and regional sectors, with different outcomes for consumers as a result.



3.1 A competitive aviation sector

Stakeholder feedback

- Many stakeholders noted the importance of strong competition in the airline sector, with the ACCC noting ‘the domestic airline industry is at a critical point from a competition perspective’.³²
- Some stakeholders raised the option of cabotage to increase competition – for example the Northern Territory Government observed ‘it can provide flexibility in the event a non-Australian airline wishes to operate an unserved domestic route’.³³

As noted in Chapter 1, the Australian domestic aviation market is highly concentrated, with the Qantas Group and Virgin Australia controlling 95 per cent of the sector as of January 2023. It is one of the most concentrated sectors in Australia. This is in part a reflection of Australia’s geography and population. While the United States, a similarly vast landmass, supports more domestic carriers, its population is ten times that of Australia.

The unique challenges created by the Australian geography and population underscore the importance of government policies that promote competition in the aviation sector to benefit consumers and businesses, and ultimately improve productivity and living standards of Australians. Challenges to increasing competition exist in both the airline and airport segments, in part due to barriers to entry arising from high capital costs, network effects and regulatory requirements.

In its June 2023 final report on Airline competition in Australia³⁴, the ACCC identified a range of policy options that could potentially further competition and improve consumer outcomes. These include:

- reform of the demand management scheme at Sydney Airport
- establishment of an independent dispute resolution ombudsman and introduction of specific consumer compensation entitlements for delayed or cancelled flights
- strengthening the regulatory regime to better protect airlines in negotiations with major airports
- prohibition of clauses in contracts between airports and airlines that prevent the airport from offering lower charges or incentives to other airlines
- relaxation of some cabotage restrictions
- further ACCC monitoring of domestic air passenger services.

Alongside the White Paper process, issues around competition in key industries such as aviation will be considered by the Competition Taskforce in Treasury, which has been established in 2023 to identify where reforms can be made to Australia’s competition settings.

32 Australian Competition and Consumer Commission (2023) *ACCC submission in response to the terms of reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

33 Northern Territory Government (2023) *Aviation White Paper to 2050*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

34 Australian Competition and Consumer Commission (2023) *Airline competition in Australia Final Report*

Australia's aviation market is experiencing structural change

Regional Express is operating routes from Adelaide, Melbourne, Canberra, Sydney, Gold Coast and Brisbane, offering some competition to Qantas and Virgin. Bonza launched services on 31 January 2023, and initially introduced flights to 17 destinations across 27 routes which are predominantly unserved by other airlines,³⁵ although it does provide competition on the Melbourne to Sunshine Coast and Melbourne to Mildura routes. Regional Express and Bonza would need to expand operations significantly to become meaningful competitors to the Qantas Group and Virgin Australia.

The Qantas Group is currently profitable, and in the top quarter of profitability of airlines worldwide (this year). Virgin Australia has indicated it returned to profitability in November 2022. But this return to profitability is recent and cyclical – margins in some segments of the sector remain low.

It is clear the Australian market is again experiencing a structural change which may impact the competitive dynamic in the future (see Chapter 1 'Sector overview'). With airlines no longer competing 'head to head' and instead focussing on market niches, the Australian Government recognises a reduction in competitive tension could adversely impact outcomes for consumers. The ACCC's Airline Competition in Australia Final Report found that the lack of direct competition over recent years has resulted in underwhelming outcomes for consumers in terms of airfares, reliability of services and customer service.³⁶

Airfares have trended downwards over recent decades, although prices have not returned to the lows experienced during the 'capacity wars' in the first half of the last decade (during this time, the Qantas and Virgin groups aggressively competed for market share, generating significant losses by charging fares that were not sustainable over the longer term). Other key developments which have helped drive down airfares since deregulation include the launch of low cost carriers including Virgin Blue, Jetstar and Tiger Airways.

While domestic airfares are higher than they were during the 'capacity wars' of 2013–14, they are well below where they were when the industry was more heavily regulated through the two-airline policy. While air fares are currently elevated, with pre-COVID levels of capacity yet to be brought back into operation, data in recent months suggests fares are again falling to lower levels (the restricted economy fare in August 2023 is 14 per cent below what it was in December 2022 and 5 per cent less than in February 2023)³⁷. The ACCC's final report found that the average price of discount fares decreased by 14 per cent between February and May 2023 and average revenue per passenger has also declined – although both remain above pre-COVID levels. A reduction in the price of jet fuel has also contributed to declining airfares. BITRE analysis found that average fares per kilometre decline with increasing route distance, market size and competition, more flights, lower oil prices, higher load factors, and seasonal demand.

In July 2023, on time arrivals were significantly lower than the long-term average (68.2 per cent versus 81.3 per cent) and on time departures were also significantly lower (68.1 per cent versus 82.5 per cent). Cancellations are significantly higher than the long-term average (4 per cent versus 2.1 per cent).

35 *Bonza's first customers and invited community members, boarded Bonza's first ever flight today* [media release], Bonza.

36 Australian Competition and Consumer Commission (2023) *Airline competition in Australia Final Report*

37 Bureau of Infrastructure and Transport Research Economics (n.d.) *Air fares time series from October 1992 to April 2023* [data set], bitre.gov.au

Figure 6: Domestic Air fare Index – Real best discount fare³⁸

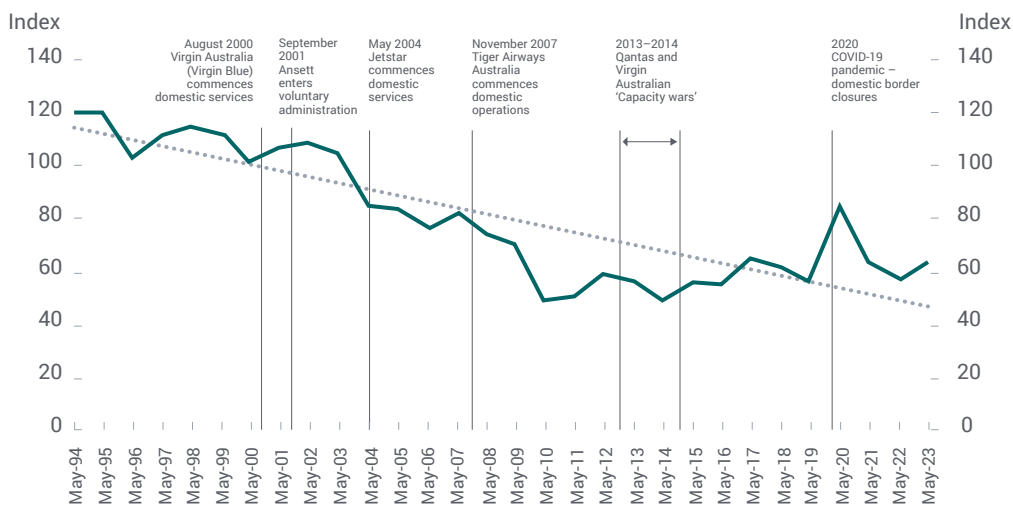


Figure 7: Change in average domestic Air fare during COVID-19 period³⁹



38 Bureau of Infrastructure and Transport Research Economics (n.d.) *Air fares time series from October 1992 to April 2023* [data set], bitre.gov.au.
 39 Bureau of Infrastructure and Transport Research Economics (n.d.) *Air fares time series from October 1992 to April 2023* [data set], bitre.gov.au

Active competition regulation

The ACCC is active in investigating allegations of anti-competitive behaviour in the aviation sector and ensuring commercial relationships support competitive outcomes.

In 2021, the ACCC considered concerns raised by Regional Express that Qantas was engaging in anti-competitive conduct. The ACCC observed that the launch of new routes by Qantas did not appear to be impeding Regional Express from competing across the broader network and that competition appeared to be increasing rather than decreasing. The ACCC also recognised the sector was in flux and that it would remain alert to any conduct that raised competition concerns.⁴⁰

In 2022, the ACCC gave clearance for Regional Express's acquisition of National Jet Express (a charter operator serving Fly-in Fly-out markets). On 20 April 2023, the ACCC announced it would oppose Qantas's proposal to acquire Alliance Airlines, and on 5 May 2023 it denied Virgin Australia and Alliance Airline's application for reauthorisation of their agreement to coordinate and jointly tender for contracts to support corporate customers such as mining companies in the Fly-In Fly-Out sector.

In June 2020, the then-Treasurer directed the ACCC to track the prices, costs and profits of the major domestic airlines (Qantas, Jetstar, Virgin Australia and Regional Express airlines) for three years as the sector worked through the impacts of the COVID-19 pandemic. It did this to uncover behaviour in the industry that damage competition and identify signs that competition in the industry is not effective.

BITRE will continue to publish data on the aviation sector, including passenger volumes and ticket prices, to assist stakeholders to assess the state of competition in the market.

Stakeholders have suggested the ACCC's airline monitoring could be restarted; the ACCC's submission in particular highlighted the usefulness of airline monitoring in investigating particular instances of airline behaviour.

Regional variations

Competitive dynamics in the aviation sector vary across Australia. The countervailing power airports have when negotiating with airlines can be expected to differ in the east coast capital cities versus central, regional and remote Australia. Similarly, it may be that some markets in rural and regional Australia are too small to support multiple carriers. As set out in Chapter 4 'Regional and remote aviation services', the quality, price and frequency of airlines services Australians have access to can be very different in capital cities and in regional and remote communities.

But detail is lacking about the specific circumstances of particular regions. The Australian Government is considering the recommendation of the Senate Rural and Regional Affairs and Transport References Committee in 2019⁴¹ that the Productivity Commission undertake a public inquiry into the determinants of domestic airfares on routes to and between regional centres in Australia. Any inquiry could, via a detailed economic analysis, investigate the feasibility of increasing operational subsidies and introducing other price control alternatives to address the high cost of regional airfares and consult with regional communities to determine whether additional routes should be subject to regulation, to help ensure competition settings are right for the aviation sector to foster the continued growth of our regions.

40 Australian Competition and Consumer Commission (2021) *Airline competition in Australia Report 3*, Australian Competition and Consumer Commission website.

41 Senate Rural and Regional Affairs and Transport References Committee (2019) *Operation, regulation and funding of air route service delivery to rural, regional and remote communities*, Commonwealth of Australia.

Some stakeholders suggest cabotage could also help

Competition could theoretically be enhanced if it was easier for foreign airlines to operate in the Australian domestic market.

Cabotage is the carriage of domestic traffic by foreign airlines. At present, the Government generally permits cabotage only in exceptional circumstances. Usually, this is when a demand exists that no Australian operator is able to satisfy, for example, the carriage of oversize mining equipment requiring extra-large aircraft, or the large movements of horses associated with the Melbourne Spring Racing Carnival.

Australia has also exchanged cabotage rights with New Zealand as part of a Single Aviation Market agreement, but New Zealand operators have not sought to exercise these entitlements. It is rarely permitted in foreign jurisdictions, although European countries have exchanged cabotage rights with each other as part of the single European aviation market.

The issue has been regularly raised by some stakeholders over the last decade, with proponents suggesting an easing of cabotage restrictions could increase competition and services while lowering consumer costs.

Further liberalising cabotage arrangements raises a range of difficulties related to the high degree of reliance on foreign regulators and regulatory frameworks to achieve policy outcomes:

- Cabotage raises regulatory considerations. In contrast to existing ‘investment cabotage’ arrangements, Australia would primarily rely on foreign regulators for safety oversight.
- Realisation of the economic benefits would depend on allowing foreign airlines to import their lower cost base (including foreign wages and conditions), raising a range of issues under the fair work framework.

A case-by-case approach to cabotage

The 2009 Aviation White Paper indicated the Australian Government would consider trading cabotage rights strategically with a major trading partner such as Europe or the US, provided safety concerns were met and reciprocal access was provided.

The 2009 White Paper also indicated the Australian Government would consider providing cabotage on a unilateral basis in exceptional circumstances, for example if a foreign carrier sought to operate a route which is not currently served by Australian airlines or which requires a government subsidy (such as routes between some of Australia’s external territories). The Australian Government considers this approach is likely to remain appropriate.

It is expected there will continue to be occasions when the Australian industry is unable or unwilling to provide a service, in which case a short-term dispensation may be accommodated. Negotiations with a major trading partner regarding cabotage rights are not expected to occur in the short-medium term.

To provide increased policy certainty, the Australian Government proposes to publish, in consultation with industry, a decision-making framework and guide for short term cabotage dispensations. This would be intended to provide clarity for industry in relation to the current process and provide an administrative framework to manage any future decision to implement a longer-term arrangement.





With airlines no longer competing ‘head to head’ and instead focusing on market niches, the Australian Government recognises a reduction in competitive tension could adversely impact outcomes for consumers. Australian The Government considers the existing ‘case-by-case’ approach to cabotage is likely to remain appropriate.

The Australian Government is considering the recommendation of the Senate Rural and Regional Affairs and Transport References Committee that the Productivity Commission undertake a public inquiry into the determinants of domestic airfares on routes to and between regional centres in Australia.

- What types of data and analysis should the Australian Government produce to support aviation competition outcomes?
- Would the Australian Government’s publication, in consultation with industry, of a decision-making framework and guide for short term cabotage dispensations support clarity of current processes to manage future decisions to implement longer-term cabotage arrangements?
- What should the Australian Government take into account in designing the terms of reference for the proposed Productivity Commission Inquiry?



3.2 Consumer protections

Key issues

- Strong competition in an industry can be expected to produce better outcomes for consumers.
- Consumer complaints in Australia suggest competition is not delivering the outcomes consumers expect.
- Key customer complaints include flight cancellations, delays and the terms and conditions for refunds and flight credits when these occur.
- An appropriate consumer framework needs to reflect the operational realities of air travel while providing adequate minimum baseline protections for travellers.
- This framework needs to consider different international ticketing arrangements, for example the practice overseas of ‘bumping’ passengers by overselling tickets on particular flights and then asking passengers to give up their seats, a practice not widely followed by Australian airlines.

Stakeholder feedback

- 31 of the 192 public submissions on the Aviation White Paper Terms of Reference explicitly mentioned ‘consumer protections’ as a key issue.
- Consumer groups advocate for the development of legislated protections for airline customers. In their submission to the Aviation White Paper Terms of Reference, CHOICE said ‘we encourage the Department to implement minimum consumer protections that make it easier for consumers to receive a refund, mandate minimum requirements for travel vouchers/credits, introduce a mandatory industry code of practice, establish a new travel and tourism ombudsman and mandate information standards’.⁴²
- Qantas announced that they would extend the travel expiry date for flight credits to 31 December 2023.⁴³
- The ACCC considers there needs to be greater incentives for airlines to invest in their customer service and dispute resolution processes. Contacts received by the ACCC about airline issues had been increasing in the years prior to the pandemic, which preceded a significant increase through the pandemic and subsequent recovery. Airlines remain one of the most complained about sectors to the ACCC.⁴⁴

42 CHOICE and Consumers’ Federation of Australia (2023) *Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

43 Qantas Group (19 May 2023) *Qantas Boosts International Network: Restoring Capacity Adding more Aircraft Launching New Routes* [media release], Qantas Group.

44 Australian Competition and Consumer Commission (2023) *Submission in response to the terms of reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

The Australian Consumer Law provides baseline protections across all sectors

The Australian Consumer Law (ACL) is enacted through the *Competition and Consumer Act 2010*. The ACL sets out consumer rights and business obligations. The ACL is enforced by the ACCC and state and territory fair trading agencies. The ACL applies to all Australian businesses including airlines.

Contracts between airlines and consumers are governed by the ACL. The ACCC is the primary agency responsible for enforcing consumer protection laws in Australia, including for aviation consumers. The ACCC does not generally resolve individual complaints about delayed or cancelled flights but focusses its compliance activities on issues that can result in widespread harm.⁴⁵

The ACL includes Consumer Guarantees which offer basic rights and obligations which businesses must meet when selling products or services. This includes guarantees that services will be rendered with due care and skill and a guarantee that services will be supplied within a reasonable time. The ACL also prevents businesses from including unfair terms in standard form contracts (generally contracts consisting of a set of standard terms and conditions issued on a repetitive basis to multiple persons), such as contracts entered into when purchasing airline tickets. Unfair terms could include allowing the business (but not the consumer) to avoid or limit their responsibilities under the contract, or allowing the business (but not the consumer) to change the terms of the contract.

The COVID-19 pandemic resulted in widespread flight cancellations, primarily due to health and travel restrictions. Following the pandemic, flight delays and cancellations remain well above long-term trends. This has contributed to a sharp rise in consumer complaints about airlines. Stakeholders have also raised concerns about the terms and conditions for refunds and travel credits for flights cancelled during the COVID-19 pandemic.

Australia has no aviation-specific consumer protection laws. The terms and conditions issued by airlines in their ticket terms and conditions are governed by the provisions of the ACL. Government, state and territory Consumer Affairs Ministers will shortly commence a national survey looking at the experiences of consumers and businesses, including travel businesses, in relation to the ACL. The Australian Government is also considering how the ACL could include prohibitions against 'unfair trading practices', noting that general prohibitions against unfair trading exist in a number of international jurisdictions.

Liability and insurance laws are also relevant. While primarily focused on arrangements relating to passenger death or injury and associated mandatory insurance requirements, the *Civil Aviation (Carriers' Liability) Act 1959* (Carriers' Liability Act) also covers issues such as lost and damaged bags. The framework does not require airlines to insure against third party (surface damage) risks.

In 2018, the Department conducted a review of Australia's aviation insurance and liability framework outlined in the Carriers' Liability Act and its regulations. Following consultation, the regulations were remade and legislative amendments were implemented in 2020 to update the liability limit, modernise drafting language and address various technical issues raised by stakeholders.⁴⁶

A range of technical issues, such as a potential right of contribution against people who contributed to injuries, were identified for further consultation and development. This includes issues associated with a potential scheme to make insurance compulsory for third party (surface damage) risks.

45 Australian Competition and Consumer Commission (n.d.) *Flight delays and cancellations*, Australian Competition and Consumer Commission website.

46 Aviation Legislation Amendment (Liability and Insurance) Bill 2020 (Cth).

Informal enforcement mechanisms are limited

The 2009 Aviation White Paper called on the airline industry to improve customer complaint-handling, which led to airlines publishing customer charters, outlining their business's commitments to consumers, and creating the Airline Consumer Advocate (ACA) to assist consumers to resolve airline complaints.

The ACA is funded by participating airlines (Qantas, Jetstar, Regional Express and Virgin Australia) and seeks to facilitate the resolution of unresolved complaints about airline services. The ACA forwards a consumer's complaint to the relevant airline, who prepares a written response for the consumer. The ACA then reviews the response before it is provided back to the consumer. Airlines have 20 working days from the date the complaint is lodged to provide a response to the consumer, subject to any requests for more information, documentation or clarification being sought from the consumer.

To access the ACA's services, consumers must meet eligibility criteria including a requirement that the passenger must have first sought to resolve the dispute with the airline directly, and have also sought the airline's review of its initial decision. The ACA can only hear complaints relating to participating airlines, and cannot issue binding decisions that affect the participating airline's response to complaints, including compelling airlines to pay compensation.

This means the ACA is not a substitute for a low-cost, accessible legal process which can ensure passengers can access fair treatment.

Australian consumer groups propose more stringent rules for rising complaints

COVID-19 and the challenges of increasing capacity have contributed to a sharp rise in consumer complaints about airlines. This is highlighted in 2021 data published by the ACA which show significant increases across participating airlines and complaint categories compared to 2019 data.

Data from the ACCC also indicates high levels of contacts commensurate with the higher numbers of cancelled or delayed flights in mid-to-late-2022. The average number of contacts the ACCC received per month in 2021 was 263, by 2022 this had risen to 476. Prior to COVID-19, the average contacts per month in 2018 and 2019 were 129 and 180, respectively. While a 'contact' does not indicate a breach of the ACL, it is indicative of rising concerns in the Australian community and gives further weight to longstanding advocacy by Australian consumer groups for aviation specific rules similar to European arrangements. There are also calls for establishing an independent ombudsman to improve processes for handling consumer complaints or a Customer Rights Charter that includes minimum requirements for consumer protection and customer service.





The Australian Government wants to improve complaint handling processes and strengthen consumer protections in the airline sector. The Australian Government is interested in stakeholder views on options to improve the effectiveness of the Airline Consumer Advocate and benefits consumer protection policies pursued in other jurisdictions could deliver for Australia's aviation sector.

- Should the Australian Government look to revise current consumer protection arrangements and, if so, through existing or new mechanisms?
- Would an expanded remit for the Airline Customer Advocate to educate customers on their legal entitlements be useful?
- Previous consultation processes have explored options to refine the passenger liability and insurance framework under the *Civil Aviation (Carriers' Liability) Act 1959* – do stakeholders still consider amendments to this framework are needed?
- Would policies pursued in other jurisdictions – such as a Passenger Bill of Rights or a stronger ombudsmen model – deliver benefits in Australia's aviation sector?



3.3 Disability access

Key issues

- People with disability continue to face barriers to accessing travel.
- The Royal Commission into Violence, Abuse, Neglect and Exploitation of People with Disability (Disability Royal Commission) heard that people living with disability have negative experiences when travelling by air.
- Air travel has unique safety and security requirements that pose challenges to accessibility.
- Some barriers to accessible air travel are not addressed by current legislation, and the internal procedural policies of airports and airlines can restrict access to air travel for people with disability.

Stakeholder feedback

- In its submission, the Australian Human Rights Commission (AHRC) noted that between 2016 and 2022, more than 100 disability discrimination complaints against airlines were received. The main issues raised included: assistance animal refusals, inaccessible facilities for wheelchair users and inaccessible ticketing arrangements for people with vision impairments.⁴⁷
- ‘The Aviation White Paper can strengthen compliance with the Transport Standards and advance a more dignified and equitable air travel experience for all Australians.’ – Emeritus Professor Rosalind Croucher AM, President, AHRC.⁴⁸

Aviation consumers who live with disability face additional barriers when engaging with air services.

The Disability Royal Commission has heard the experiences of people living with disability engaging with aviation services. These include being seen as an afterthought amid flight cancellations, being denied travel with assistance animals, a lack of accessible flight options in regional and remote areas, limited aircraft capacity to accommodate wheelchairs, extended and unreasonable check-in times, insufficient information from airlines on accessibility arrangements and a lack of communication and complaint mechanisms.

Policy Priority 5 of Australia’s Disability Strategy 2021–2031⁴⁹ is that ‘transport systems are accessible to the whole community’. The Australian Government is committed to removing barriers to enable people living with disability to exercise full choice and control over their lives, including accessing air travel. A reform process to review the effectiveness of current regulatory frameworks is underway, this includes reviewing disability access standards for airports and airlines.

47 Australian Human Rights Commission (2023) *Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

48 Australian Human Rights Commission (2023) *Re: Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

49 Department of Social Services, *Australia’s Disability Strategy 2021–2031*, Australian Government Disability Gateway website.

The *Disability Discrimination Act 1992* is the Commonwealth's framework to prevent discrimination against people living with disabilities

The *Disability Discrimination Act 1992* (Disability Discrimination Act) includes provisions to ensure the accessibility of services such as public transportation and access to premises.

The Transport Standards, made under the Disability Discrimination Act, seek to remove discrimination for people with disability in relation to public transport services to provide equality and independence.

The Transport Standards establish the minimum accessibility requirements to be met by providers and operators of public transport services; including conveyances (planes) and infrastructure. The majority of airports (if not all) are covered by the *Disability (Access to Premises – Buildings) Standards 2010* (Premises Standards) which is also made under the Disability Discrimination Act in addition to the Transport Standards.

A reform process to modernise the Transport Standards is currently underway to address some of the accessibility issues relating to aviation identified by people with disability. The Department is leading this work, and held public consultations in 2021 and 2022 on a package of reforms, including reforms which will apply to aviation services. Infrastructure and Transport Ministers confirmed the first tranche of 16 reform areas on 11 February 2022. The first tranche of reforms include staff training improvements to better meet the needs of people with disability, which will cover airport and airline staff. A second tranche of 60 reforms was considered by Ministers on 9 June 2023. The reforms will now proceed to an Australian Government approval process. Details of the reforms and implementation arrangements, including the Decision Regulation Impact Statement, will be made publicly available following this process.

The Transport Standards must also be reviewed every five years. The most recent statutory review of the Transport Standards commenced in December 2022 and public consultation was open until 30 June 2023. The review process considers the effectiveness of the Transport Standards in removing discrimination from public transport infrastructure and services, and provides the opportunity for stakeholders to recommend future amendments to the Transport Standards. It is expected that issues in the aviation sector will be a focus of stakeholder feedback during the review.

But the aviation sector has struggled to work within the broader transport standard framework

Air travel is a heavily regulated form of transport, with specific safety and security requirements that can create additional challenges for passengers living with disabilities. Whilst the Transport Standards articulate specific responsibilities to remove discrimination from aviation services, people living with disability continue to encounter barriers when traveling by air. Stakeholders have also reported concerns relating to compensation for damage to mobility aids, airport security screening, carriage of lithium-ion mobility aid batteries and recognition of assistance animals, which are outside the scope of the Transport Standards.

People living with disability may also be impacted by poorly delineated operational responsibilities between airports and airlines, particularly at interfaces where support is required. For example, where mobility aid users require assistance to transfer from set down zones to inside the airport terminal, neither airport nor airline staff assist passengers. Where it is unclear who is responsible for providing assistance, passengers living with disability may not receive support to undertake a journey.

Airline and airport operators should develop a common user experience from 'kerb to aircraft' by identifying where responsibility lies for assistance of passengers across the whole journey, and the types of assistance for passengers available. This includes the security screening process, noting that the



current Aviation Screening Notice includes provisions for screening of people with special circumstances to remove barriers in security screening where possible.

Both the report from the review of the Transport Standards and report from the Disability Royal Commission are expected to be released in late-2023. Recommendations from these reports will be considered in the Aviation White Paper. It may be the case that a standard specific to the aviation sector could better facilitate access to aviation.

The Aviation Access Forum is an important source of advice for government

The Aviation Access Forum (AAF) is a consultative forum on disability access issues in Australian aviation, comprising government agencies, the disability community and airline and airport operators. The AAF encouraged many major airline and airport operators to put in place Disability Access Facilitation Plans. However, AAF members have expressed dissatisfaction about the ineffectiveness of the AAF. There is opportunity to more clearly clarify the AAF's role to ensure it remains a key forum for government and industry to come together and develop a response to deal with the discrimination being experienced in the aviation sector.

Industry collaboration and investment is also necessary

The Australian Government expects the aviation sector will need to make substantial additional and ongoing investments to make services accessible and legally compliant with human rights obligations, including in relation to:

- staff training
- carriage of assistance animals and mobility aids
- the standardisation of processes for carrying lithium-ion wheelchair batteries on aircraft
- complaints processes
- provision of more accessible formats of communication and information dissemination.

One option that could be considered is whether an aviation-specific Transport Standard will act out more explicitly the human rights obligations of the sector.



The Australian Government is committed to retaining a voice for travellers living with disability about how they can be better served in their interaction with the aviation sector. This Green Paper is testing ideas about how this can best be achieved.

- What further improvements can be made to the Disability Standards for Accessible Public Transport to accommodate the unique requirements of air travel?
- What improvements can be made to aviation accessibility that are outside the scope of the Disability Standards for Accessible Public Transport?
- What are the specific challenges faced by people with disability wishing to travel by air in regional and remote areas?
- How can Disability Access Facilitation Plans by airlines and airports be improved?
- How should the AAF be restructured to be more effective and better able to drive and enforce change to address issues faced by travellers living with disability?



3.4 Economic regulation of Australian airports

Key issues

- LFAs are generally viable, stable assets.
- Previous Government reviews, including the PC's reviews into the economic regulation of airports and the ACCC's airport price and quality-of-service monitoring, have found airports do not exercise monopoly power to the detriment of consumers, though more information could help bring examples to light, if any.
- There may be an opportunity to review the Aeronautical Pricing Principles and explore ways to bolster their use without imposing additional burdens to industry or the Australian Government.

Under the Commonwealth's long-term policy of 'light-touch' economic regulation of airports, investment at airports around Australia has increased over the previous decades. As noted above in Chapter 1 'Sector overview', airport capacity is an important enabler of national economic growth. New runways and terminals across capital cities opening from the mid-2020s will provide substantial increases in capacity at Australia's largest airports, which may offer benefits for competition in the sector.⁵⁰ This could in turn bring consumer benefits in terms of networks and pricing.

Within the framework of 'light-touch' regulation, each year the ACCC releases a report on its monitoring of airports. The monitoring covers prices, costs, profits and quality of service levels at Sydney, Melbourne, Brisbane and Perth airports. These various types of report have enabled a linear view of airports' performance over a number of years and is intended to identify where service quality or price competitiveness have deteriorated. The results of quality of service monitoring vary from year to year but typically remain stable in the 'Good' rating.⁵¹

While the ACCC monitors prices and quality of service at monitored airports, the PC conducts periodic reviews into the economic regulation of airports. The latest review (2019) maintained the view that although airports are natural monopolies, there was little evidence to suggest exercise or abuse of power. Subsequently, work has commenced considering regulatory amendments to allow the collection of additional information from airports, to enable a clearer view of whether the airlines' claims of abuse of monopolistic powers can be substantiated.

The ACCC has consulted airlines on potential additional data that could be collected to improve its monitoring activities. The collection of additional data was recommended in the last PC Review of the Economic Regulation of Airports in 2019, to see whether there is any evidence of airports using their market power to the detriment of consumers.

50 L.E.K. Consulting (2023), Aviation White Paper: Scenario Analysis of the Future of Australian Aviation, report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

51 Australian Competition and Consumer Commission (2022) *Airport quality of service monitoring report 2020-21*, Australian Competition and Consumer Commission website.

Pricing for aeronautical services at airports

Aeronautical charges, such as movement charges and terminal usages fees, are commercially negotiated between airlines and airports within a framework of non-binding Aeronautical Pricing Principles⁵² established by the Australian Government in the early 2000s. These negotiations have at times involved drawn out discussions and resulted in litigation to resolve disputes. In addition, Sydney Airport is subject to price notification with respect to services connecting regional NSW with Sydney Airport, as outlined in Chapter 4 'Regional and remote aviation services'. Airlines consider airports abuse their monopoly position, arguing they do not have a choice about which airports to fly to in most markets. They consider this allows airports to take advantage of them through 'excessive' charges, also stating that 'Australian airports are among the most profitable in the world.'⁵³

Airports argue,⁵⁴ that while they are in a monopolistic position they do not make use of or abuse this position and that airlines have countervailing power, with the upper hand in negotiations because of their market dominance and airports' dependency on airlines for patronage.

The PC, in its 2019 Inquiry Report into the Economic Regulation of Airports, noted Aeronautical Pricing Principles form a part of the current, effective light-handed regulatory regime.⁵⁵ The PC recommended the Aeronautical Pricing Principles be amended to specify that any agreement between an airport and an airport user must not contain anticompetitive clauses.

The Australian Government considers that a review of the Aeronautical Pricing Principles and how their implementation could be improved may be worthwhile. It is noted that the current dispute resolution mechanism available to airlines and airports – including recourse to litigation – act as incentives for parties to seek commercial outcomes to their disputes.

52 Department of Infrastructure and Transport (2011) *Submission to the Productivity Commission inquiry into the Economic Regulation of Airport Services*, Productivity Commission website.

53 Airlines for Australia and New Zealand (2023) *Aviation White Paper Consultation: Airlines for Australia and New Zealand's submissions in response to Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

54 Australian Airports Association (2023) *Aviation White Paper – Response to the Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

55 Productivity Commission (2019) *Inquiry Report: Economic Regulation of Airports*, Productivity Commission website.



Figure 8: Aeronautical Pricing Principles

The pricing principles relating to prices for aeronautical services and facilities (as defined in Part 7 of the Airports Regulations 1997) provided by airports are:

- a. that prices should:
 - i. be set so as to generate expected revenue for a service or services that is at least sufficient to meet the efficient costs of providing the service or services; and
 - ii. include a return on investment in tangible (non-current) aeronautical assets, commensurate with the regulatory and commercial risks involved and in accordance with these Pricing Principles;
- b. that pricing regimes should provide incentives to reduce costs or otherwise improve productivity;
- c. that prices (including service level specifications and any associated terms and conditions of access to aeronautical services) should:
 - i. be established through commercial negotiations undertaken in good faith, with open and transparent information exchange between the airports and their customers and utilising processes for resolving disputes in a commercial manner (for example, independent commercial mediation/binding arbitration); and
 - ii. reflect a reasonable sharing of risks and returns, as agreed between airports and their customers (including risks and returns relating to changes in passenger traffic or productivity improvements resulting in over or under recovery of agreed allowable aeronautical revenue);
- d. that price structures should:
 - i. allow multi-part pricing and price discrimination when it aids efficiency (including the efficient development of aeronautical services); and
 - ii. notwithstanding the cross-ownership restrictions in the Airports Act, not allow a vertically integrated service provider to set terms and conditions that discriminate in favour of its downstream operations, except to the extent that the cost of providing access to other operators is higher;
- e. that service-level outcomes for aeronautical services provided by the airport operators should be consistent with users' reasonable expectations;
- f. that aeronautical asset revaluations by airports should not generally provide a basis for higher aeronautical prices, unless customers agree; and
- g. that at airports with significant capacity constraints, peak period pricing is allowed where necessary to efficiently manage demand and promote efficient investment in and use of airport infrastructure, consistent with all of the above Principles.

Airlines access to slots at Australian airports

Stakeholders have noted difficulty accessing slots at airports has the potential to constrain competition in the aviation market, with Bonza and Regional Express both noting difficulty accessing slots at Sydney Airport during peak periods. Part of the explanation offered by stakeholders for this barrier has been concern that incumbent slot holders have been able to manipulate the rules, particularly the need to use a slot at least 80 per cent of the time, to maintain access to more slots than they use.

A slot is a permission to take-off and land at a scheduled time on a specified date at an airport. At airports where demand exceeds capacity, slots are allocated on a historical precedence basis, where if an airline regularly utilises a slot they can retain that slot in the future.

A number of Australian airports are slot-constrained, particularly during peak periods. These airports operate within a global environment and rely on the Worldwide Airport Slot Guidelines (WASG) as the foundation of the global slot coordination process. The WASG is jointly published by the IATA, Airports Council International and the Worldwide Airport Coordinators Group.

Some key features of slot coordination outlined in the WASG include:

- airlines are entitled to retain slots on the basis of historical precedence if they used the slots at least 80 per cent of the time in the previous equivalent season (the ‘use it or lose it’ rule)
- following the allocation of and changes to historic slots, the remaining slots form a slot pool, with a proportion allocated to new entrants, if possible.

While most airports operate in accordance with the latest WASG, slot rules for Sydney Airport are part of the Sydney Airport Slot Management Scheme 2013, which has not kept pace with global developments. The PC recommend the Sydney Airport Slot Management Scheme 2013 be publicly reviewed to assess how effectively the Scheme contributes to the efficient use of airport infrastructure. In response, the then Government commissioned The Review of the Sydney Airport Demand Management Scheme, an independent review prepared by Mr. Peter Harris AO.

The Harris Review provided recommendations to ensure the framework is fit-for-purpose, including through:

- balancing the impact on the efficient use of airport infrastructure with noise management to maintain quality of life for the Sydney flight path residents
- mitigating the restrictions on competition and improving resilience within the industry.

The Harris Review also noted the alignment to the WASG and compliance form the basis of slot allocation credibility and the current Sydney Airport Slot Management Scheme 2013 is not consistent with the improvements in compliance standards in slot utilisation, including the ability to examine a wider range of potential compliance issues defined as ‘slot misuse’.

Following the Harris Review, the Australian Government has recently concluded targeted consultation regarding potential changes to the Sydney Airport Demand Management Scheme, with a particular eye to modernising the slot allocation framework and strengthening compliance measures to ensure that slots are not being misused by airlines.

We will have more announcements to make about these reforms in due course. The Australian Government is considering the recommendations from these reviews.



Under the Commonwealth’s long-term policy of ‘light-touch’ economic regulation of airports, investment at airports around Australia has increased over the previous decades. The Australian Government considers a review of Aeronautical Pricing Principles and how their implementation could be improved may be worthwhile.

- What measures should be taken to ensure Australian aviation markets operate efficiently, improve competition settings, and deliver optimal consumer outcomes?
- Are the Aeronautical Pricing Principles fit-for-purpose? How could they be improved?
- Should the Australian Government mandate use of the Aeronautical Pricing Principles? Why/why not?

Regional and remote aviation services





Aviation contributes strongly to regional development, playing an important role in servicing the needs of regional and remote communities across Australia by providing and maintaining access to a range of essential services such as health care and education. Air travel is also important for connecting people across Australia, due to the vast distances between population centres. The Australian Government recognises that regions are diverse and are evolving to meet the challenges and opportunities of the modern world. It is crucial the Australian Government leverage the economic shifts underway.

Aviation services also support Closing the Gap targets 1, 2, 8 and 14 in remote communities.⁵⁶ Air services are the only reliable means of transport for remote communities across Australia when road access is cut during the tropical wet season and in times of emergency. An effective aviation industry not only connects regional communities, but contributes positively to local economic growth, social cohesion and productivity. Access to affordable air services are a key contributor to the liveability of regional Australia.



⁵⁶ Outcome 1: Aboriginal and Torres Strait Islander people enjoy long and healthy lives; Outcome 2: Aboriginal and Torres Strait Islander children are born healthy and strong; Outcome 8: Strong economic participation and development of Aboriginal and Torres Strait Islander people and communities; Outcome 14: Aboriginal and Torres Strait Islander people enjoy high levels of social and emotional wellbeing.

4.1 The role of airlines and airports in supporting regional economies

Key issues

- Smaller population centres in regional Australia are not commercially viable markets for regular passenger transport air services by commercial aircraft operators, nor do they generate significant revenue for airports.
- Regional and remote airports and air services need a clear pathway to transition to net zero.
- The operation of air services, especially to remote aerodromes, can help support Closing the Gap targets and improve access to critical services such as healthcare, education and justice.
- The Australian Government is committed to supporting regional access to capital cities.

Stakeholder feedback

- The Western Australian Government's submission on the Terms of Reference for the Aviation White Paper notes 'fit for purpose airport infrastructure and access to air services are critical to the liveability of many remote communities across Australia. Air services are the only reliable means of transport for remote communities when road access is cut during the tropical wet season and in times of emergency.'⁵⁷
- In its submission to the Federal Budget, the Australian Airports Association recommends delivery of a program to drive greenhouse gas emission reductions at airports.⁵⁸
- The Regional Aviation Association of Australia notes in its submission on the Terms of Reference for the Aviation White Paper 'It is also important to understand the government's position on what measures will be in place for sectors of the industry that just can't practically achieve those targets. This is very much a possibility when looking at the costs to achieve these targets with new aircraft/technology and of course the supply chain for SAF in our remotest parts of Australia.'⁵⁹

57 R Saffioti (2023) *Aviation White Paper Terms of Reference – Western Australian Submission*, Department of Infrastructure, Transport, Regional Development, Communications and Arts website, Western Australian Government.

58 Australian Airports Association (2023), *Federal Budget Submission*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

59 Regional Aviation Association Australia (2023), *RAAA Submission on the Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Responsibility for regional air services

There are a range of entities with responsibility for regional air services. Government responsibility for aircraft and air services is shared between the Australian and state and territory governments. The Australian Government's primary consideration in relation to aviation is the safety and security of air services. Many elements of the Australian Government's policy and regulatory framework have implications for regional Australia and the regional aviation industry.

As outlined in Chapter 8 'Fit-for-purpose agencies', CASA develops and promulgates aviation safety standards and the Department of Home Affairs is responsible for regulating aviation security. The Australian Government also undertakes strategic engagement in regional aviation, reflecting national interest priorities.

The Government operates the Remote Air Services Subsidy Scheme, which subsidises a regular weekly air transport service for the carriage of passengers and goods, such as educational materials, fresh food and other urgent supplies to communities in remote and isolated areas of Australia. The Australian Government also manages the Enroute Charge Payment Scheme, providing support for regional commercial airlines to support low volume and new routes to small and remote communities, as well as aeromedical services. The Government underwrites air services to Norfolk Island and the Indian Ocean Territories.

States and territories have adopted a variety of approaches to regulating aviation within their states, and to support a basic level of transport connectivity and minimum passenger services. The focus of their programs is to facilitate services on routes which may not be commercially viable.

For example, the Western Australian Government regulates and caps consumer prices on some air routes in the state to ensure efficient, effective and regular air services occur on these routes and the needs of the community are met. The Queensland Government funds the Local Fare Scheme which provides air fare subsidies for routes to Cape York, Gulf of Carpentaria and Torres Strait. The Northern Territory Government funds the Patient Assistance Travel Scheme which provides financial help for travel and accommodation expenses for people who need to travel a long distance to see an approved medical specialist.

Air services are a critical enabler of economic growth. The Western Australian and Northern Territory Governments noted in their submissions on the Aviation White Paper Terms of Reference the importance of the role air services will play in the development of the Middle Arm Precinct and the resource and tourism sectors.⁶⁰ 90 per cent of Western Australia is classified as remote or very remote. Affordable air fares are vital to sustaining successful tourist markets in rural, regional and remote areas, particularly when areas experience decreased incomes and reduction in population due to drought. Regional communities are concerned high prices for air travel adversely impact tourism growth.⁶¹

Characteristics of regional air services markets

Many of our regional airports have become important, sustainable regional hubs served by multiple airlines and attracting aviation-related industries. However, for smaller regional towns and communities, demand and market driven solutions providing RPT and freight transport services are less likely.

60 R Saffioti (2023), *Aviation White Paper Terms of Reference – Western Australian Submission*, Western Australian Government, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website; S Drabsch (2023) *Aviation White Paper to 2050*, Department of Industry, Tourism and Trade, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

61 Rural and Regional Affairs and Transport References Committee (2019), *Report The operation, regulation and funding of air route service delivery to rural, regional and remote communities*, Australian Parliament House website.

Some studies suggest Australia is one of the most expensive countries in the world to fly in, with large distances separating small population centres outside of capital cities.⁶² Low numbers of passengers do not generate enough revenue to match significant airline operating costs. Airport charges, fuel prices in regional areas and high costs associated with attracting workers are often cited as contributing to the cost of regional air services. This can disadvantage communities and compound the impact of underrepresented and disadvantaged cohorts.

The number of Australian airports with regular public transport services has declined over the past 30 years, at the expense of the connectivity of regional communities. Despite growth in passenger movements and in overall capacity, there has been a decrease in the number of regional aerodromes served, down from 278 in 1984 to 142 in 2019.⁶³ Between 1989 and 2019, the number of regional routes fell from 458 to 291 and the number of remote routes fell from 264 to 163. The number of airlines serving regional aerodromes has also decreased from 53 in 1984 to 28 in 2010. As of March 2023, even with the introduction of Bonza to the Australian market, this has further reduced to 23. A decline in the number of passenger flights to smaller regional locations has been attributed to a trend towards the use of larger aircraft.

Over the long-term, it is possible that AAM services will improve regional air connectivity and enable new point-to-point networks and on-demand air services for short air routes (i.e., 200-400km). This may allow the development of a regional hub model, where larger aircraft are used to travel between regional hubs and capital cities, with shorter onwards journeys undertaken by AAM. Similarly, it is possible electrification of small fixed-wing aircraft (i.e. 9–14 seats) will reduce operating costs on short routes and enable greater regional connectivity.

The ageing aircraft fleet employed by some regional air service operators may present a challenge as they come to the end of their usable life. This may result in larger aircraft being used, known as ‘up gauging’, due to the lack of an appropriate replacement for existing 30–40 seat passenger capacity aircraft which are commonly used on these routes. This may cause further consolidation of regional routes.

The regional air fleet will also need to decarbonise over the period to 2050. Regional Express has partnered with Dovetail Electric Aviation to develop and certify the retrofitting of Regional Express aircraft with electric engines. Regional Express will undertake trials of electrified aircraft in the coming years. Electric or hydrogen powered aircraft may first enter service on short-haul regional air routes, noting the technology is not expected to replace existing turboprops on longer range routes until beyond 2040. Access to sustainable aviation fuel in regional hubs may also be required.

Responsibility for regional aviation infrastructure

Privatisation of LFAs has proven successful in delivering substantial private sector investment in aviation infrastructure over the past 30 years. But the market-driven approach to delivering aviation can only function where it is profitable for private investors to participate. Where this is not the case, governments have to consider whether to support infrastructure investment to help facilitate air services to regional and remote communities.

There are around 350 airports in Australia that are considered inner regional, outer regional, remote or very remote locations by the Australian Government. Of these, seven are LFAs (Mt Isa, Townsville, Darwin, Alice Springs, Tennant Creek, Hobart and Launceston). The vast majority of regional airports are now owned by local councils, many of which struggle to finance their ongoing maintenance.

62 Rural and Regional Affairs and Transport References Committee (2019), *Report The operation, regulation and funding of air route service delivery to rural, regional and remote communities*, Australian Parliament House website.

63 Bureau of Infrastructure, Transport and Regional Economics (2008), *Air transport services in regional Australia: Trends and access report 115*, Bureau of Infrastructure and Transport Research Economics website.

There are more than 2,000 other small airstrips in Australia.⁶⁴ Around 75 per cent of these small airstrips are located in regional and remote areas, and are owned by local or state and territory governments, or privately. These airstrips enable general aviation activities to service cattle stations, First Nations communities, mining sites and other remote locations for various purposes.

It has been estimated 40 per cent of airports operate at a loss and are exposed to ongoing, increasing operational, regulatory and maintenance costs.⁶⁵ These airports tend to be located in regional and remote areas which do not have large populations. There is a strong correlation between airport revenue and passenger traffic, and airports that do not receive RPT flights usually have larger gaps between expenditure and revenue.⁶⁶ Airports with greater passenger numbers are more likely to have sufficient revenue to be financially stable. Further, regional and remote airports often do not enjoy commercial opportunities to generate revenue and need to rely on other funding sources for required maintenance and upkeep.

New technologies may reduce costs and improve the availability of regional and remote services. Satellite Based Augmentation System (SBAS) has the potential to provide more accurate and reliable navigation service at regional airports without needing ground-based infrastructure. This could help increase frequency of services, and reduce likelihood of cancelled flights. Drones, AAM and other emerging technologies have the potential to significantly improve regional connectivity and reduce the cost of air services, if the technology to use these forms of transport are available in regional and remote locations. However, there is also a risk the infrastructure required to enable the operation of these technologies may add to the cost burden of struggling aerodromes.

Assistance for regional airports has traditionally been provided by state and territory governments, with many operating grants schemes to finance upgrade works. In recent years, the Australian Government, as part of broader regional program funding has also provided some funding for various regional airport upgrades.

The Australian Government provided funding of \$100 million for safety and access upgrades at regional airports through the Regional Airports Program, to assist owners of regional airports to undertake essential works, promoting aviation safety and access for communities, and the Regional Aviation Access Program which committed \$72.6 million (2020–21 to 2023–24) to support connectivity in remote Australia and assist remote airstrips to improve their ability to support aeromedical services. During COVID-19 these schemes were supported by the \$50.1 million Regional Airport Security Screening Fund and the \$94.5 million Regional Airports Screening Infrastructure program (see 'Aviation security screening is essential for the safety and security of travellers' in this chapter for further information). Some regional airports are struggling to meet operating costs, with many smaller airports especially raising concerns in relation to increased security screening requirements. Australian Government schemes operate alongside state and territory government programs that support airports and airlines.

A framework for place-based decisions

The Australian Government's Regional Investment Framework (the Framework) underpins the government's strategic approach to regional investment, and is aimed at realising the Australian Government's ambition that 'no one is held back and no one is left behind.' The Framework values local voices and priorities, and enables the Australian Government to support people, the places they live in, the services they rely on and the regional industries and local economies that are vital to the nation's prosperity.

64 Australian Airports Association (2018) *AAA Submission to the Productivity Commission Inquiry into the Economic Regulation of Airports*, Productivity Commission website.

65 Australian Airports Association (2018) *AAA Submission to the Productivity Commission Inquiry into the Economic Regulation of Airports*, Productivity Commission website.

66 ACIL Allen Consulting (2016) *Regional Airport Infrastructure Study*, Treasury website.

The Australian Government's investments in regional aviation should deliver on the potential of regional Australia, and build on each region's unique strengths. Place-based decision-making that draws on the experience of local government alongside regional bodies must guide investment in our regions.

Access to the Sydney basin

Most regional flights in Australia connect regional communities to state capitals. The Australian Government is committed to supporting regional access to capital cities. As an essential transport hub for regional New South Wales, peak period congestion at Sydney Airport presents a significant challenge for regional routes. It has been longstanding policy to ensure access and prices for regional carriers at the airport remain reasonable. A price cap for regional NSW flights accessing airport services has been in place since 2002. The prices Sydney Airport can charge for aeronautical services and facilities are capped in line with increases to the consumer price index. Sydney Airport is required to lodge a price notification with the ACCC when its proposed price exceeds the highest price it has charged for those services in the last year. This system aims to facilitate continued access to Sydney Airport.

The current price cap arrangements mean there are no agreements between airlines and Sydney Airport for regional NSW flights into Sydney Airport. The Productivity Commission (PC) has recommended the price cap and notification regime should only apply to aeronautical services that are not covered in commercial agreements between Sydney Airport and airlines operating flight services to and from regional NSW. Commercial agreements for some popular regional routes may improve service quality, to meet consumer expectations.

The opening of WSI in late 2026 will increase airport capacity in the Sydney basin and improve access to the Sydney basin from regional airports. A meaningful period of operation at WSI, once it enjoys an established network of flights, will be needed before it is possible to assess the impact WSI's capacity has on access for regional aviation services to the Sydney basin.

The transition to net zero could provide opportunities for our regional communities

The Australian Government recognises that now and over coming years, it will be critical to leverage the economic shifts underway across the world for the benefit of Australia's regions, embracing and supporting productive and inclusive change, including the transformation to a net zero economy. Developments to support decarbonisation of aviation, including bioenergy feedstock production, and green hydrogen, have the potential to support regional economies and create jobs.

The ARENA's Bioenergy Roadmap Report (the Report), highlights economic growth and job creation as potential economic benefits derived from an Australian bioenergy sector, including through the production of bioenergy feedstocks (including SAF). Many resources are located in regional areas and harnessing them for bioenergy could support local economies by creating new income streams and jobs. Modelling in the Report estimates bioenergy could potentially contribute 26,200 new additional jobs by the 2030s and 35,300 jobs by the 2050s, with at least one in four additional jobs expected to be in regional areas.⁶⁷

Hydrogen development, which could support new aviation propulsion technologies, also has potential to support Australia's regions. By 2050, Australia's hydrogen industry could generate \$50 billion in additional GDP and create more than 16,000 jobs in regional Australia.⁶⁸

67 Australian Renewable Energy Agency (2021) *Australia's Bioenergy Roadmap*, Australian Renewable Energy Agency, Australian Government.

68 C Bowen (13 April 2023) *2022 State of Hydrogen report reinforces Australia's green hydrogen powerhouse potential* [media release], Australian Government.

The Australian Government is establishing a new national Net Zero Authority to help deliver positive economic transformation for regional industries, workers and communities as Australia decarbonises. The Authority will help coordinate work between the Australian Government and state, territory and local governments, as well as with industry and local communities. The goal of this collaboration is to support regions that have been dependent on emissions intensive industries by improving the coordination of effort and support from across government programs and policies, and helping to mobilise investment in new industries and opportunities.

Domestic sustainable aviation fuel production could be an opportunity for regional communities

In June 2023, the Australian Government announced ARENA's Sustainable Aviation Fuel (SAF) Funding Initiative with \$30 million of grant funding to support the domestic development of SAF production. Grants for engineering studies or pilot programmes across the supply chain, from agricultural feedstock supply to final fuel production, will fast track development of a local industry in regional Australia.

As set out in CSIRO's *Sustainable Aviation Fuel Roadmap*, Australia has an opportunity to develop a diversified portfolio of feedstocks for a domestic SAF industry. Large landmass, temperate climates, advanced farming practices and established land transport supply chains are potential assets to develop a range of biogenic feedstocks. These comparative advantages can be seen in Australia's current production and export volumes in oilseeds, sugars and agricultural residue. Australia is a major exporter of canola seed to the EU, where a significant amount is converted into biofuels. Additionally, Australia processes large quantities of animal fat that is sold to countries such as Singapore and the US for processing into biofuels.⁶⁹

That said, a situation where Australian-produced feedstock is exported internationally under long-term supply contracts could undermine feedstock use by Australian refiners and operators, and result in Australia missing out on the economic and sustainability benefits of domestic SAF production.

Opportunities presented by Australian domestic SAF production include:

- **Liquid fuel security and sovereign capability:** Producing fuels domestically from Australian feedstocks could assist in safeguarding Australia's long-term sovereign refining capability to mitigate the risk of supply disruptions. Australia imports over 90 per cent of its liquid fuels (based on imports of refined products and domestic production based on imported crude) through long supply chains exposed to geopolitical and climate change risk. With Australia's liquid fuels consumption projected to grow into the 2030s, domestic production of alternative fuels such as SAF can help diversify our sources of liquid fuels and decrease our dependence on imported liquid fuels.
- **Local options for decarbonisation:** A local supply of SAF would allow domestic airlines to access low-emission fuel and contribute to Australia achieving decarbonisation targets. Without domestic production, SAF is currently limited to airlines that travel to ports where SAF is available. SAF production can have as a by-product, other low-carbon products such as renewable diesel and lighter hydrocarbons, enabling further decarbonisation in road transport and heating.
- **Jobs and development for Australia's regions:** Feedstock production and collection depend heavily on regional areas to construct and manage supporting infrastructure and supply chains for biogenic SAF and synthetic fuels. Fuel production will also provide job creation opportunities that would be missed if feedstock was exported without domestic value added.

69 Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Sustainable Aviation Fuel Roadmap* (2023), CSIRO website.

- **Supporting Australia's plan to become a renewable energy superpower:** The Australian Government is investing more than \$40 billion towards Australia becoming a renewable energy superpower. This includes \$2 billion in Hydrogen Headstart, a new program to scale up development of Australia's renewable hydrogen industry. Furthermore, the \$15 billion of funding allocated under NRF will provide finance for projects that diversify and transform Australia's industry and economy. Through loans, guarantees and equity investments, the NRF will partner with the private sector to drive investments that add value and develop capability in seven priority areas of the economy including transport, and renewables and low emissions technology. Australia has an opportunity to produce and export renewable and green fuels, including SAF, as part of its renewable energy superpower ambitions.

However regional aviation will face decarbonisation challenges

The characteristics of regional aviation present unique challenges for the sector to meet net zero targets.

Australia's regional fleet is ageing, with the Saab 340 and De Havilland Canada Dash 8 series 100, 200 and 300 aircraft that serve many regional areas now averaging over 20–30 years old. These aircraft can remain in service for years to come with adequate spares but will likely need to be replaced or substantially refurbished in the medium- to long-term.

Scenario planning work undertaken for the Department indicates electric and hydrogen fixed-wing aircraft may enter the fleet in the medium- to long-term. With these aircraft likely limited to smaller seat capacity, due to their energy density limitations, they may serve as a replacement for these aging aircraft. The adoption of electric and hydrogen fixed-wing aircraft may provide the regional aviation sector with a mechanism to achieve decarbonisation.

To support electric and hydrogen aircraft, regional airports will likely require new infrastructure. For electric aircraft, this could include installation of battery charging facilities and grid upgrades to ensure adequate power supply. More remote airports may also require installation of specific power units, such as solar farms or generators, and storage facilities to ensure sufficient power supply. For hydrogen aircraft, airport upgrades may include onsite hydrogen storage and refuelling infrastructure.

Regional airports will have small markets from which to recover high fixed costs related to infrastructure investments, potentially making these infrastructure upgrades to support decarbonisation technologies challenging for these airports.

The introduction of new fuels and technologies will require new operational skills from the aviation workforce, including at regional airports. Regionally based operators, with smaller workforces and less training capacity compared to larger operators may face difficulties in training and attracting a workforce that is prepared for the adoption of these technologies and fuels.

For operators, there are uncertainties about the costs associated with electric aircraft. The scenario planning work undertaken for the Department indicates airlines procuring new electric aircraft will likely incur substantial capital costs, which would typically be offset through high aircraft utilisation. This higher utilisation requirement may diminish their suitability for regional routes.

The Transport and Infrastructure Net Zero Roadmap and Action Plan will consider the specific challenges facing the regional aviation sector. Stakeholder views on the particular challenges the regional aviation sector face are sought, as an input into that work. These issues will also be considered by the Jet Zero Council.



Emerging technologies may create new mobility paradigms in regional Australia

As discussed in Chapter 9 'Emerging aviation technologies', new technologies are expected to transform the aviation sector. This may offer new opportunities to increase the connectivity of regional and remote communities and grow regional economies, while supporting the transition to net zero.

Regional aviation may utilise smaller aircraft to transport fewer passengers and freight on more frequent schedules. In the future, regional centres may act as AAM hubs, connecting major regional centres to smaller regional or remote communities with a point to point network using sustainable AAM aircraft. This could improve regional air connectivity for passengers and freight, by enabling point-to-point networks and on-demand air services on short routes that would not rely on aerodromes.⁷⁰

Electric aircraft, well suited for lighter aircraft on shorter routes, may also lower the cost of air travel in regional communities, increasing the viability of regional air routes. This has the potential to improve freight supply chains and reduce community isolation, particularly in remote areas which can be cut off during the wet season or flood events. There are opportunities to explore the benefits emerging aviation technology can deliver for regional Australia, and how this might support the Australian Government's Closing the Gap commitments.

Climate change resilience at airports

The vulnerability of Australia's airports to the impacts of a changing climate is an increasingly important issue. However, the capability of airport operators to assess climate risks and develop adaptation strategies varies. Large private operators are more likely to have sufficient capital and strong commercial incentives to strengthen the resilience of their assets in the face of a changing climate, but regional council airport owners may lack sufficient resources to respond.

Internal analysis by the Department suggests climate change risks that airports face across Australia include sea level rise, storm tides, major rainfall, and bushfires. For example, greater temperatures can threaten runway infrastructure, can be a safety risk for passengers and staff, and impact the operation of aircraft, which require more thrust and longer runways to take off in high heat environments.

Aviation services may also need to consider the climate resilience of their operations and the potential impacts of climate change. Changing wind patterns may impact runway operations and flight paths, more intense storms have the potential to cause greater delays, and rising temperatures may change passenger demand for travel. Safety regulations may also need to consider the impacts of weather event on flight safety.

From 2023–34, The Australian Government will provide up to \$1 billion over five years through the Disaster Ready Fund (DRF) to help curb the devastating impacts of disasters by investing in disaster resilience and risk reduction projects across Australia.

70 L.E.K. Consulting (2023), *Aviation White Paper: Scenario Analysis of the Future of Australian Aviation*, report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

Adaptation strategies to address these risks will need to vary by the type of hazard, the extent of an airport's vulnerability, and the costs of implementation. While primary responsibility for asset protection sits with the owner, potential ways to increase climate resilience for Australia's airports could include:

- providing improved information to airport operators about local climate risks
- providing guidance to airports on assessing and managing climate risks, which could include the development of an Australian aviation climate risk assessment and management framework
- seeking the inclusion of climate risk assessments in the master plans of LFAs, and
- incorporating climate resilience criteria in regional airport grants program guidelines.



The Australian Government recognises the vital role aviation plays in servicing the needs of regional and remote communities including providing access to essential services and helping to address many Closing the Gap targets. The Australian Government also recognises the transition to net zero presents unique challenges and opportunities for Australia's regions.

- Where should the Australian Government focus its engagement in regional and remote aviation, including helping achieve Closing the Gap outcomes, noting established state, territory and local government responsibilities and programs?
- Traditionally, where intra-state aviation services have been subsidised, costs have been carried by state and territory governments. Does this remain the best structure?
- What opportunities do emerging aviation technologies present for regional and remote Australia?
- What are specific issues experienced by the regional and remote aviation sector in the context of decarbonisation? What elements should the Transport and Infrastructure Net Zero Roadmap and Action Plan include to recognise the specific circumstances of the regional and remote aviation sector?
- What opportunities are there to develop domestic bioenergy feedstock production and collection in Australia's regions, and what policy settings from Government would support this?
- What are the challenges faced by regional and remote aviation and airports posed by our changing climate?
- How do local governments and aerodrome operators consider climate resilience when managing their aviation assets?



Maximising aviation's contribution to net zero





05



The Australian Government has adopted emissions reduction targets of 43 per cent below 2005 levels by 2030 and net zero emissions by 2050. These targets are detailed as part of Australia's response to the Paris Agreement, and are enshrined in legislation under the *Climate Change Act 2022*.

As a 'hard-to-abate' industry, aviation faces unique challenges in reaching decarbonisation goals. There will be a range of measures that will help maximise aviation's contribution to net zero including efficiency gains, propulsion technology advancements, use of high-quality offsets and the development and uptake of SAF.⁷¹ The implementation of these measures can bring substantial opportunities for Australian industry, jobs and, potentially, domestic fuel security.

To guide the transport sector's transition to net zero, the Australian Government will lead development of a Transport and Infrastructure Net Zero Roadmap and Action Plan. The Roadmap and Action Plan will deliver evidence and leadership to accelerate decarbonisation across the transport and transport infrastructure sectors, including the aviation industry. It will offer industry policy clarity to support investment decisions in decarbonisation of assets and fleets. The Roadmap will also outline the roles of different governments, industry and the community, and share best practice to demonstrate shared responsibility. In July 2023, the Australian Government announced the development of government-guided sectoral plans to support Australia's Net Zero 2050 plan. The Roadmap will form the Australian Government's sectoral emissions reduction plan for transport. The development of the Roadmap will support consideration of proposals to be considered in the Aviation White Paper.

The Australian Government has also established the Australian Jet Zero Council. The Jet Zero Council brings together a cross-section of experts from across the aviation industry supply chain to work with the sector to inform the design of policy settings to encourage emissions reduction. The Australian Government is determined to work with industry to ensure a strong and sustainable aviation sector that supports emissions reduction targets, while growing jobs and innovation. The Council will work across the sector and with government to promote, mobilise and galvanise industry's own decarbonisation efforts.

SAF is an existing technology which will support aviation's transition to net zero, with synthetic SAFs, electric and hydrogen technologies likely to also become important in the future.

⁷¹ International Civil Aviation Organization (2022), *Report on the feasibility of a long-term aspirational goal (LTAG) for international civil aviation CO₂ emission reductions*, International Civil Aviation Organization website.

5.1 Opportunities and challenges in decarbonising aviation

Key issues

- Aviation generates approximately 2.5 per cent of the world's carbon emissions. Domestic aviation accounted for about 7 per cent of emissions from the transport sector. Aviation's proportionate emissions impact is likely to grow as other sectors continue to decarbonise.
- Factors such as the need for light, high energy density fuels and limited available substitutes make aviation a 'hard-to-abate' sector.
- Key measures to maximise aviation's contribution to net zero include: efficiency gains, new propulsion technologies, high-quality offsets, and SAF. All will need to be pursued to reach net zero by 2050.
- The international community is embracing these opportunities, with governments and industry committing to ambitious decarbonisation targets today. Key trading partners such as the United States (US), United Kingdom (UK), Europe, and Japan are all taking action.
- Through the Safeguard Mechanism our two major emission-producing entities in aviation – Qantas and Virgin Australia – are required to reduce their emissions intensity by 4.9 per cent per year to 2030.

The global picture – aviation is a growing contributor to emissions

Globally, the aviation sector generates approximately 2.5 per cent of the world's carbon emissions. In 2019, direct carbon dioxide (CO₂) emissions from aviation equated to 618.82 megatonnes.⁷² Aviation's proportionate emissions impact is likely to continue to grow as other sectors continue to decarbonise with mature technologies.

In the financial year 2021–22, domestic aviation accounted for about 7 per cent of emissions from the transport sector.⁷³ Over the last two decades, Australia's aviation emissions have increased, even as total emissions have started to decline across the economy.

Although the COVID-19 pandemic disrupted this pattern, most forecasts expect strong long-term aviation demand growth, meaning aviation emissions are likely to continue to rise in the absence of abatement policies and concerted efforts of the aviation sector and its supply chains.

⁷² International Energy Agency (2018) *International Energy Agency Aviation Tracking Report*, International Energy Agency website.

⁷³ Department of Climate Change, Energy, the Environment and Water (n.d.) *Australia's National Greenhouse Accounts*, Department of Climate Change, Energy, the Environment and Water website.

There are a number of ways to reduce emissions in the 'hard to abate' aviation sector

As set out in Commonwealth Scientific and Industrial Research Organisation's (CSIRO) recently published *Sustainable Aviation Fuel Roadmap*, a range of options could achieve meaningful net reductions in aviation's emissions if pursued.⁷⁴

- **Efficiency gains:** Adopting advanced materials such as lightweight carbon fibre and more efficient engines helps improve fuel efficiency, producing fewer emissions. Adopting new technologies and operational practices can lead to more efficient aircraft maintenance, ground movements and airspace use. These gains historically bring efficiency improvements of 2 per cent per annum, but as flight volumes increase, these benefits are likely to be outweighed by the impacts of increasing air traffic.
- **New propulsion technologies:** While battery and fuel-cell-powered planes have been successfully flown in demonstrations, it may take some time before they become widely available and initially are only expected to be suitable for short-haul flights. Using new fuels such as hydrogen for longer-haul flights would face significant technological and supply chain challenges, such as developing onboard hydrogen storage and establishing large-scale green hydrogen production and distribution. Creating refuelling and recharging infrastructure and large-scale manufacturing capabilities will require time and investment, and costs are currently unclear.
- **High-quality carbon offsets:** Airlines use carbon offsets as an indirect measure to reduce their unavoidable carbon footprint. Offsets are generated by projects that reduce, remove, or capture atmospheric emissions. Offsets are a measure to achieve net emissions reductions, rather than a measure to decarbonise aviation. These projects, such as reforestation or renewable energy, cancel out some or all CO₂ emissions from flights through carbon accounting. Technological advancements have increased the carbon accounting legitimacy of offset projects and demand has grown with net zero targets. However, social impact challenges remain about quality and transparency of offsets and reliability of accounting data. Offsets will play a role in the near-term as other technologies scale and in the long-term to address residual CO₂ emissions. Under the Safeguard Mechanism reforms, facilities using offsets equal to 30 per cent or more of their baseline will need to provide a report detailing why they are not performing more on-site abatement. This may drive increased uptake of SAF and other decarbonisation measures where available.
- **Flight alternatives:** Modal shift towards alternative transportation methods like high-speed rail and increased use of videoconferencing could reduce demand for flights, consequently leading to emissions reduction. However, while these options exist in Australia, the country's relatively lower connectivity, dispersed population and geographical isolation from the rest of the world may limit flight alternatives.
- **SAF:** SAF is blended with conventional jet fuel in ratios of up to 50 per cent to ensure compatibility with aircraft fuelling systems. The industry is working towards ratios of 100 per cent. To be considered sustainable, SAF must be sourced in a way that does not deplete natural resources, can be continuously and repeatedly replenished and produce fewer carbon emissions than conventional jet fuel. Uncertainty in feedstock and technology choice, slow deployment and higher production costs have limited investment in large-scale projects.

Not all measures will be applicable in every circumstance, for example decarbonisation of long-haul flights is expected to be driven by SAF, while retro-fitting of existing aircraft is expected to offer promising opportunities for short-haul flights and on regional routes currently utilising propeller aircraft.

⁷⁴ Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Sustainable Aviation Fuel Roadmap* (2023), CSIRO website.

Airports and the operations they support will play a key role in the transition to net zero, including through developing new operating procedures for different fuel types, supplying the infrastructure and services required by aircraft and through decarbonising their own operations. Airport infrastructure, for example, may in future need to support battery powered aircraft requiring consideration of grid connections, onsite electric infrastructure and charging and battery storage infrastructure. They may also need to support arrangements for the distribution of SAF. The total costs of supporting infrastructure to facilitate the deployment of electric and hydrogen fuelled aircraft may mean SAF is a more cost-effective option for decarbonisation, even for short and medium haul routes.

The international community is taking action

Across the world, industry, governments and international organisations, such as ICAO, have recognised the need to take action now to ensure cleaner skies tomorrow. ICAO drives international policy on reducing emissions from international aviation and, along with international maritime, international aviation is one of only two sectors excluded from national totals as set out by the United Nations Framework Convention on Climate Change (UNFCCC).

ICAO regularly updates the UNFCCC process on international aviation emissions and their activities to reduce these emissions, including the long-term aspirational goal of net zero by 2050 (LTAG) in line with the Paris Agreement's temperature goal and the Carbon Offsetting and Reduction Scheme for international Aviation (CORSIA), to hold international aviation emissions at a global baseline.

Globally, the aviation sector recognises the need to decarbonise and has made progressive commitments to sustainable aviation solutions. The IATA, which represents 300 airlines and 83 per cent of air traffic, supports ICAO's LTAG and achieving net zero by 2050.

In Australia, these commitments are backed and matched (or exceeded) by Australian airlines such as Qantas and Virgin Australia, with Qantas also committing to a 25 per cent reduction in net emissions from 2019 levels and a target of 10 per cent sustainable aviation fuel in its overall fuel mix by 2030.⁷⁵

All emitters in the aviation industry will need to contribute to net zero commitments – not just airlines

To meet our net zero targets, all major emitters in aviation related industry sectors will have a role in reducing their emissions. This includes airports and other areas of the aviation industry including airport service providers, such as catering, security, safety, refuelling, and aircraft support and maintenance.

Emitters who do not meet the Safeguard Mechanism threshold, but who meet other threshold under the NGER scheme, are required to report annually on their emissions. In 2021–22, Australia Pacific Airports Corporation Limited (responsible for Melbourne and Launceston Airports) and Perth Airport Development Group Pty Ltd reported emissions under NGER.

Melbourne and Brisbane Airports have committed to be net zero by 2025, Sydney Airport has a goal of net zero carbon emissions by 2030, Hobart Airport is aiming to achieve net zero emissions by 2035 and Perth Airport has a goal to be net zero by 2040. These airports are pursuing initiatives including electrification of ground operations, using and generating renewable electricity, preparing for the use of SAF and purchasing offsets to meet their goals.

⁷⁵ Qantas Group (2023) *Valuing our planet*, Qantas Group website.

Non-CO₂ emissions

Overall emissions from aviation, including non-carbon sources, may have a cumulative effect three times the size of carbon emissions alone.⁷⁶ However, there is uncertainty about the effects of aviation's non-CO₂ emissions such as sulphur oxides, particulate matter and nitrogen oxides. The UK's Jet Zero Strategy notes recent scientific evidence suggests that 'whilst non-CO₂ emissions can have both warming and cooling effects, the net warming rate is likely to be around three times that of CO₂.⁷⁷ While SAF may reduce non-carbon emissions, further research is necessary to understand the impacts of these non-CO₂ emissions, and identify necessary options for their mitigation.

Internationally, governments have implemented a range of measures to drive decarbonisation

A number of jurisdictions have implemented policy mandates and incentives to drive the decarbonisation of aviation. These all have the potential to impact Australian aviation operators, and our approach will need to be considered in this international context.

Examples of international activity include:

Country	Policy mandate or incentive
United Kingdom	<p>The UK has formed a Jet Zero Council – an industry-government partnership with the aim of delivering at least 10 per cent SAF in the UK fuel mix by 2030 and zero emissions transatlantic flight within a generation.</p> <p>In 2022, the UK Government announced it will introduce a SAF mandate equivalent to at least 10 per cent (around 1.5 billion litres) of jet fuel to be made from sustainable sources beginning in 2025.</p>
European Union	<p>In April 2023 the EU Council and the European Parliament reached provisional political agreement on a proposal aiming to decarbonise the aviation sector and create a level playing field for a sustainable air transport (the ReFuelEU Aviation Initiative).⁷⁸</p> <p>The draft regulation sets minimum obligations for all fuel suppliers to gradually increase the share of sustainable aviation fuels in the fuel supplied to operators at EU airports. The minimum share of SAF supplied at each EU airport should be 2 per cent in 2025 and 5 per cent in 2030, increasing to 20 per cent in 2035, 32 per cent in 2040, 38 per cent in 2045, and 63 per cent in 2050.</p>

⁷⁶ European Union Aviation Safety Agency (2020) *Updated analysis of the non-CO₂ climate impacts of aviation and potential policy measures pursuant to the EU Emissions Trading System' Directive Article 30(4)*, European Union Aviation Safety Agency website.

⁷⁷ UK Department for Transport (2022) *Jet Zero Strategy*, UK Government website.

⁷⁸ European Union Aviation Safety Agency (n.d.), *Fit for 55 and ReFuelEU Aviation*, European Union Aviation Safety Agency website.

Country	Policy mandate or incentive
United States of America	<p>The US Government's SAF Grand Challenge has allotted \$4.3 billion in funding to support the development of SAF products and for fuel producers.</p> <p>The 2022 Inflation Reduction Act creates a new tax credit for certain fuel mixtures that contain SAF sold or used between 31 December 2022 and 1 January 2025. The SAF credit is \$1.25 per gallon of SAF which must have a minimum reduction of 50 per cent in lifecycle greenhouse gas emissions. There is also a supplemental credit of one cent for each percent the reduction exceeds 50 per cent.</p>
Japan	In 2021, Japan announced a 10 per cent SAF target for airlines by 2030.
India	<p>The Indian Ministry of Civil Aviation and the Ministry of Petroleum and Natural Gas are working to develop a blending mandate, likely 1 per cent.</p> <p>India aims to fly 100 million passengers using a 10 per cent SAF blend by 2030.</p>

The World Economic Forum also lead two global initiatives that aim to decarbonise the aviation industry and promote the production and use of SAF. The Clean Skies for Tomorrow Coalition sets a target of 10 per cent SAF in the global jet aviation fuel supply by 2030, while the First Movers Coalition commits to replacing 5 per cent of conventional jet fuel demand with SAF by 2030.⁷⁹

Australia is working with States bilaterally to collaborate on sustainable aviation and share experiences on mechanisms to decarbonise the aviation sector across the whole supply chain.

Australia has in place a comprehensive framework of measures to drive decarbonisation across our economy

Like other advanced economies, Australia is developing a comprehensive framework of measures to drive decarbonisation across the economy and meet our net zero targets. These measures include annual emissions reduction requirements for Australia's largest emitters (including our largest airlines) through Safeguard Mechanism reforms, public monitoring and reporting of emissions over time through the NGER scheme, financial support for clean energy projects through the Clean Energy Finance Corporation (CEFC) and the Australian Renewable Energy Agency (ARENA), as well as a range of other initiatives such as the Research and Development (R&D) Tax Incentive.

Through these measures and funding streams, the Australian Government aims to deliver its climate targets in a way that minimises costs and shares the effort across the economy.

⁷⁹ Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Sustainable Aviation Fuel Roadmap* (2023), CSIRO website.

State and territory governments are also playing an important role in decarbonisation and the development of new sustainable fuel industries

State and territory government investment is also supporting the establishment of new sustainable fuel industries in their jurisdictions.

Jurisdiction	Strategic plan or roadmap
Australian Capital Territory	The Climate Change Strategy will lay the foundations for the ACT's commitment to net zero emissions by 2045.
New South Wales	Hydrogen Strategy, which sets out the state vision and path for developing a thriving green hydrogen industry.
Northern Territory	NT Renewable Hydrogen Strategy which sets out the approach to the development of a new renewable hydrogen industry in the Territory.
Queensland	Biofutures 10-Year Roadmap and Action Plan, outlining a vision for a \$1 billion sustainable and export-oriented industrial biotechnology and bioproducts sector attracting significant international investment, and creating regional, high-value and knowledge-intensive jobs.
South Australia	South Australia's Hydrogen Action Plan aims to facilitate investments in hydrogen infrastructure, establish a regulatory framework, deepen trade relationships, foster innovation and workforce skills and integrate hydrogen into the state energy system.
Tasmania	Renewable Hydrogen Action Plan sets out a vision for Tasmania to capitalise on its existing and expanding renewable energy resources. This includes \$20 million funding towards the Tasmanian Renewable Hydrogen Fund.
Victoria	Renewable Hydrogen Industry Development Plan which sets out a blueprint for supporting the growth of this emerging high potential sector.
Western Australia	Western Australian Renewable Hydrogen Strategy, which sets out the strategic areas of focus for the development of the hydrogen industry.



The Australian Government is determined to work with industry to ensure a strong and sustainable aviation sector that supports emissions reduction targets on the path to net zero by 2050, while growing jobs and innovation. The Australian Government is clear that all emitters in the aviation industry will need to contribute to net zero commitments.

- How can Government work with industry to ensure a strong and sustainable aviation sector that supports emissions reduction targets while growing jobs and innovation?
- Given there are a number of measures that industry and government could pursue to help achieve net zero by 2050 in aviation, are there specific measures that more emphasis and support should be given to?
- What should be included in relation to aviation in the Australian Government's Transport and Infrastructure Net Zero Roadmap and Action Plan (including for sectors such as GA and airports)?
- How can the Australian Government ensure all emitters in the aviation sector play a role in meeting Australia's emissions reduction targets?

5.2 Sustainable aviation fuel

Key issues

- SAF is the most advanced means to support aviation meeting the objective of net zero by 2050.
- Demand for SAF is high – including both domestic and regional (Pacific) demand, but it is expensive and currently produced only in very small quantities compared to global demand for jet fuel.
- There is competition for SAF feedstocks between transport modes and countries.
- As set out in CSIRO's recently released Sustainable Aviation Fuel Roadmap, Australia has an opportunity to develop a diversified portfolio of feedstocks for an Australian SAF industry that could bring many advantages to Australia including new jobs, new regional jobs, shoring up domestic liquid fuel security, and providing a vital input for decarbonising Australian aviation.
- New refining capacity will be required to unlock a potential Australian SAF industry. Private capital markets and funding supplied through specialist government investors such as ARENA and the CEFC are possible project funding sources.

Stakeholder feedback

- Immediate priorities identified by stakeholders are to lay foundations for a supportive regulatory and policy environment that supports increased domestic production and uptake of SAF.
- Particular measures requested from industry include building social licence for a transition to SAF, ensuring SAF integrity through education and certification, ensuring the benefits of SAF use can be accounted for through existing reporting mechanisms like NGERs or through other, new arrangements, establishing a national framework for Voluntary Consumer Purchasing and exploring the merits of SAF targets.

Sustainable aviation fuel provides one of the main levers in the immediate and longer term to reduce emissions

Given the limits of operational efficiency gains, the early stage of development of alternative propulsion technologies and the increasing competition for offsets, SAF provides one of the main levers in the immediate and longer term to reduce aviation emissions. Compared to the other options, SAF currently has the greatest potential to reduce the most carbon emissions as it uses mature technologies that integrate with existing and new turbine powered aircraft, provide much greater range than alternative propulsion technologies and most importantly, can be scaled. With timeframes for widespread deployment of new propulsion technologies in large aircraft likely to be affected by a range of factors such as the pace of technological development and airline fleet renewal timelines,⁸⁰ SAF is expected to play a key role in helping meet carbon emissions reduction targets.

80 L.E.K. Consulting (2023), *Aviation White Paper Scenario Analysis of the Future of Australian Aviation Final Report*, report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

As well as reducing net carbon emissions, the use and production of SAF also provides other benefits when compared to fossil fuel derived jet fuel:

- **Reduction in particulates:** The combustion of crude-oil derived jet fuel produces a range of particulate matter emissions and soot. These lead to formation of ice crystals and contrails which, when accumulated and persistent, have potentially significant warming effects on the atmosphere. SAF potentially reduces the overall warming effect of combustion, due to reduced proportion of particulates and soot.⁸¹
- **Renewable co-products:** The production of SAF leads to the production of other fossil fuel replacements, such as renewable diesel, lubricants and lighter hydrocarbons, allowing other local industries to access low-carbon alternatives.⁸²

Sustainable aviation fuel costs more and supply is low

In 2022, between 300 and 450 million litres of SAF is estimated to have been produced globally, three to four and a half times the 100 million litres of SAF produced in 2021, and a significant expansion from well under one million in 2016.⁸³ But SAF still covered only around 0.1 to 0.15 per cent of total aviation fuel demand.⁸⁴ Currently, there is no SAF incorporated into Australia's jet fuel supply.

Internationally, SAF costs currently two to four times more than conventional fuel,⁸⁵ mostly due to limited economies of scale and feedstock costs.⁸⁶ SAFs are not currently forecast to reach price parity unless there are significant developments in technology or market conditions. However, as they require minimal infrastructure investment and aircraft redesign, the overall cost impact of SAFs on the aviation industry may be less than this price difference suggests.

Global supplies are expected to grow strongly over the next few years. For example, Neste, the world's largest SAF producer, plans to increase production more than 10 times to 1.875 billion litres by the end of 2023.⁸⁷ Where SAF supplies are developed is also important. The US and Europe have strong policies in place to support development of SAF production. But supply in the Asia-Pacific region, which is expected to drive much of international economic development out to 2050, is important if growth of the aviation sector is not to be constrained.

Over time, new forms of Power to Liquid generation of SAF may be unlocked through R&D. The use of feedstocks such as hydrogen to create synthetic SAF are nascent, but research in this space is encouraging.

81 Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Sustainable Aviation Fuel Roadmap* (2023), CSIRO website.

82 Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Sustainable Aviation Fuel Roadmap* (2023), CSIRO website.

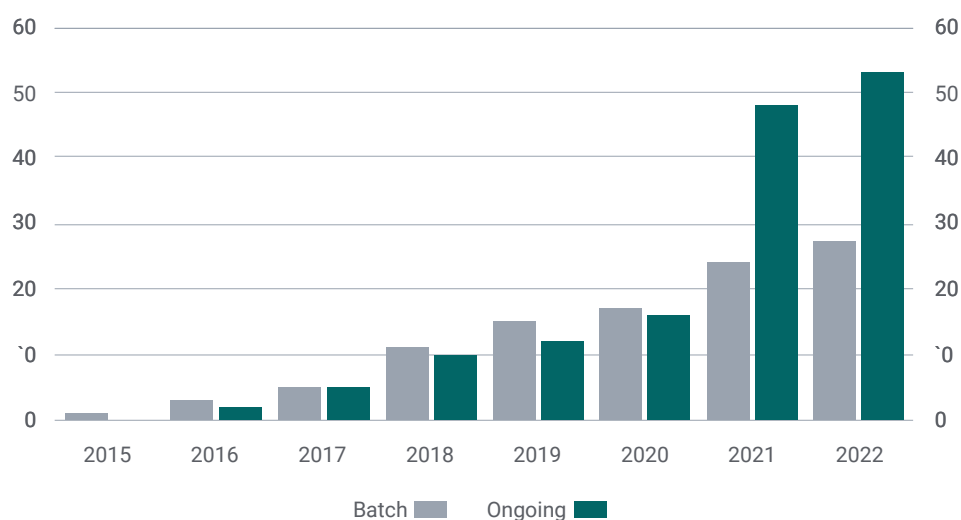
83 International Air Transport Association (n.d.) *SAF Deployment*, International Air Transport Association website.

84 International Air Transport Association (n.d.) *SAF Deployment*, International Air Transport Association website.

85 International Air Transport Association (2022), *Incentives Needed to Increase SAF Production*, International Air Transport Association website.

86 Neste (2018) *Renewable Jet Fuel, why does it cost more?*, Neste website.

87 Neste (n.d.), *Neste MY Sustainable Aviation Fuel*, Neste website.

Figure 9: A growing number of airports are distributing SAF on an ongoing basis⁸⁸

Not all sustainable aviation fuel decarbonises equally

Biofuels can emit more greenhouse gases than some fossil fuels on an energy-equivalent basis, depending on production process and time horizon of analysis.⁸⁹ Crop-based feedstocks may also compete with food production, potentially increasing the cost of essential grains and cooking oils. Robust certification arrangements, which provide assurance of SAF environmental credentials will be required to support confidence in SAF integrity.

Australia's lack of refining capacity limits opportunities to leverage feedstock advantages

Today there is sufficient feedstock to supply approximately 5 billion litres of SAF production, but Australia is constrained by refining potential.⁹⁰ Even with planned SAF production coming online from 2026 onwards, establishing Australia as a sovereign SAF producer will require new refining capacity. See Chapter 4 for a discussion of opportunities for regional Australia presented by SAF production.

CSIRO's *Sustainable Aviation Fuel Roadmap* presents a techno-economic analysis of regional feedstock opportunities, presenting governments, industry and investors with map of opportunities for leveraging our region's comparative advantages in the production of SAF.

⁸⁸ Reproduced from US Global ETFs (2022) *2022 Has Been a Pivotal Year for Sustainable Aviation Fuel*, US Global ETFs website.

⁸⁹ United States Environmental Protection Agency (2023), *Economics of biofuels*, United States Environmental Protection Agency website.

⁹⁰ Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Sustainable Aviation Fuel Roadmap* (2023), CSIRO website.

Stakeholders have identified a wide range of possible interventions that could be considered by governments and industry to help accelerate the local industry

During consultations on the Aviation White Paper Terms of Reference, and at roundtable discussions on the design and establishment of the Australian Jet Zero Council, stakeholders have raised a number of ideas for further supporting the push to jet zero through the establishment of a domestic SAF industry.

Stakeholder feedback has covered a wide spectrum of ideas, canvassing proposals such as:

- building social licence for SAF through education
- building confidence in SAF integrity through robust certification arrangements
- exploring more flexible accounting arrangements to better recognise SAF use
- creating demand for domestically produced SAF through government procurement, including Australian Public Service (APS) travel and Defence fuel purchasing. This procurement activity could support the Australian Government's 'APS Net Zero 2030' policy, for the APS to reduce its greenhouse gas emissions to net zero by 2030
- reviewing fuel excise arrangements
- considering grants, subsidies and partnerships with industry participants seeking to produce SAF in Australia
- stimulating demand through mandates, targets or low-carbon fuel standards, and
- additional supply side support measures such grant programs.

Short-, medium- and long-term priorities

It will not be feasible to pursue all possible lines of enquiry at once, suggesting the need to identify short-, medium- and long-term priorities.

The Jet Zero Council will provide a forum to help drive and coordinate investigation of possible measures to establish the 'building blocks' of a supportive regulatory and social environment. The initiatives below could be prioritised for investigation in order to support existing industry efforts to establish a domestic SAF industry, and build confidence for investment in the next generation of biorefineries.

Table 1: Establishing a domestic SAF industry

Building industry literacy and social licence	Jet Zero Council to lead work to identify potential social licence activities, including through industry and community awareness and education initiatives, to address perceptions of 'greenwashing'.
Establishing robust SAF certification arrangements	The Jet Zero Council will assist Government with advice on the development of a certification regime, taking into account Green Paper feedback, international standards and existing work across Government on guarantee of origin schemes for other products, such as hydrogen. ⁹¹
National Framework for Voluntary Consumer Purchasing	Jet Zero Council to explore development of the Framework to support customers opting in to purchase a portion of SAF for their flights.

⁹¹ Department of Climate Change, Energy, the Environment and Water (n.d.) *Guarantee of Origin scheme*, Department of Climate Change, Energy, the Environment and Water website.

Exploring more flexible arrangements to better recognise sustainable aviation fuel use

The Australian Government has updated the NGER Scheme to make biomass-derived SAF reportable within the Scheme from 1 July 2023. The Australian Government recognised calls for further change by renewable fuel consumers who source fuel from common infrastructure to be able to reflect the full emissions benefits of these fuels in their emissions reporting. The Australian Government will consider whether these issues are best addressed through updates to NGER or through developments in other schemes. Advice of the Climate Change Authority and the Australian Jet Zero Council may inform development of the Australian Government's response to this issue.

The Jet Zero Council could provide advice on potential amendments to NGER accounting or through other arrangements, informed by views presented in response to the Green Paper and to the public consultations on updates to the NGER Scheme.

Demand signal options

Stakeholder feedback has suggested that an opportunity to further support the development of a local SAF industry would be to explore the possibility of introducing blending mandates, low-carbon fuel standards or the setting of public targets for future SAF consumption to provide a clear 'demand signal' to the market.

Mandates

Imposing a mandate on the industry in addition to the obligations imposed by the Safeguard Mechanism would capture smaller aviation businesses not covered by the Safeguard Mechanism. It would create a new 'demand signal' for SAF production although global demand for SAF is already high.

Assessment of the case for a blending mandate could be progressed through an independent cost-benefit analysis of possible models, considering projected supply levels and in the economy wide abatement costs of the measures, as well as the extent to which it would complement the Safeguard Mechanism reforms. This work could also consider the extent to which a SAF mandate has implications for the production and demand for other low carbon fuels.

Low-carbon fuel standards

Stakeholder feedback has included the suggestion that Government considers the introduction of a low-carbon fuel standard. Unlike volumetric mandates, low-carbon fuel standards are performance standards that mandate a specific reduction in the carbon intensity of the average fuel mix over time. Given Australia is dependent on different liquid fuels across multiple sectors, a low-carbon fuel standard will need to be considered in a broader process, outside the aviation specific Green and White Papers.



SAF targets

SAF targets (voluntary or mandatory) provide another option for sending clear demand signals to the local production market.

However, mandatory targets have been criticised as imposing unnecessary costs on industry given the current SAF pricing differential and that there are few other such measures being used by other countries who in essence have competitor airlines in the Asia-Pacific region.

Stakeholders have also observed that Government procurement policy targets could be used as a lever to stimulate more local SAF production – through leveraging Defence – as the Commonwealth's largest direct consumer of aviation fuels, and Government travel purchasing power.

A long-term vision of Australia as a SAF producer and consumer

In setting short, medium- and long-term priorities, it will be important to keep the 'end game' in mind. In consultations to date, stakeholders have stressed they see immense opportunity for Australia in becoming not just a consumer of SAF, but also a producer – which could deliver a trifecta of benefits:

- reduced aviation emissions
- new regional jobs and industries, and
- greater liquid fuel security.

Realising such a vision will require a concerted effort from across investors, feedstock producers, refiners and suppliers, the aviation industry, its customers and government.



SAF is currently the most viable approach to decarbonising the aviation sector.

- What are the benefits and risks associated with updating the NGER scheme and/or other policy mechanisms to enable unique claims on SAF sourced through common infrastructure? How can risks be managed?
- What types of arrangements are necessary to support industry confidence in the quality standards and sustainability certification of SAF?
- Should policy and regulatory settings be refined to support development of domestic SAF production capability and industry take-up of SAF?
- What are the current and future challenges in developing an Australian SAF production industry, including challenges associated with growing, refining and consuming feedstocks?



5.3 Electric and hydrogen powered aviation

Key issues

- Hydrogen and electrification are promising new low and zero emission aviation technologies, with reduced range compared to carbon-based fuels.
- While there are differing views, it is likely that hydrogen powered aircraft will not be in significant use until at least 2040–2050.
- Some electric powered aircraft technology manufacturers are targeting 10+ seat capacity before 2030,⁹² however, broader deployment of electric powered aircraft is not expected until at least the 2030s. The application of these technologies will likely be most suitable for short-haul routes.
- The development and adoption of these technologies will require capital and operational investment.

Electrification is a promising new low/zero emission aviation technology...

Electric powered aircraft use battery electric propulsion systems and are initially aimed at replacing traditional fuel powered piston and turbine engines. Electric powered technologies offer zero emissions aviation, when powered by sustainable electricity sources.

Hybrid-electric conversions, which convert conventionally powered aircraft into aircraft powered by both conventional fuel and electric power sources may be attractive in the short- to medium-term.

...as is hydrogen powered aviation...

Hydrogen aircraft use hydrogen-powered fuel cells to power electric motor-driven propellers in smaller planes, or burn hydrogen to power jet engines in larger aircraft. Hydrogen eliminates CO₂ emissions in flight completely. Considering non-CO₂ emissions as well, estimates show hydrogen combustion could reduce the climate impact of flight by up to 75 per cent and fuel-cell propulsion by up to 90 per cent.⁹³

To support emissions objectives, hydrogen will need to be produced through methods producing low or zero carbon emissions.

Deployment of electric and hydrogen aircraft will not be immediate...

Hydrogen powered aircraft are unlikely to enter widespread deployment until earliest 2035, with 2040–2050 more likely. Electric powered aircraft technology is more advanced, with some manufacturers targeting 10+ seat capacity before 2030.⁹⁴ Broader deployment of electric powered aircraft is expected in the 2030s.

In the medium to long term, larger hydrogen aircraft may enter service in Australia to replace or supplement fleets of smaller jet aircraft.

92 L.E.K. Consulting (2023), *Aviation White Paper Scenario Analysis of the Future of Australian Aviation Final Report*, report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

93 Clean Aviation Joint Undertaking (9 June 2022), *'How can hydrogen technologies power the clean aircraft of the future?'*, Clean Energy Aviation website.

94 L.E.K. Consulting (2023), *Aviation White Paper Scenario Analysis of the Future of Australian Aviation Final Report*, report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

...but could support decarbonisation of general and regional aviation...

Using currently available technology, electric aircraft will likely be limited to routes between 300–500km, due to battery energy density limitations, making them suitable for regional routes and general aviation. As new battery technologies offering greater energy densities become available, longer haul flights of 1–2 hours duration may be achievable by 2030. The projected cost efficiencies of battery-powered aircraft may see them adopted quickly for regional short-haul routes. The adoption of electric or hydrogen-powered AAM could also support future decarbonisation efforts in the sector (see Chapter 9 'Emerging Aviation Technologies').

A proportion of Australia's GA fleet, due to its age, relies on Avgas. Avgas is not currently substitutable with SAF, meaning SAF is not available as a pathway for that portion of the GA sector. Fleet modernisation and new propulsion technologies could form a pathway for GA operators who cannot use SAF to decarbonise.

There is significant industry interest in the potential for electric planes to decarbonise regional and short-haul flying for aircraft with passenger capacity of 20–30 seats. As an example, electrification of aircraft propulsion is being rolled out for light aircraft and GA training, particularly as conversions of existing aircraft. Adoption of electric aircraft will necessitate significant charging infrastructure at airports.

Remote and regional aviation faces challenges to service viability and customer economic constraints that may necessitate further interventions to support rollout of SAF to these areas. Alternative options including electrification may also be challenged by low electricity grid resilience and the cost of replacement aircraft.

There are barriers to the development and adoption of electric and hydrogen technologies

With fleet turnover timeframes long, where retro-fitting of new technology to existing aircraft is not an option, decisions to replace Australia's ageing turboprop fleet with next generation conventional aircraft may delay the uptake of electric and hydrogen aircraft, as the adoption of these new technologies and associated operational requirements will be deferred until the next series of fleet upgrades.

Airports will need to upgrade infrastructure to support new technologies. For hydrogen, these could include hydrogen facilities on-airport to mitigate hydrogen volumes lost during transportation. Some smaller regional airports may face difficulties ensuring hydrogen supply, depending on arrangements for hydrogen logistics supply chains. For electric aircraft, this could include upgrades to support battery charging, swapping and storage, and electricity grid upgrades.

Total ownership costs for electric aircraft remain uncertain at this point in time. In addition to being initially more expensive to purchase than conventional aircraft, electric aircraft may incur substantial costs for battery replacement and recycling. Ongoing maintenance and operation costs may be lower.

Reliance on hydrogen to power the aviation industry will require substantial improvements to hydrogen production transport and capacity in Australia.



Australian companies are pushing the frontier...

Regional Express has partnered with Dovetail Electric Aviation to trial aircraft fitted with a single hydrogen-electric engine (powered by fuel cell and batteries) in 2024. Dovetail Electric has also received \$3 million from the Australian Government to develop, test and certify conversion of turbine-powered planes into fully electric-powered aircraft.

Queensland-based Stralis Aero is developing a program to retrofit hydrogen fuel cell powered electric engines into the 15 seat Beechcraft B1900D aircraft, with a planned entry into service in 2026. To be a zero emissions option this will require the use of hydrogen produced with zero emissions. With the viability and attributes of these new technologies uncertain, early government support for research and development may provide initial investment certainty for industry to help assess the viability of these technologies. For Government, engagement with research and development activity may help inform future regulation and certification of these technologies, and inform future policy directions.

The Emerging Aviation Technology Partnerships (EATP) Program is a Government-industry partnership program, providing government funding and support for industry to develop and deploy innovative technologies including drones, eVTOL aircraft, and low and zero emission propulsion systems. The EATP Program aims to support the growth of the emerging aviation technology sector in Australia, address regulatory barriers to technology uptake, and demonstrate the potential benefits to Australian businesses and communities. Round 1 included funding for Praxis Labs to develop structural solar surfaces for the wings of an upcoming fleet of electric aircraft.



...and existing initiatives could be leveraged to support hydrogen supply chains...

The Australian Government has initiatives underway to support the development of Australia's hydrogen capacity. The National Hydrogen Strategy sets a vision for a clean, safe and competitive hydrogen industry and contains strategic actions around national coordination, developing production capacity, supporting local demand, responsive regulation, research and development and skills and workforce. A key element of Australia's approach will be to create hydrogen hubs, clusters of large-scale demand around ports, cities, regional or remote areas to provide industry with a springboard to scale. On 24 February 2023 Energy and Climate Ministers agreed to review the National Hydrogen Strategy. The Australian Government will be leading a Review of the National Hydrogen Strategy to ensure Australia remains on a path to be a global hydrogen leader by 2030 on both an export basis and for the decarbonisation of Australian industries. The review will take into account global and domestic developments since the original strategy was developed, including the impact of the US Inflation Reduction Act and other emerging overseas policies to support hydrogen.

The Australian Government committed \$2 billion in the 2023–24 Budget for the Hydrogen Headstart program to scale up development of Australia's renewable hydrogen industry. The Australian Government committed \$38.2 million in the 2023–24 Budget for a Guarantee of Origin scheme over four years to track and verify emissions associated with renewable electricity, hydrogen and hydrogen energy carriers. The scheme is intended to commence in 2024. Over time, the scheme is planned to expand to certify a range of low emissions products such as synthetic fuels. The ARENA's Renewable Hydrogen Funding Round committed \$70 million to help fast track development of renewable hydrogen in Australia.

Additionally, the Australian Government has committed over \$500 million to support the development of Regional Hydrogen Hubs, including in Townsville (Qld), Gladstone (Qld), Port Bonython (SA), Bell Bay (Tas), the Hunter Valley (NSW), the Pilbara (WA), and Kwinana where the Australian Government has committed \$70 million for BP to develop a green hydrogen plant at its Kwinana facility (H₂Kwinana).

Through the \$300 million Advancing Hydrogen Fund, the CEFC is working to support the growth of a clean, innovative, safe and competitive Australian hydrogen industry. Renewable hydrogen can enable the deep decarbonisation of difficult-to-abate sectors of our economy, particularly in transport and industry, while accelerating the contribution of renewable energy.

These initiatives to support a domestic hydrogen industry and associated supply chains could help enable aviation's adoption of hydrogen technologies, including as a feedstock for synthetic SAF production. It will be important that aviation is considered in the development of these and future economy-wide hydrogen initiatives.



...before developing longer term aviation-specific policy options

With the uncertainty about viability and deployment timeframes of these technologies, the optimal types of longer-term policy interventions are unclear. However, as technologies mature, further investigation and development of policy and regulatory options will be necessary to give industry the required certainty and to ensure the safety of these technologies. Potential longer-term policy solutions could involve reviewing regulatory frameworks to ensure they remain appropriate to accommodate new technologies, certification of hybrid-electric, electric and hydrogen powered aircraft, and support for airports to invest in electric and hydrogen infrastructure.



The Australian Government sees new propulsion technologies as an opportunity to decarbonise the aviation sector in the longer term. New propulsion technologies may provide a pathway for decarbonising the general and regional aviation sectors.

- How can policy and regulatory settings support research and development and subsequent investment in emerging low and zero emission technologies and related infrastructure?
- What information and guidance is needed to support regional aviation's net zero transition in the context of these emerging technologies?



Airport development planning processes and consultation mechanisms





Aviation is integral to Australia’s economic and social landscape. The aviation industry enables tourism, trade, and essential economic connectivity, and plays a critical role in facilitating the delivery of services to regional communities. But aviation operations also generate a range of impacts on communities. Governments, planners, regulators, airports, airlines and air service providers all have a role to play in engaging with the communities impacted by their activities.

Aircraft noise affects communities surrounding airports. Aviation can also generate other adverse impacts such as air pollution from aircraft and ground operations. The Australian Government remains committed to transparent and proactive aircraft noise management, international benchmarking and collaboration across industry to manage the impact of aircraft noise. However, a level of noise disturbance is unavoidable as activity grows to meet passenger demand. Through the Aviation White Paper, the Australian Government will consider what additional options are needed to improve airport development planning processes and consultation mechanisms. The Australian Government is not considering imposing any additional constraints on airports such as curfews or movement caps.



6.1 Noise

Key issues

- How best to facilitate growing demand for aviation while managing community impacts.
- Effective land-use planning is the best way to reduce the impact of noise on the population while managing urban expansion but responsibility for that is dispersed in government.
- The airports, airlines and GA operators who profit from aviation have an important role to play in managing the community impacts generated by their investments and activities.
- The projected growth in drone use at lower altitudes will cause new, and different types, of noise impacts. New governance arrangements need to be established to respond to this.

Stakeholder feedback

- 63 of the 192 public submissions received on the Terms of Reference for the Aviation White Paper concerned noise, often accompanied by feedback on the importance of consultation mechanisms with impacted communities.
- Community members, advocacy groups and the Aircraft Noise Ombudsman (ANO) consider the existing use of Australian Noise Exposure Forecast (ANEF) contours to portray the impacts of aircraft noise to be inadequate.
- The Australian Airports Association noted in its submission on the Terms of Reference for the Aviation White Paper '[t]he gap between community expectations and the government and aviation industry's response to aircraft noise management presents a clear challenge to social licence of the aviation industry out to 2050.'⁹⁵
- The ANO observed complainants 'often express confusion when trying to find out who is responsible for regulating aircraft noise and anger at what appears to be a general lack of regulation.'⁹⁶
- Communities report it is unclear how their concerns are considered when decisions about airport planning or flight paths that affect them are being made.

95 Australian Airports Association (2023) *Aviation White Paper – response to the Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

96 Aircraft Noise Ombudsman (2023) *Submission to Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Aircraft generate noise

Australians and Australian businesses benefit from aviation, including through the ability to travel and/or transportation of freight by air. With demand for aviation increasing, greater airport capacity is being delivered to meet scheduled air traffic growth out to 2050. Aircraft movements in Australia are expected to increase and could increase from 3 million up to between 8 and 10 million per year by 2050.⁹⁷ With Australian airspace becoming busier towards 2050 – with potential annual aircraft movements tripling by 2050 – the challenge will be to balance community concerns around noise with the social and economic benefits of aviation growth.⁹⁸ While the speed, scale and deployment details of drones and AAM is uncertain, it is possible these craft will start to generate significant noise at lower altitudes as well.

There is a role for airlines, airports, air service providers and all three levels of government to play in mitigating the impact of aircraft noise. Airlines can ensure they land and take off at airports according to noise abatement procedures, by choosing efficient procedures to reduce noise and by deploying more advanced aircraft which generate less noise. Airports can ensure their planning documentation is sufficiently detailed and accessible so the community can understand noise impacts, including the communities further away from airports who may not be expecting to be impacted by aircraft noise. The Australian, state and local governments can ensure appropriate land-use planning occurs around airports to minimise residential and sensitive development close to them.

The Australian Government encourages airports to take a greater role in engaging with communities outlining the measures they take to reduce aircraft noise and communicating and providing easy-to-understand information about aircraft noise measurements and current and future noise mitigation strategies. There may be scope for best practice guidelines on consultation with affected communities to be developed for LFAs. The Australian Government is aiming to deliver a best-practice community engagement program for the preliminary flight paths of WSI and welcomes stakeholder feedback on appropriate engagement opportunities. Airservices Australia is also developing a Community Engagement Standard to guide consultation on new or changing airspace designs (see 'Airservices Australia's draft Community Engagement Standard' in this chapter).

Aircraft noise complaints

Airservices Australia is responsible for receiving complaints and enquiries about aircraft noise and operations at LFAs and most airports in Australia. Complaints can also help identify issues of concern and possible opportunities for improvement. Airservices' Noise Complaints and Information Service (NCIS), hosted on its website, is where the community can go to make a written complaint. The Australian Government is seeking feedback on how the operation and effectiveness of the NCIS could be improved.

Under current processes, when Airservices receives a written complaint, it will review and determine an appropriate response, generally within 21 days of receiving the complaint. Airservices will investigate the complaint and then send its findings to the person in writing. If Airservices cannot identify any way to resolve the issue, reasons will be given explaining why. Some stakeholders have raised concerns about the level of resourcing and transparency around the existing complaint response process.

97 L.E.K. Consulting (2023), 'Aviation White Paper: Scenario Analysis of the Future of Australian Aviation', report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

98 L.E.K. Consulting (2023), 'Aviation White Paper: Scenario Analysis of the Future of Australian Aviation', report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

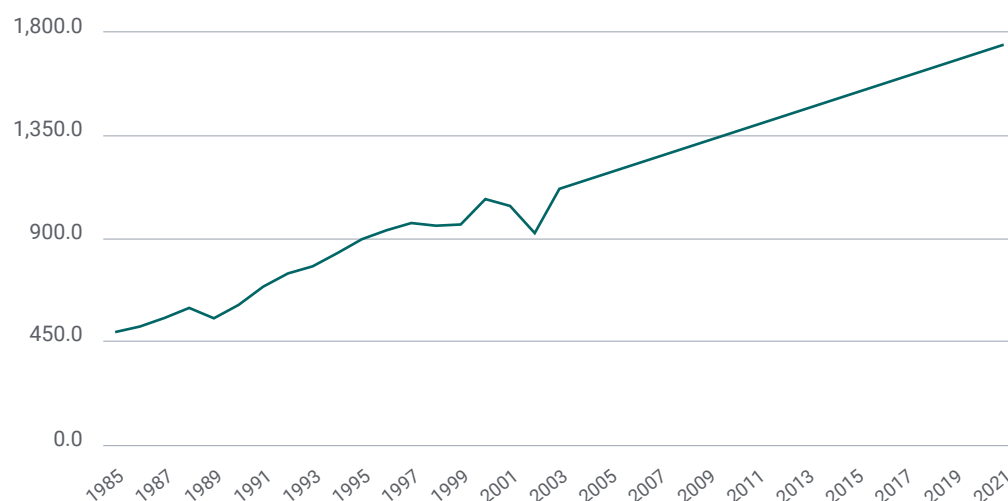
If a person is not satisfied with the way Airservices has handled a complaint, the person can request a review by the Aircraft Noise Ombudsman (ANO). The ANO was established in response to the Australian Government's 2009 Aviation White Paper as a function within Airservices to conduct independent reviews of how Airservices handles complaints about aircraft noise, the community consultation processes related to aircraft noise, and the presentation and distribution of aircraft noise-related information. The ANO can make recommendations for improvements where necessary.

The ANO is not established under separate legislation. The Minister responsible for Airservices Australia has set successive Statements of Expectations for Airservices Australia which have included supporting the ongoing role of an independent ANO, which reports to the Airservices Board. The rationale for establishing the ANO within Airservices Australia was that role of the ANO was very closely tied to the role of Airservices Australia as the air navigation service provider and their role in managing aircraft noise, and that having it closely aligned would provide greater benefit than having it as an independent body.

However, the 2010 Rural and Regional Affairs and Transport References Committee's report into the effectiveness of Airservices Australia's management of aircraft noise⁹⁹ and some submissions to the Terms of Reference for the Aviation White Paper, as well as attendees at roundtables held to consult on the Terms of Reference, have called for increasing independence of the ANO by making it separate from Airservices Australia and having it report directly to the relevant Minister. Stakeholders have suggested this would not only allow the ANO to be able to act independently, but improve the perception of independence, community trust and confidence in the Ombudsman, and potentially afford greater scope and enforceability for ANO recommendations.

For aviation to continue to grow, airports, airlines and Airservices Australia must actively foster the social licence for airport and aviation activity, which will always need to be the subject of an ongoing conversation, otherwise there may be restrictions on aviation activity and growth.

Figure 10: Total scheduled hours flown international and domestic.¹⁰⁰



99 Rural and Regional Affairs and Transport References Committee (2010), *Report The effectiveness of Airservices Australia's management of aircraft noise*, Australian Parliament House website.

100 Bureau of Infrastructure and Transport Research Economics (2022), *Timeseries 2014-2021 Australian Aircraft Activity 2014-2021* [data set], bitre.gov.au.

How the Australian Government regulates and manages aircraft noise

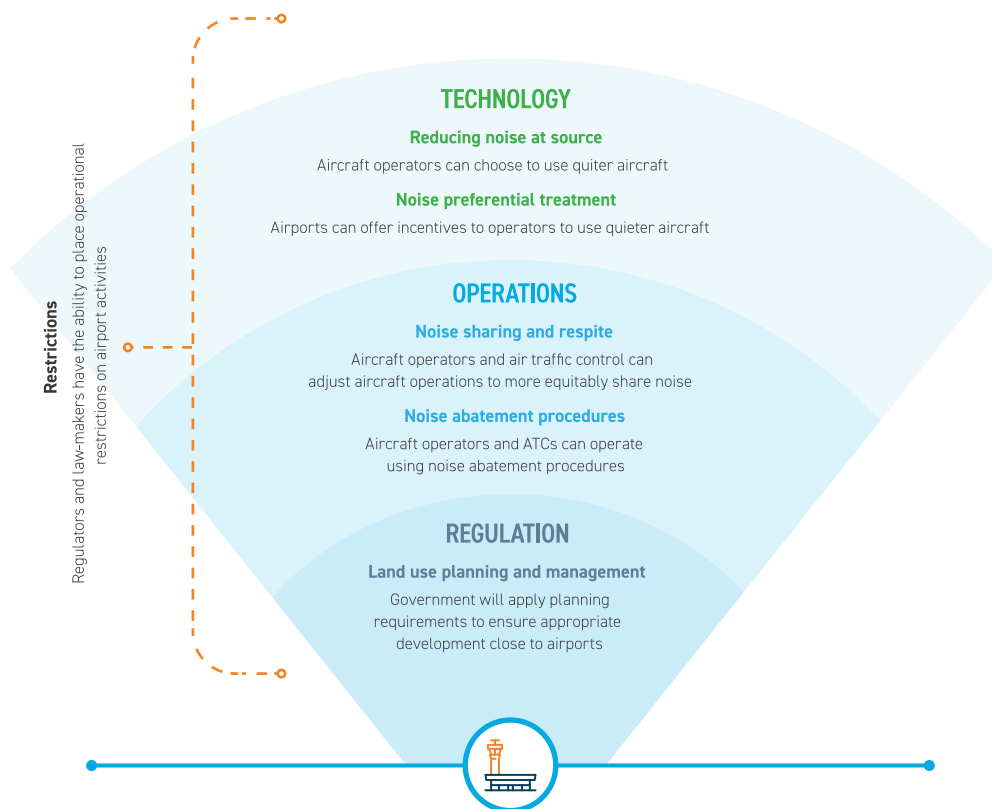
This chapter aims to set out clearly the framework through which governments, planners, regulators, airports, airlines and air service providers consider and take into account the noise impacts of aviation. This is to provide transparency to communities as to how the framework operates, and to support stakeholders to provide feedback as to how this framework might be improved.

The regulatory approach to aircraft noise draws on international best practice as contained in the ICAO's *Balanced Approach to Aircraft Noise Management* (the ICAO Balanced Approach). The four elements of the balanced approach are:

- reduction of noise at the source (technology standards)
- land-use planning and management
- noise abatement operational procedures, and
- operation restrictions.¹⁰¹

The ICAO Balanced Approach is reflected in Airservices Australia's approach to aircraft noise management.

Figure 11: Aircraft noise management¹⁰²



101 International Civil Aviation Organization (n.d.), *Aircraft noise*, International Civil Aviation Organization website.

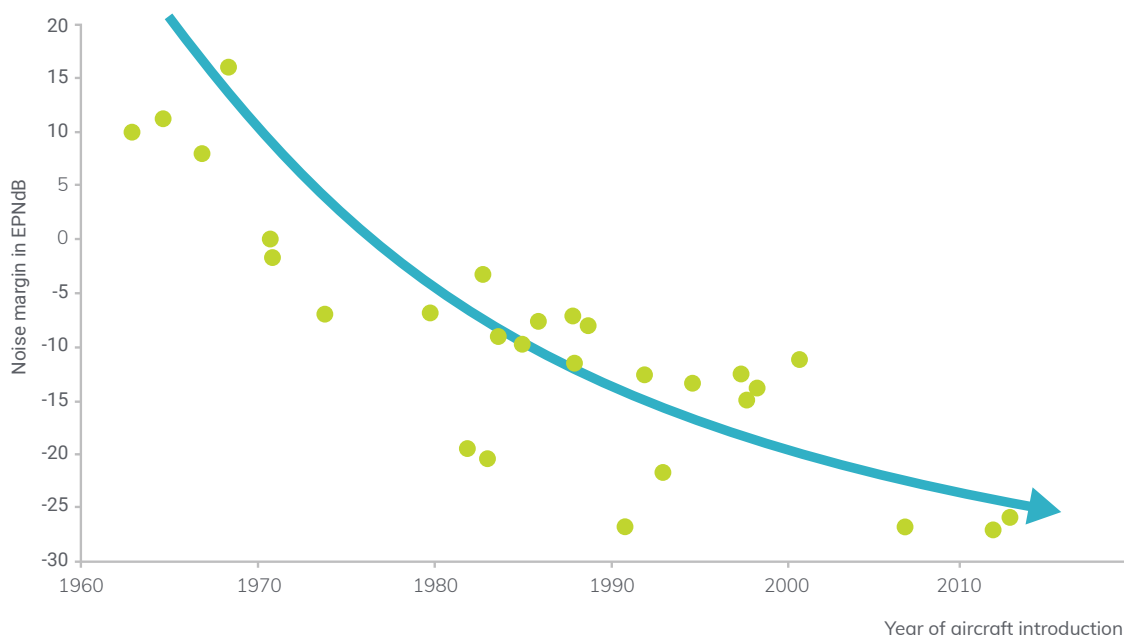
102 Airservices Australia (n.d.), *Our Commitment to Aircraft Noise Management*, Airservices Australia website.

Technology

Australian aircraft noise regulations require most aircraft operating in Australian airspace to comply with noise standards and recommended practices that stem from Australia's international obligations under the Convention on International Civil Aviation.¹⁰³ Recognising aircraft operating in Australia are predominantly built overseas, the Australian Government supports continued application of these international standards for aircraft noise.

Technological innovations over the last several decades have led to aircraft becoming progressively quieter, particularly through composite airframe materials and improvements to engine technology.¹⁰⁴ But while each generation of aircraft is quieter, aviation growth is expected to 2050, driven by passenger demand. The deployment of new technologies such as drones and AAM, while not as loud as larger aircraft, will also raise noise issues given the low altitudes and proximity to residential areas at which they operate. It will be important to regulate these new technologies in a way that maintains social license and delivers benefits to communities.

Figure 12: Noise margin (effective perceived noise in decibels, EPNdB) and year of aircraft introduction¹⁰⁵



While industry drives technological innovation and the adoption of quieter aircraft, in some countries, airports incentivise airlines to use quieter technology.

¹⁰³ Department of Infrastructure, Transport, Regional Development, Communications and the Arts (n.d.) *Aircraft noise regulations*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

¹⁰⁴ Department of Infrastructure, Transport, Regional Development, Communications and the Arts (2016), *Western Sydney Airport Environmental Impact Statement, Volume 2A, Chapter 10 Noise (aircraft)*, Western Sydney Airport website.

¹⁰⁵ Department of Infrastructure, Transport, Regional Development, Communications and the Arts (2016) *Western Sydney Airport Environmental Impact Statement, Volume 2A, Chapter 10 Noise (aircraft)*, Western Sydney Airport website.

Operations

Noise sharing and restrictions, noise abatement procedures

Noise sharing arrangements, including noise abatement procedures, and operational restrictions apply at a number of airports around Australia. These types of noise management techniques are specific to each airport due to the different geographic, meteorological and demographic make-up of the towns or cities the airports are situated in.

Four LFAs (Sydney, Gold Coast, Adelaide and Essendon Fields) operate under a curfew imposed by the Australian Government. Sydney Airport also operates with an hourly movement cap on flights, under Commonwealth legislation. These arrangements limit passenger aircraft movements to certain hours of the day, and limit the number of planes which may take off or land at an airport in any one hour. The imposition of caps and curfews have significant economic impacts, affecting an airport's productivity and profitability, and limits the ability of airlines to recover from disruptions (for example due to adverse weather). The Australian Government is not considering imposing any additional constraints on airports such as curfews or movement caps.

Formal, noise sharing arrangements currently apply at Sydney Airport through a Long-Term Operating Plan (LTOP)¹⁰⁶. The LTOP was developed in the mid-1990s in response to community pressure to share the noise generated by Sydney Airport. Airservices Australia developed a report setting out options for operating the Airport in a way that shares the noise as fairly as possible. This document was released for public comment in late 1996 and a final version was developed, taking into account community feedback. The then-Minister for Transport and Regional Development directed Airservices Australia to implement the LTOP. To support this, Airservices Australia has adopted a 'preferred runway selection system' which is further dependent on weather and traffic conditions.¹⁰⁷

Noise abatement procedures are also in place at all major airports in Australia, which are designed to reduce aircraft noise through different ways aircraft depart and approach an airport, including:

- preferred flight track and/or runway modes of operation
- Noise Abatement Departure Procedures such as directing aircraft to depart over water at night
- approach procedures such as Continuous Descent Operations (CDO) and low power, low drag techniques
- modified flight path angles to adjust climb gradients, and
- restrictions on engine run-ups (a type of engine check) and/or ground equipment use.¹⁰⁸

Airservices Australia manages these procedures and safety of operations remains the primary consideration. Although these procedures set operational expectations on aircraft on approach and departing an airport, they are mostly not mandatory (with the exception of the airports with legislated arrangements, such as Sydney Airport mentioned above). There are times where they are not able to be followed (such as in adverse weather events or emergencies) or where the flight crew has decided on a different departure or approach for operating the aircraft, generally for safety reasons.

Information on adherence to procedures is produced by Airservices Australia in certain contexts, for example for briefing an airport's Community Aviation Consultation Group (CACG) or responding to an aircraft noise complaint (see 'Aircraft noise complaints' below).

106 Department of Infrastructure, Transport, Regional Development, Communications and the Arts (n.d.) *The Long Term Operating Plan (LTOP)*, Sydney Airport Community Forum website.

107 Sydney Airport (2019) *Masterplan 2039*, Sydney Airport website, F-56.

108 Airservices Australia (n.d.), *Noise abatement procedures*, Airservices Australia website.

A number of airports have 'Fly Neighbourly' agreements in place. Such agreements are non-binding undertakings by operators at specific airports to operate their aircraft in specific ways, such as operating above a certain flight level over certain areas around the airport or only undertaking particular operations at certain times. These agreements are typically an initiative of the airports with the surrounding local council and operators at their facilities.

Noise amelioration programs to acquire or insulate certain residences, schools, hospitals, churches and childcare centres were undertaken under previous Government policy at Sydney and Adelaide Airports from the mid-1990s to the conclusion of the Adelaide Airport scheme in 2012. The principal criterion for inclusion in these programs was the location of such buildings within unacceptable or conditional ANEF contours. These programs were administered by the Australian Government and undertaken prior to, or as part of the privatisation of the major airports. The Department will release a noise insulation and property acquisition policy as part of the draft Environmental Impact Statement (EIS) for the preliminary flight paths for WSI. The draft EIS is expected to be released in the second half of 2023.

For other LFAs, the Australian Government notes the airport-lessee companies are responsible for developing and implementing their own noise mitigation programs within their communities along the lines of previous Government policy.

Airservices Australia has developed *Flight Path Design Principles* that seek to balance the competing objectives of operational efficiency, environmental protection and minimisation of noise impacts, while ensuring safety remains the primary factor.

Airservices Australia is preparing a Community Engagement Standard for flight path and airspace design changes, which is an important step towards developing a consistent and improved process for community engagement.

Regulation

Land-use planning is the most effective way to manage the impacts of aircraft noise

The best tool to manage aircraft noise is effective land-use planning – limiting or preventing the construction of residences and community facilities (such as schools and hospitals) under known current or future flight paths. Protecting airports from encroaching development, particularly residential dwellings, has benefits for both operating aircraft and the community. This is true for both civil and military airports. Aircraft can operate efficiently in a manner that minimises noise and other environmental impacts, such as emissions, and dwellings can be planned to minimise their exposure to operating aircraft.

State, territory and local governments naturally seek to develop certain land for their own broader planning objectives. However, in doing so, they need to consider land around airports and the impact of aircraft noise around communities.

Continued commitment to the National Airports Safeguarding Framework will safeguard airport operations

Land-use planning is usually the responsibility of state, territory and local governments. Strategic land planning decisions can prevent residential or other incompatible development under what are known to be future flight paths. State and territory governments can also require potential purchasers of buildings to be notified the building is aircraft-noise affected, and provided details of the existing or expected noise levels.



To supplement the *Airports Act 1996* (Airports Act) framework, the Australian Government is implementing in partnership with states and territories the National Airports Safeguarding Framework (NASF). NASF provides guidance on mitigating aircraft noise off-airport as well as a number of other safety issues, including wind shear, wildlife strike risk and intrusions into protected airspace. It is appropriate to consider NASF when planning developments around civil and military airports. Implementation of NASF in each state and territory, and in local government planning, is ongoing but is inconsistent across jurisdictions.

NASF was developed by the National Airports Safeguarding Advisory Group (NASAG), comprised of Australian Government, state and territory government planning and transport officials, Department of Defence (Defence), CASA, Airservices Australia, and the Australian Local Government Association. It provides a mechanism for all levels of government to consult on how to balance the objectives of reducing aircraft noise impacts on the community against the need to continue to provide land for development through strategic land-use planning.

NASF Guideline A, *Measures for Managing Impacts of Aircraft Noise*, provides guidance to decision-makers of all three levels of government to 'manage the impacts of noise around airports, including assessing suitability of developments'.¹⁰⁹ Guideline A further states 'governments recognise the merits of utilising a range of noise measures and tools in conjunction with the Australian Noise Exposure Forecast system to better inform strategic planning and to provide more comprehensive and understandable information on aircraft noise for communities'.¹¹⁰

A 2019 NASF implementation review identified the incomplete introduction of planning mechanisms to address NASF-related issues by local governments. It also found a lack of awareness of NASF by town planners is hindering best practice consideration of development applications near airports. Continuing implementation of NASF towards existing goals by 2027 should be maintained to improve planning outcomes on and near airports and under flight paths for both the aviation industry and for nearby communities. As the majority of airports are not subject to the Airports Act, state and territory governments need to take a leading role in formally adopting the Framework and providing capacity building for state and local planners to be aware of and implement NASF in their planning decisions.

Large scale infrastructure like airports may be developed over years or decades

There can be a long period of time between statutory approvals of new airports or runways, and those airports or runways becoming operational. This makes land use planning around the airport in the intervening years critical to managing the impact on the community.

- The MDP for Brisbane Airport's new runway was approved in 2007.¹¹¹ Construction began in 2012 and major stages of construction completed in 2020.¹¹² The final airspace changes designed by Airservices Australia were validated by CASA in 2018,¹¹³ with the new runway commencing operations in mid-2020.

109 Department of Infrastructure, Transport, Regional Development, Communications and the Arts, *National Airports Safeguarding Framework Guideline A: Measures for managing impacts of aircraft noise*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

110 Department of Infrastructure, Transport, Regional Development, Communications and the Arts, *National Airports Safeguarding Framework Guideline A: Measures for managing impacts of aircraft noise*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

111 Brisbane Airport (n.d.), *BNE Projects Early planning and approvals*, Brisbane Airport website.

112 Brisbane Airport (n.d.), *BNE Projects Early planning and approvals*, Brisbane Airport website.

113 Brisbane Airport (2020), *Flight path and aircraft noise information booklet*, Brisbane Airport website.

- The Airport Plan and EIS for the stage 1, single runway operations of WSI were approved in 2016. Planning for the airspace and flight path design commenced in 2017, a draft EIS for the preliminary flight paths will go on public exhibition in the second half of 2023. Airport operations are expected to begin in 2026.¹¹⁴
- Melbourne Airport submitted a draft MDP for its proposed third north-south runway for Ministerial consideration in 2023. If the MDP is approved, the airport expects construction to take 4 to 5 years to complete,¹¹⁵ stating the absolute earliest operations could commence would be in 2027.¹¹⁶ Planning for Melbourne Airport has foreshadowed a four-runway system since the 1960s, with this arrangement contained in development plans since the Melbourne Airport Strategy of 1990.¹¹⁷

This means land planning around the site in the period between initial approval to plan for a new runway and the operation of that runway is critical.

One approach the Australian Government considers evidences good practice has been the development WSI. The Australian Government has worked with the New South Wales Government over several decades to ensure appropriate land use planning controls were in place around the Commonwealth-owned land at Badgerys Creek, even before there was a policy to build a new airport in Western Sydney, to protect the future airport from encroaching incompatible development, particularly residential housing.

Planning for future development of new airports or runways would require a similar level of planning controls in place ahead of the development being required.

Explaining noise through development processes

For the 22 Commonwealth-owned LFAs, proposals to make any new development at these airports are governed by the Airports Act.

The Airports Act planning approval process contains legislative requirements for community consultation on the development of the primary planning document, an airport's Master Plan, as well as for major airport developments that require an MDP. Importantly the planning processes under the Airports Act require the use of the ANEF to illustrate noise impacts.

114 Department of Infrastructure, Transport, Regional Development, Communications and the Arts (2023), *Western Sydney International (Nancy-Bird Walton) Airport: Flight path design for single runway operations*, Western Sydney Flight Paths website, accessed 11 May 2023.
 115 Melbourne Airport (n.d.), *Construction Fact Sheet*, <https://media.caapp.com.au/pdf/kkcx8/3942cc69-b6d7-4fc7-a67f-f70df03e8256/Construction.pdf>.
 116 Melbourne Airport (n.d.), *Virtual Visitor Centre: Frequently Asked Questions*, <https://caportal.com.au/melair/virtual?hview=modalFAQS>.
 117 Melbourne Airport (2022), *Melbourne Airport Master Plan 2022*, Melbourne Airport website.



Depicting aircraft noise: use of the Australian Noise Exposure Forecast and other noise metrics

The ANEF system has been a tool to guide land-use planning surrounding airports for almost 40 years. The inclusion of an ANEF is a legislated requirement for Master Plans under the Airports Act and specific building requirements are specified using ANEF contours in Australian Standard 2021:2015 'Acoustics – Aircraft noise intrusion – Building siting and construction'. Inclusion in the standard prescribes what types of development are acceptable, conditionally acceptable, and unacceptable in different ANEF contours.

Table 2: Australian Standard AS2021:2015 Acoustics – Aircraft Noise Intrusion – Building Siting and Construction

Building Type	Acceptable	Conditionally Acceptable	Unacceptable
House, home, unit, flat, caravan park	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hotel, motel, hostel	Less than 25 ANEF	25 to 30 ANEF	Greater than 30 ANEF
School, university	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Hospital, nursing home	Less than 20 ANEF	20 to 25 ANEF	Greater than 25 ANEF
Public building	Less than 20 ANEF	20 to 30 ANEF	Greater than 30 ANEF
Commercial building	Less than 25 ANEF	25 to 35 ANEF	Greater than 35 ANEF
Light industrial	Less than 30 ANEF	30 to 40 ANEF	Greater than 40 ANEF
Other industrial	All ANEF zones	All ANEF zones	All ANEF zones



There are three categories of ANEF that may be used in an airport Master Plan: the Standard ANEF (which accounts for types of aircraft usage in 5-20-year horizon), the Long Range ANEF (20+ years) and the Ultimate Practical Capacity ANEF (i.e. the most aircraft movements an airport could accommodate).

It may be that aircraft noise exposure calculations are not clearly understood and do not match community expectations. For example, people living outside the 20 ANEF contour may expect no aircraft noise even though noise does not 'stop at the contour boundary'.

The Aircraft Noise Ombudsman has recommended the Ultimate ANEF should be required in Master Plans and MDP; and the number of ANEF contours displayed in Master plans should be 'increased' – including contours below the 20 ANEF contour.¹¹⁸

It is becoming increasingly recognised that relying solely on ANEF contours is insufficient for portraying noise and its impact. NASF Guideline A suggests additional noise metrics should be used.¹¹⁹ It is also increasingly acknowledged by airports, which are already taking the initiative to include other noise metrics alongside the ANEF in their Master Plans to better illustrate noise. Melbourne Airport, for example, acknowledged the limitations of ANEFs and produced 'number-above contours' (charts that show the average number of aircraft noise events above certain decibel levels) in its 2022 Master Plan.¹²⁰

Another noise metric used in the context of aircraft noise are 'sound level' measures. Sound level measures offer a range of different options, such as sound level equivalent (LAeq) and maximum sound level (LAMax) based on energy averages of sound levels of noise sources. These measures can offer a more realistic and more comprehensible portrayal of noise for the community. Sound level measures are already used by some airports, including Melbourne Airport in its 2022 preliminary draft MDP for the proposed North-South Third Runway Project,¹²¹ and by the Department for the 2016 EIS for WSI.¹²²

Flight path and airspace planning

The Australian Government is also involved (at both LFAs and at non-LFAs) when airports propose a new flight path and airspace design as a result of a significant project such as a new runway, or when there are major changes to the flight paths and airspace around an airport. These paths or changes to them can impact on communities.

118 Aircraft Noise Ombudsman (2023) *Submission to Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

119 Department of Infrastructure, Transport, Regional Development, Communications and the Arts (n.d.), *National Airports Safeguarding Framework Guideline A: Measures for managing impacts of aircraft noise*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

120 Melbourne Airport (n.d.), *Master Plan 2022*, Melbourne Airport website, 300.

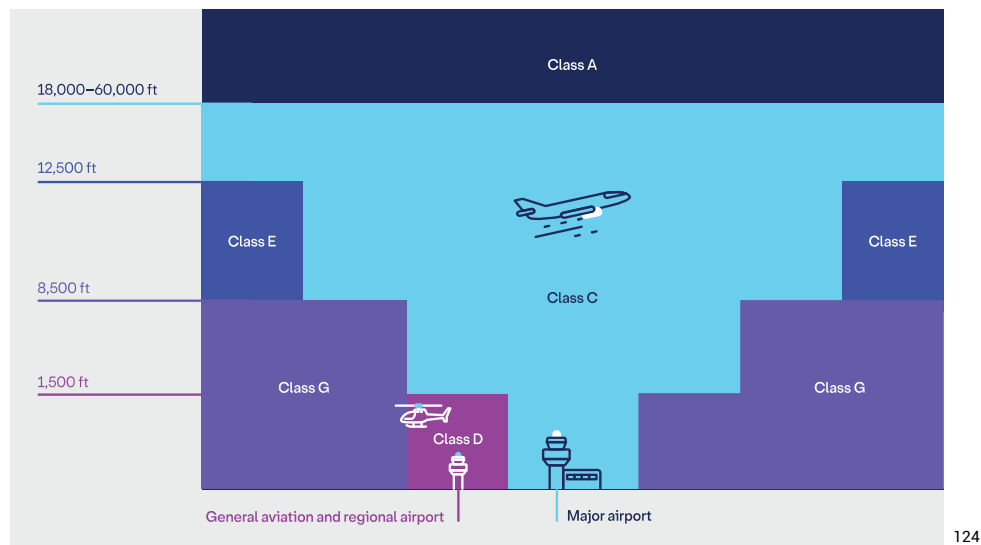
121 See in particular Melbourne Airport (2022), *M3R preliminary draft Major Development Plan*, chapters C3 and D3.

122 See in particular Department of Infrastructure and Regional Development (2016), *Western Sydney Airport: Environmental Impact Statement Volume 2a Stage 1 Development*, Western Sydney Airport website, chapter 10, section 10.4.

“Airspace” and “flight paths” – what do these terms mean?

Airspace

Airspace is the volume of space above ground level and is regulated by the *Airspace Act 2007* (the Airspace Act). Airspace has both horizontal and vertical dimensions, and it is usually defined in reference to the location of an airport. Airspace in Australia is divided into two major types: controlled and uncontrolled.¹²³ Controlled airspace is where Airservices Australia or Defence manages aircraft operations through air traffic controllers. Uncontrolled airspace is where there is generally no clearance required by ATC for aircraft to operate in, but they must still follow rules on how to operate in this airspace. The more common classes of airspace in Australia can be seen in the diagram below. Classes A, C, D and E airspace is controlled and class G airspace is uncontrolled.



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Airspace is administered and regulated by CASA under the Airspace Act. In addition, the Department is responsible for the protection of prescribed airspace – generally a limited amount of airspace immediately around an LFA.¹²⁵ The function of prescribed airspace is to protect airspace at and around airports in the interests of safety, efficiency and regularity of aircraft operations. It establishes a system to manage intrusions – temporary or permanent – that occur in close proximity to airports. This would include things like cranes operating during the construction of a building, or regulating planned building heights of proposed developments around airports that may interfere with the safe, efficient, regular operation of aircraft at the airport. Applications to undertake such activities in prescribed airspace are considered by the Department.

Flight paths

A flight path is the specific corridor or course in airspace an aircraft takes to get from one place to another. Flight paths can be a number of kilometres wide, as opposed to what may be portrayed as single lines on a map, and aircraft may fly differently within corridors. This is for a range of reasons, such as type of aircraft and its technical capability. Weather and other operational reasons – such as specific flying procedures to reduce aircraft noise (see earlier in section 6.1) – may also cause aircraft to alter their flight paths.¹²⁶

123 The term ‘uncontrolled airspace’ refers to Class G airspace where a controlled service is not provided. Airservices Australia (n.d.) *How airspace is managed Australian airspace architecture*, Airservices Australia website.

124 Airservices Australia (n.d.) *How airspace is managed Australian airspace architecture*, Airservices Australia website.

125 Airports (Protection of Airspace) Regulations 1996 (Cth), pt 2.

126 Airservices Australia (n.d.) *FAQs*, Airservices Australia website.

Airservices Australia is usually responsible for designing, developing and implementing flight paths around controlled aerodromes. Its *Flight path design principles* set out how flight paths will be designed – considering safety, Australian and international standards, noise and community aspects, efficiency and the environment, and operational aspects¹²⁷.

In order to determine the environmental impact on the community, a preliminary flight path and airspace design are usually subject to an environmental assessment under EPBC Act. This is a separate process to the detailed technical development of detailed flight path changes or changes to airspace.

Generally, once a preliminary flight path and airspace design has been through an environmental assessment, CASA considers any airspace changes and Airservices Australia and the airport continue work on the detailed flight path design. While the outcomes of the environmental assessment inform the detailed technical work, consideration of safety of operating aircraft remains the highest priority.

After the introduction of new, major or permanent changes to flight paths and airspace design, Airservices Australia conducts a 'Post-Implementation Review' (PIR) to assess the implementation of the new design.

These processes are outlined in more detail below. While flight paths may or may not be subject to a regulatory review (depending on the scope of the change), the environmental assessment under the EPBC Act and the good business practice of conducting PIRs – both independent of the Airports Act Master Plan and MDP processes – ensure consideration of impacts on the community.

Environmental assessment on preliminary flight path and airspace design

An environmental assessment is required under the EPBC Act for changes to airspace that will have or are likely to have a significant impact on the environment, whether or not an airport is a LFA or non-Commonwealth airport.

Where there are very significant changes proposed, an environmental assessment (for example, in the form of an EIS) can be required, which triggers a public consultation process on the preliminary flight path and airspace design. During this process, community views are taken in the form of submissions, leading to the Minister responsible for the EPBC Act making a decision on the final EIS.

If the final EIS is approved, the Minister responsible for the Airports Act may decide to publish the preliminary flight path design. The Minister may also place conditions on their approval.

In considering preliminary flight path and airspace design, a certain level of obligation to protect the environment from the effects of the operation and use of aircraft is placed on CASA and Airservices Australia.¹²⁸ An EIS may be used by CASA or Airservices Australia as evidence to demonstrate compliance with both the EPBC Act and their own legislation. While MDP or EIS approval by a Minister does not limit or dictate flight paths or airspace, any major deviation from the MDP or EIS may require additional consideration of environmental impacts, for example through further environmental assessment.

Development of detailed flight path and airspace design

Following the completion and publication of an environmental assessment in an EIS, a detailed flight path and airspace design is undertaken by airports in close collaboration with Airservices Australia. While the MDP and EIS can help inform the detailed design process, neither the MDP nor the EIS provide an 'approval' for the final design.

¹²⁷ Airservices Australia (2020) *Flight path design principles*, Airservices Australia website.

¹²⁸ *Air Services Act 1995* (Cth), pt 2 div 2 (for Airservices Australia) and *Civil Aviation Act 1988* (Cth) pt II (for CASA).

If there is a detailed flight path design change required, airports work with Airservices Australia on the detailed design. Airservices Australia and airports would inform the community and aircraft operators of the timing for the flight path design change to be implemented. Airservices Australia is developing a Community Engagement Standard for flight paths and airspace design changes as discussed below.

If a change to airspace is required, CASA receives what is known as an ‘airspace change proposal’, which proposes an airspace architecture that aligns with the EIS and any conditions placed upon it. CASA manages the process for airspace changes according to the requirements of the *Airspace Act 2007*.¹²⁹ CASA also has a role in providing technical validation to the way most aircraft approach and depart airports.¹³⁰ While CASA processes focus on technical validity and the safety of operating aircraft, proponents of a proposed airspace change must provide evidence of consultation with relevant stakeholders.

Airservices Australia Post-Implementation Review of flight path and airspace design

Airservices Australia undertakes PIRs after airspace and flight path changes are implemented. PIRs review the impacts of real-world operations against the predictive modelling for potential environmental and community impacts. PIRs also determine the effectiveness of the environmental impact assessment and community engagement processes. The outcomes of PIRs inform future changes, identify opportunities to improve noise outcomes or operational efficiency where practicable, and are intended to improve the overall change management process.¹³¹ PIRs are generally conducted 12 months after new or significantly altered flight paths commence operating. This enables the reliable capture of operations data including seasonal variations. PIRs take between 12 and 18 months to complete, depending on the complexity and size of feedback received.

Airservices Australia’s draft Community Engagement Standard

Airservices Australia is preparing a Community Engagement Standard for flight path and airspace design changes. This work is an important step in communicating a standard process for the community. The proposed Standard:

- outlines 10 ‘engagement principles’ that set clear expectations for the community about how the engagement will be conducted, as well as expectations about how First Nations peoples will be consulted
- outlines the ‘benefits of effective community engagement’ which are expected outcomes, and ‘drivers for flight path and airspace change’ which provide reasons for why changes are needed
- introduces three different degrees of engagement according to the level of impact the changes are expected to have:
 - Level 1: airport expansion such as a new runway (major change, high complexity, affects many people)
 - Level 2: new flight paths in existing airspace (smaller scope of change but noticeable impact, large but focused set of stakeholders)
 - Level 3: operational changes in existing airspace (minor changes to operating procedures affecting a limited number of people)

¹²⁹ Civil Aviation Safety Authority (2023), *Airspace change process*, Civil Aviation Safety Authority website, accessed 2 June 2023.

¹³⁰ Civil Aviation Safety Regulations 1998 (Cth), pt 173.

¹³¹ Airservices Australia (2022) *Post Implementation Review of the Hobart airspace design review*, Airservices Australia website.

- outlines a 'general process for delivering engagement' that includes five steps:
 - Step 1: Engagement planning – consulting the community on who needs to be involved
 - Step 2: Develop and assess options – the first opportunity for the public to see the flight path and airspace concepts
 - Step 3: Engage – the formal proposed design and environmental assessment
 - Step 4: Update and submit – including reengagement with the community if there is a certain level of changes or unidentified impacts, and eventual approval of the design
 - Step 5: Implement and review – including the existing PIR process.

The proposed Standard would essentially 'codify' processes, clearly articulating the process for the community along with arrangements for engagement before and after formal regulatory approvals.

There is also potential within 'Step 1: General process for delivering engagement' in the Standard to explore whether engagement is capturing a sufficient "catchment" of areas that may be impacted by aviation operations from new runways or airports. This may mean that the area covered by engagement could be larger or smaller than in previous community consultations depending on the scope of impact on the community.

Noise from new technology such as drones

For their uptake to increase, it is essential that new aviation technologies maintain public acceptance.

The uptake of new aviation technologies is at a high level and community and industry demand may continue to drive the growth in the use of drones and other AAM. Technology is changing the nature of aviation and has the potential to have a transformative impact on transport and logistics. Effective regulation of noise impacts will be critical as the demand for new technology grows.

The Australian Government is considering the development of an outcome-based framework for emerging aviation technologies (see Chapter 9 'Emerging aviation technologies'). Consultation with state and territory authorities, industry and the community is informing the development of noise management approaches for future technologies. The proposed framework is intended to effectively manage noise impacts from drones and future technologies, and, provide a mechanism to enforce noise limits at a local level.





The Australian Government wishes to further explore the opportunities to better manage noise around our airports.

- Do you have comments on how the operation and effectiveness of the Noise Complaints Information Service could be improved?
- How could the Australian Noise Exposure Forecast, and use of the ANEF in Government planning processes, be improved?
- What are appropriate, modern noise metrics that should be used to communicate aircraft noise impacts?
- How can governments better communicate with potential purchasers of properties which will be affected by aircraft noise in the future?
- How can new and different types of noise impacts from projected growth in drone use best be managed?
- Do these processes provide sufficient opportunity for impacts on the community to be identified and taken into account? How can they be improved?
- What can be done to proactively mitigate noise impacts by better informing residents and land-use planners?
- What else can airlines and airports do to support better management of aircraft noise?
- What can be done to facilitate increased adoption and implementation of the National Airports Safeguarding Framework principles for land planning to optimise land-use activity and reduce community impacts?
- Could governance arrangements for the Aircraft Noise Ombudsman be improved to provide greater independence, including publishing its findings and reports?
- Are there opportunities to improve transparency by publishing information about other decisions made by CASA, Airservices or airports around flight paths, and how aircraft approach and depart airports?
- How can the flight path design principles be improved?



6.2 Community consultation mechanisms

Key issues

- The Airports Act requires community consultation for planning documents: Master Plans and MDP for when they propose large projects where costs are above a monetary threshold or impacts are significant.
- Ongoing consultation on the impacts of airport operations occurs via CACGs established for 19 of the 22 LFAs.¹³²
- The Australian Government is seeking greater airport-led consultation about projects such as new runways that would lead to airspace changes, and increased influence on how airports conduct community engagement.
- Contemporary community expectations on better practice community engagement may not be easily provided for in the current land-use planning framework.

Stakeholder feedback

- Many community stakeholders reported they consider the planning process opaque. For example, Community Aviation Alliance Australia stated: 'From the perspective of aircraft noise affected communities, the current aviation regulatory framework is [...] a complex and fragmented amalgam of Commonwealth statutes, state and local government land planning legislation managed across multiple portfolios, departments, statutory authorities and corporatised entities, heavily weighted towards promoting growth of the aviation industry, [that is] airport expansion and airspace efficiency.'¹³³

Ongoing forms of community consultation

Airports undertake different levels of community engagement as part of their normal business practice, including maintaining their social licence to operate. Airports conduct ongoing engagement on a range of issues, giving the community a level of involvement in planning for all new projects, aviation and non-aviation, but engagement on major new infrastructure such as new runways, is generally far more extensive, commencing from the early concept development.

Where an airport undertakes a project that has an impact well outside its boundaries, such as the noise generated by a new runway, there is a high level of community interest. The EIS for WSI Stage 1 (a single runway serving up to 37 million annual passengers) in 2016 received 4,975 submissions from 3,973 individual submitters, and of those approximately 80 per cent came from the Blue Mountains.¹³⁴

¹³² Adelaide, Alice Springs, Archerfield, Bankstown, Brisbane, Camden, Canberra, Darwin, Essendon Fields, Gold Coast, Hobart, Jandakot, Launceston, Melbourne, Moorabbin, Parafield, Perth, Sydney and Townsville airports. WSI currently convenes the Forum on Western Sydney Airport during its construction.

¹³³ Community Aviation Alliance Australia (2023) *Joint submission to the Aviation Policy Review White Paper – March 2023*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

¹³⁴ Department of Infrastructure and Regional Development (2016) *Western Sydney Airport Environmental Impact Statement Chapter 5*, Western Sydney Airport website.



Where non-aviation development like a warehouse or office block on an airport site is undertaken and otherwise has limited impact on the surrounding community, interest from the community can be very limited. This suggests different levels of community consultation may be needed for different kinds of developments. Canberra Airport received no submissions at all on a 2021 MDP for an office development.¹³⁵

Most operational LFAs convene CACGs as a forum to discuss all airport development and the impacts on communities around them.¹³⁶ The establishment of CACGs stems from the 2009 Aviation White Paper which recommended the establishment of community-focused groups to inform LFAs of the community's views. The Department developed a model terms of reference for the CACGs, which have generally been adopted by the airport-lessee companies (ALCs) of LFAs.

The composition and role of each CACG varies but, in general, there is an independent chair and membership comprises local community representatives, representatives of Airservices Australia, airport users such as airlines and other interested and related bodies. The Department attends as an observer and ALCs provide secretarial support, but neither controls the CACGs' direction or mission. These groups provide a forum for community members to raise concerns about airport operations, including noise impacts with the airport operator, and are also an avenue for engagement with Airservices Australia on flight path matters.

CACGs may benefit from specific subcommittees on different issues. The creation of subcommittees is a matter for each individual CACG. For example, if an airport is proposing a major project such as a new runway, its CACG could potentially operate a subcommittee on that project and impacts such as aircraft noise while the project is in the planning and construction phase. This would enable everyday CACG business to continue in the regular meetings while giving specific attention to large projects with significant community interest. While subcommittees are not part of the current CACG guidelines issued by the department, these could be amended to recommend such temporary subcommittees be stood up as a dedicated forum to help the community provide feedback to airports on specific issues.

LFAs also engage the community through mechanisms such as social media, letter-box drops and through raising-awareness activities through local councils or community events. Many LFAs are involved in community activities and sponsorships as part of their own corporate social responsibility objectives.

Engagement with First Nations peoples

First Nations peoples have unique cultural interests regarding impacts to country and sky. The Australian Government is aware there is a need for better ways of working together with First Nations peoples to ensure a greater understanding of the impacts of design and delivery choices relating to aviation policies and regulations, particularly through areas like formal partnerships and shared decision making identified in the National Agreement on Closing the Gap.

There is a need to improve engagement with First Nations peoples on airport development and the impacts of aviation operations on, above and through Country. This is because current requirements for engagement and consultation with First Nations peoples for LFAs are usually limited to the broad consultation requirements for community engagement under the Airports Act and EPBC Act requirements for consideration of cultural heritage. This means in practice that engagement is often limited only to Master Plans and MDPs for major airport developments.

¹³⁵ Canberra Airport (2021) *Major Development Plan for 1 George Tyson Drive Office Development*, Canberra Airport website.

¹³⁶ WSI has slightly different arrangements. It convenes the Forum on Western Sydney Airport (FOWSA), for which the Department provides secretarial support.

Western Sydney International (Nancy-Bird Walton) Airport Case Study

In 2016 archaeological excavations commenced on the future site of the WSI. During the excavations approximately 40,000 artefacts were found on site. Artefacts salvaged found to be of importance, in consultation with Aboriginal stakeholders, are to be stored within an Aboriginal cultural heritage Keeping Place. Since 2017 the Department has undertaken a number of engagement activities with key stakeholders to identify aspirations and ideas suitable for the Keeping Place. This work is ongoing with further small group and open forum engagement activities planned to occur in 2023.

The Department is currently preparing a draft EIS for WSI's preliminary flight paths, scheduled to be released to the public in the second half of 2023. As part of this process there has been extensive consultation with Traditional Owners and other key First Nations stakeholders to understand areas of significance within the WSI study area. These consultations, which included kitchen table yarn sessions, are important to understand potential impacts on culturally sacred sites and how the flight paths can impact First Nations peoples within the Western Sydney area.

The Department will use the insights from the consultations with First Nations to inform digital tools to help the community actively see noise impacts on homes and businesses in proximity to the upcoming flight paths. In addition to identifying key landmarks in Western Sydney the tools will also identify and label sacred site marker points so that First Nations communities can consider the flight paths impact on those sites as well as other locations such as houses or schools.



The Australian Government wants to work with stakeholders to evaluate the effectiveness of existing consultation arrangements, and identify how best to improve the framework.

- How can the existing consultation framework be improved to facilitate efficient planning and development, while preventing environmental harm and ensuring continued access for aviation users?
- Are CACGs working for the community? What are good aspects, and what can be improved?



6.3 Land use planning on-site at airports

Key issues

- The land-use planning framework for the 22 LFAs, which is contained in the Airports Act, does not reflect modern land-use planning practice or equivalent state/territory requirements.
- Ensuring airports are resilient to the effects of climate change is an increasing priority, as is evidence of planning to meet a net zero 2050.
- Privatisation of Commonwealth airports means airport operators need to generate a commercial return. This can undermine the provision of aeronautical services at these airports, where users are unwilling to pay commercial rates.

Stakeholder feedback

- The Australian Airports Association comments: 'In discussing the theme of airport development planning processes, a wider discussion on sensible and proportionate reform of airport regulation out to 2050 should take place as part of the White Paper to meet the intent of the Airports Act 1996 to provide access to airlines and supply the required infrastructure to meet forecast demand.'¹³⁷
- The Australian Airports Association also argues 'There continues to be significant concerns of the increased time and money costs incurred by airports from the lengthy and complex interactions between the [Airports Act and the EPBC Act]'.¹³⁸

The Airports Act has delivered important outcomes

There may be opportunities to modernise the regulatory framework for the 22 LFAs under the Airports Act.¹³⁹ It is important to ensure regulatory arrangements promote productivity, investment and efficiency.

The LFAs regulated by the Commonwealth under the Airports Act have been subject to a stable, predictable planning regime under the Airports Act and the EPBC Act. The system of preparing strategic-level Master Plans and MDPs for specific 'major airport developments' like new runways, terminals, warehouses or rail services has helped maintain the Commonwealth's oversight of these airports.

It has also allowed private sector expertise and capital to deliver significant improvements in capacity and infrastructure at airports – for example, the multi-billion-dollar runway and terminal developments at Brisbane, Perth and Melbourne airports. While they are highly profitable, the Australian Airports Association estimates our 10 largest airports invested \$11.5 billion on airport improvements over the decade to 2017, as airports have facilitated growth in aircraft, freight and passenger movements across the aviation sector and the broader economy.

¹³⁷ Australian Airports Association (2023) *Aviation White Paper – response to the Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

¹³⁸ Australian Airports Association (2023) *Aviation White Paper – response to the Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

¹³⁹ Adelaide, Alice Springs, Archerfield, Bankstown, Brisbane, Camden, Canberra, Darwin, Essendon Fields, Gold Coast, Hobart, Jandakot, Launceston, Melbourne, Moorabbin, Mt Isa, Parafield, Perth, Sydney, Tennant Creek, Townsville and Western Sydney International (Nancy-Bird Walton) airports.

The Airports Act regime and obligations under the Head Lease applying to each of the LFAs, allow continued Commonwealth stewardship over what remain critical pieces of national infrastructure.

The long-held, bipartisan policy enabling airports to draw income from non-aviation, commercial development has been accepted by past governments as a way to enable investment in aviation infrastructure and has largely been successful.

However, there are protections under the Airports Act that impose obligations on LFAs to operate the airports as airports and to account for growth in aviation through continuing to develop the airports as demand grows.

LFAs are required to submit a draft Master Plan every five or eight years, depending on the airport categorisation, with a planning horizon of 20 years. Under the Airports Act, included in the matters that must be addressed is that the draft Master Plan must specify:

- the airport lessee company's development objectives for the airport; and
- the airport lessee company's assessment of the future needs of civil aviation users of the airport, and other users of the airport, for services and facilities relating to the airport.

When determining whether to approve or refuse the draft Master Plan, included in the matter that the Minister must have regard to is:

- the extent to which carrying out the plan would meet present and future requirements of civil aviation users of the airport, and other users of the airport, for services and facilities relating to the airport concerned.

The Master Planning requirements, and the obligation for LFAs to develop and submit draft MDPs for the Minister's consideration for projects that will have a significant impact on the airport stakeholders and the local community, provides Government oversight, while continuing to encourage private investment.

Planning triggers may be able to be improved

LFAs argue the long lead-times for planning and development in the MDP process are out of step and more onerous compared with planning provisions for similar development off-airport, particularly the \$25 million development costs trigger (i.e. developments costing above this amount require an MDP, increasing the planning burden. Significant escalation in costs in the construction industry now mean that projects with relatively little impact on aviation operations or the surrounding community are still triggering the need for an MDP). LFAs argue the cost and length of time to produce and process MDPs is a brake on their ability to progress projects, and advocate a review of the planning framework to ensure it mirrors contemporary practice¹⁴⁰.

The Australian Government recognises there may be merit to tailoring the level of regulation to reflect the scale or impact of projects. A significance test is already used in some state jurisdictions' planning systems as a first step for project proponents to determine planning documentation requirements, including community consultation, with clear criteria as to what may trigger increased MDP-style scrutiny.

While there is a time limit on the Infrastructure Minister's consideration of MDPs (50 business days), once a request for advice is received there is no time limit on the Environment Minister for sending their advice back to the Infrastructure Minister. The Airports Act also prescribes specific requirements for community consultation, making them hard to update as community expectations change.

¹⁴⁰ See submissions on the Aviation White Paper Terms of Reference from the Australian Aviation Association (AAA) and airports at Brisbane, Perth and Canberra – *Aviation White Paper – Terms of Reference Submissions | Department of Infrastructure, Transport, Regional Development, Communications and the Arts*



For example, no advice is required on the emissions implications of airport development, nor on how access for those living with disability will be ensured.

In some states, all documentation relating to a project, including assessments, public submissions and views of government agencies prior to Ministerial decision, are published on the internet as a measure of transparency. While the Airports Act does not require such publication, Melbourne Airport has indicated an intention to publish its Supplementary Reports for the Master Plan 2022 and the Third Runway Project MDP as a measure of transparency with its community.

Airports also must provide space for services such as border security, and provision for this space is a key planning consideration. Growth in the network of international airports is driving increasing resourcing pressures for border agencies. These issues are discussed further in Chapter 11 'International aviation'.

Better coordination of freight on and off airports

Airports and other industry participants have raised airfreight as a key issue for Government consideration,¹⁴¹ noting room for improvement in the integration of freight operations between airports and off-airport freight networks.¹⁴²

Encroachment of incompatible land uses affecting contemporary and future freight corridors and facilities, including airports, may impact the efficiency and round the clock movement of freight, by leading to the calls for operating restrictions. There are challenges in aligning land-use planning across jurisdictions to ensure the preservation of freight networks, including different planning frameworks and priorities.

Improving understanding of the volume, value and nature of airfreight movements may help freight planning at airports by providing the information needed to appropriately plan for freight movements. The development of a National Freight Data Hub may offer opportunities to improve airfreight data.

Embedding outcomes and actions from the National Freight and Supply Chain Strategy and its National Action Plan may help improve coordination of freight movements on and off airports. There is an important role for state governments to play in ensuring freight corridors off-airport are able to meet the future demand for high-value airfreight in the future.

Environmental regulation at airports

LFAs are subject to environmental regulation under both the Airports Act and the EPBC Act. The Australian Government seeks to explore opportunities to assess, improve and clarify the function of roles in environmental regulation at all airports to enable better stakeholder and environmental outcomes.

Activity is underway to remake the Airports (Environment Protection) Regulations 1997, which are due to sunset in April 2025. This process is providing stakeholders with the opportunity to comment on the effectiveness of existing environment regulatory frameworks.

¹⁴¹ Infrastructure Partnerships Australia (2023) *Submission to the Federal Department of Infrastructure, Transport, Regional Development, Communications and the Arts on the Aviation White Paper Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

¹⁴² Australian Airports Association (2023) *Aviation White Paper – response to the Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

The Australian Government released its response to the review of the EPBC Act by Professor Graeme Samuel in December 2022, titled *Nature Positive Plan: better for the environment, better for business*. The response builds on the recommendations of the review, and is also being informed through a comprehensive consultation process and will result in a reform of Australia's national environmental laws.

These reforms include establishing National Environmental Standards and streamlining regulatory systems for business, to ensure faster, clearer, more efficient decision-making that enables economic development while at the same time ensuring better protection for the natural environment and heritage.

Details of a package of new national environment laws will be released for public consultation in the second half of 2023.

Per- and poly-fluoroalkyl substances (PFAS) is also an issue at many airports. Ensuring nationally consistent whole-of-site investigations and management plans positions the Australian Government to effectively carry out its regulatory functions at LFAs by understanding the source of PFAS pollution and deliver better environmental outcomes under the Airports Act and the Airports (Environment Protection) Regulations 1997. The Australian Government is currently implementing the \$130.5 million PFAS Airports Investigation Program (the Program) to identify the extent and nature of legacy PFAS contamination at civilian airports where PFAS-containing firefighting foams were historically used up to 2010. The Program will ensure independently audited whole-of-site PFAS testing and nationally consistent management plans are put in place to effectively manage any onsite or offsite contamination.

Climate change resilience at airports

As noted above in Chapter 4 'Regional and remote aviation services', the vulnerability of Australia's airports to the impacts of a changing climate is increasingly important. Maintaining airport functionality during climate events is also important for civil crisis response capabilities.

Whilst large private operators of Australia's LFAs are well placed to strengthen the resilience of their assets in the face of a changing climate, the Australian Government is considering how the master planning process addresses this concern.



The Australian Government considers there may be opportunities to modernise the regulatory framework for the 22 LFAs under the Airports Act and notes the importance of ensuring regulatory arrangements promote productivity, investment and efficiency.

- How could the Australian Government improve regulation to facilitate efficient planning and development while preventing environmental harm and protecting airports for aviation use?
- Is a monetary threshold still an appropriate mechanism for determining a 'major airport development' requiring an MDP? What other significance tests could the Australian Government consider?
- Do current master planning processes adequately account for climate risks and if not, how could they be improved?
- Do the current master planning processes support all airport users, including general aviation?



07

General Aviation





GA is a diverse sector that plays a variety of important roles in aviation including servicing regional communities, delivering education and health services, regional freight and transport, tourism, recreation, agricultural mustering and spraying, instructional flying, sport and pleasure flying, and emergency services. Parts of GA are expanding rapidly while other areas struggle with the impact of changing markets and demand for their services and skills shortages.

GA is an evolving sector. While GA is traditionally viewed as activities flown by small light aircraft, the variety of aircraft and activities undertaken by GA continues to change over time and is rapidly growing with the introduction of new technologies. For example, GA now includes new technologies such as drones. Drones are an increasingly important part of the GA landscape, being used for agriculture, surveillance, search and rescue, disaster relief, media and construction. Drones are a growth area for general aviation. It is expected our skies will be shared by crewed and uncrewed aircraft as industry transitions towards an integrated model.¹⁴³

GA offers significant benefits to communities and to the Australian economy, including through training offered by instructional flight schools, spraying and mustering improving agricultural productivity, and supporting Australia's crisis response capability. Perhaps the most famous GA service, the Royal Flying Doctor Service (RFDS), provides a lifeline for those that live, work and travel in rural and remote Australia, by providing Australians with access to healthcare and emergency services for 95 years. The RFDS's fleet of 79 aircraft attended more than 212,000 patients in FY2021–22,¹⁴⁴ flying the equivalent of 34 trips to the moon and back.¹⁴⁵

In the future, GA has the potential to unlock new opportunities and benefits, particularly for regional and remote communities, by creating air connections that would otherwise be too costly to be viable through traditional transport. Greater connectivity allowed by technologies like AAM may also increase the viability of existing traditional services, including for passenger transport, by expanding catchment areas for regional airports.

With typically shorter flight lengths and lower weights than scheduled air services, emerging propulsion technologies such as electric batteries may be a key part of the transition of the GA sector to net zero.

The traditional GA sector is likely to continue to be impacted by broader societal and macroeconomic factors, which present both challenges and opportunities for the sector. Options presented in other chapters of this Green Paper may help flexible GA businesses continue to adapt to the changing operating environment and support GA's natural growth and regeneration.

There may be opportunities for government and industry to work together to adopt place-based approaches in key regions, ensuring regional industries are sustainable and diverse. For example, Swoop Aero is trialing the use of medical delivery drones to deliver medication throughout Darling Downs, increasing the accessibility of medications and ensuring they will remain accessible even during emergencies.¹⁴⁶

143 Civil Aviation Safety Authority (2022) *Annual Report 2021-2022*, Civil Aviation Safety Authority website, 17, accessed 2 June 2023.

144 Royal Flying Doctor Service (n.d.) *National Consolidated Statistics 2021/2022*, Royal Flying Doctor Service website.

145 Royal Flying Doctor Service (n.d.) *Facts & Figures*, Royal Flying Doctor Service website.

146 southburnett.com.au (2022), *Drone Trial To Take Off*, southburnett.com.au/news2/2022/12/07/drone-trial-to-take-off/.

7.1 A growing general aviation sector

Key issues

- GA has growth potential, with emerging technologies in particular presenting opportunities for regeneration of the sector.
- Appropriate regulatory frameworks will support growth of emerging technology in the GA sector.
- New propulsion technologies, such as electric powered aircraft, may support the GA sector's transition to net zero.
- The Australian Government is undertaking a GA study to inform evidence-based policy for the sector.
- CASA is undertaking reforms to streamline GA regulatory arrangements and provide risk-based oversight of the sector.

Stakeholder feedback

- The sector seeks direction from Government about how the net zero transition will affect them. The Regional Aviation Association of Australia's submission to the Terms of Reference notes 'It is also important to understand the government's position on what measures will be in place for sectors of the industry that just can't practical[ly] achieve those targets [net zero by 2050]. This is very much a possibility when looking at the costs to achieve these targets with new aircraft/technology.'¹⁴⁷
- The Australian Airports Association also notes: 'GA continues to face the same issues, namely: tensions between aeronautical and non-aeronautical development at airports, access to airspace.'¹⁴⁸
- Some stakeholders consider CASA's approach to regulation does not sufficiently consider industry burden, however other stakeholders have pointed to improvements in CASA's regulatory approach. For example, the Regional Aviation Association of Australia has said 'efficacy of CASA's engagement with the aviation sector, including via public consultation, has never been better.'¹⁴⁹

Some General Aviation sectors have significant growth potential

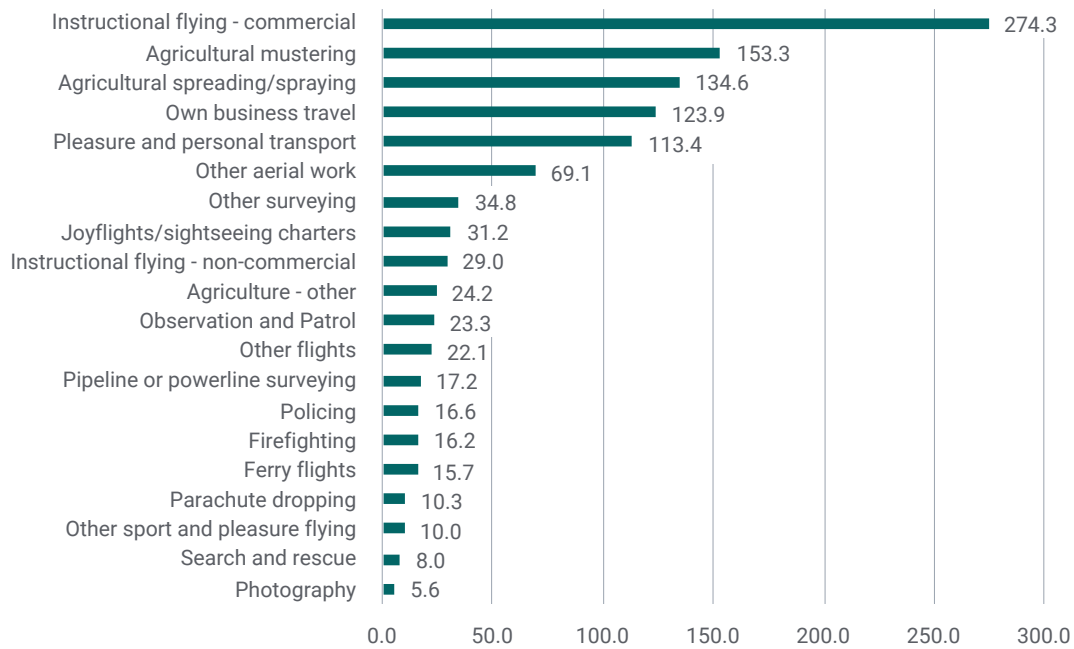
GA is a diverse sector that delivers a variety of important services.

Of the more than 1,140,000 hours flown by GA aircraft, aerial work is the largest proportion of flying time, with 506,000 hours reported in 2021. Instructional flying was the second greatest activity with 303,000 hours. These represented 44 per cent and 26 per cent of total flying time for GA. Sport and pleasure flying represented 15 per cent. However, there are many other types of GA activity, operated using a wide variety of aircraft. Further information is contained in Figure 13 below.

147 Regional Aviation Association of Australia (2023), *RAAA Submission on the Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

148 Australian Airports Association (2023) *Aviation White Paper – Response to the Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

149 Regional Aviation Association of Australia (2023), *RAAA Submission on the Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Figure 13: General Aviation hours flown by flying activity in 2021 (thousands)¹⁵⁰

Changes in the demand for, cost and supply of GA aircraft and personnel will continue to create opportunities and challenges for different parts of the GA sector.

The diverse nature of the sector promotes flexibility, allowing businesses to pivot towards different services when demand changes and is an important asset for the broader industry.

Since 2010, total crewed GA activity in Australia has generally trended down, but not for all sub-sectors. Flight instruction and manned agricultural activities has shown growth since 2014. Several GA sectors, such as recreational and sport flying activities have experienced decreased activity since 2010. New and emerging technologies are expected to offset these declines.

Australia is well placed to capitalise on the growing global demand for pilots, supported by good weather, uncongested airspace and a global reputation for safety. This presents significant growth potential for the GA sector. There may be further opportunities to expand the current flight training industry in Australia, attracting student pilots domestically and from overseas to fill long term demand for new pilots.

New technologies are likely to drive new opportunities for General Aviation

Emerging technologies may also provide opportunities for GA to provide innovative services, identifying new use cases that do not require heavy payloads or long flight times. With typically shorter flight lengths and lower weights than scheduled air services, emerging propulsion technologies such as electric batteries are likely to be a key part of the transition of the GA sector to net zero and unlocking new benefits for GA.

¹⁵⁰ Bureau of Infrastructure and Transport Research Economics (2022) *Timeseries 2014–2021 Australian Aircraft Activity 2014–2021* [data set], bitre.gov.au.

The number of drones operating in Australia is already greater than the number of existing airspace users combined. Registrations of drones rose 8.6 per cent to 29,965 in 2021–22.¹⁵¹ The size of the AAM sector is expected to follow a similar trend to drones.¹⁵² In 2013 there were fewer than 1,000 licensed pilots and operators, by 2017 there was nearly 7,000.¹⁵³ Emergence of new technologies in the GA sector will require regulatory flexibility and adaptability to harness trends and changing demand.

CASA recently undertook an industry scan to determine the future regulatory activities and changes needed to support the deployment of new technologies, many of which will operate in the GA sector. CASA has established a Future Strategies Taskforce to work through a range of future regulatory challenges and issues that did not sit within CASA's existing workstreams. CASA has developed *The RPAS and AAM Strategic Regulatory Roadmap* to provide clarity about Australia's future approach to aviation safety regulation and oversight for drones and AAM.¹⁵⁴

The GAAN provides advice to the Minister for Infrastructure and Transport on matters affecting the GA sector and will continue to be a key consultation mechanism to help guide the Australian Government's approach to these and other issues.

Instructional flying and agricultural flying are set to take off

GA has traditionally played a role in providing training to the aviation industry more broadly, with flight schools often providing early training for people seeking a career in aviation. Training for remotely piloted aircraft has rapidly increased over the past decade.

There may be further opportunities to expand the current flight training industry in Australia, attracting student pilots domestically and from overseas to fill long term demand for new pilots. The use of electric aircraft may make Australia's flight instruction sector even more effective and competitive.

Case study – Electric aircraft in flight schools

Electric aircraft may further enhance the efficiency and viability of many GA activities, particularly flight training and agricultural work, due to lower operational costs. The Slovenian made Pipistrel Velis Electro, an electric two seat training aircraft, is an example of a new type of aircraft beginning to see use in flight schools around the globe. The single-engine aircraft can fly up to 12,000 feet and has a maximum speed of 98 knots (113 mph). The Velis Electro's maximum noise level is 60 dBa.

The Velis Electro was certified in the UK in 2021, and in mid-2022 seven Velis Electros were in use for flight training. The aircraft has been picked up by flight schools as the design is quieter and has lower operating costs, users reported the operating costs were 10 per cent of the cost to operate a fuel powered aircraft. The lithium-ion batteries last for approximately 50 minutes of flight time. The Velis Electro is priced similarly to the equivalent Pipistrel gasoline-fuelled model. In Australia, the Cloud Dancer pilot school in Jandakot has been using three Velis Electro for pilot training.

151 Civil Aviation Safety Authority (2022) *Annual Report 2021–2022*, Civil Aviation Safety Authority website.

152 Civil Aviation Safety Authority (n.d.) *The RPAS and AAM Strategic Regulatory Roadmap*, Civil Aviation Safety Authority website.

153 Bureau of Infrastructure and Transport Research Economics (2017) *General Aviation Study*, Bureau of Infrastructure and Transport Research Economics website.

154 Civil Aviation Safety Authority (n.d.) *The RPAS and AAM Strategic Regulatory Roadmap*, Civil Aviation Safety Authority website.

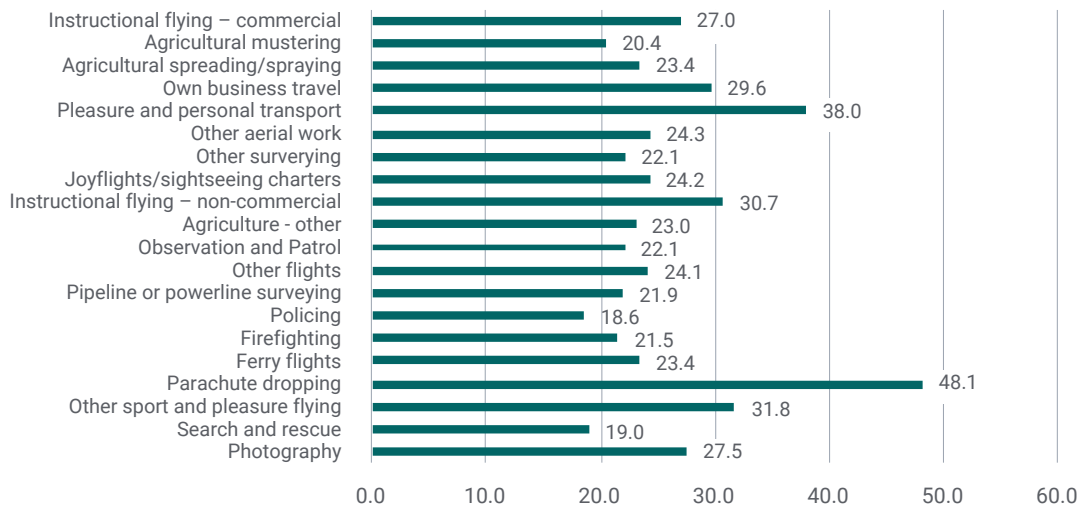
Agricultural mustering and spraying are two of the most common flying activities for GA. Mustering has shown consistent growth since the early 1990s, and while hours flown spreading and spraying appear to be decreasing to a small extent, this is due to the increasing capacity of spraying aircraft, and increasing efficiency in timing and frequency of application.

These activities are likely to continue to be large sections of GA, but may also present new opportunities through the use of emerging technologies, as electric aircraft are capable of longer flying times and greater payloads. Trials are underway to explore the use of drones to locate and muster livestock.¹⁵⁵

New aviation technologies may provide opportunities for General Aviation's decarbonisation

The average age of the traditional fixed wing GA fleet is over 31 years old. However, the age of aircraft in different sub-sectors varies.¹⁵⁶

Figure 14: Average age of aircraft (years)¹⁵⁷



Many of these aircraft are reliant on leaded Avgas, which produce CO₂ emissions. Due to compatibility requirements, these aircraft cannot use SAF to reduce emissions.

The US is seeking to reduce and eliminate leaded Avgas from its GA fleet by 2030 by developing unleaded fuel infrastructure, supporting research and development, authorising safe unleaded fuels, and considering further regulation or policy needed to support unleaded fuel infrastructure. CASA has issued recommendations on the use of unleaded aviation fuels. (AWB 28-019 Issue 2 – 17 March 2023).

155 Meat & Livestock Australia (2022) *Goat producers trial drone mustering*, Meat and Livestock Australia website.

156 Bureau of Infrastructure and Transport Research Economics (2022) *Timeseries 2014–2021 Australian Aircraft Activity 2014–2021* [data set], bitre.gov.au.

157 Bureau of Infrastructure and Transport Research Economics (2022) *Timeseries 2014–2021 Australian Aircraft Activity 2014–2021* [data set], bitre.gov.au.

The most common and reliable type of Avgas is 100 octane Low Lead, also known as 100LL.¹⁵⁸ While viable alternatives to 100LL are in development and may be ready for use in Australia in the near future, with typically shorter flight lengths and lower weights than scheduled air services, emerging propulsion technologies such as electric batteries are likely to be a key part of the transition of the GA sector to net zero. With large international markets moving away from the use of leaded Avgas, access to leaded Avgas imports for the domestic market in Australia may be adversely affected.

The Australian Government is undertaking a General Aviation study

BITRE is currently undertaking a study of the GA sector that is due to be completed in late-2023.

An analysis of the GA industry and its constituent sub-sectors, including quantitative data where available, will assist all stakeholders to understand the long-term drivers of economic activity in the GA sector, and help inform policy and regulation to support GA's growth. The scope of the project will examine data from 2016 to 2022.

CASA is undertaking reforms to streamline arrangements and provide risk-based regulatory oversight

CASA is responsible for the regulation of civil aviation, for monitoring regulatory impacts on industry and working with industry to identify opportunities to refine regulatory frameworks.

CASA's primary and most important consideration is air safety. However, CASA considers other relevant considerations, including cost, and adopts risk-based regulatory approaches to regulation and decision making.

In the past, GA stakeholder have raised concerns that CASA undertook limited industry consultation and ignored feedback. In recent years, GA stakeholders have noted improvements to CASA processes and seek CASA's continued positive engagement with industry, including through its GA workplan.

The Department, as the policy agency responsible for providing advice to Government on aviation policy, has a role in considering the economic impact of policy and regulation, and in the promotion and growth of GA.

Further discussion of CASA's approach to safety regulation can be found at Chapter 8.2



The Australian Government identifies opportunities for growth and regeneration of the GA sector, especially in the context of new and emerging technologies. New technologies may also offer opportunities for the GA sector to decarbonise.

- Do policy and regulatory settings adequately facilitate the GA sector's evolving role in Australian aviation?
- Are there any changes to policy and regulatory settings that might facilitate the GA sector's evolving role in Australian aviation including through protections at GA airports and supporting the transition to a sustainable, net zero GA sector?
- Are existing consultation mechanisms, including the GAAN and CASA-led ASAP and TWGs, appropriate?

¹⁵⁸ United States Federal Aviation Administration (n.d.) *Aviation Gasoline, Federal Aviation Administration website.*

Fit-for-purpose agencies and regulations





Aviation is a complex global industry. All aspects of the sector, including aircraft manufacture and supply, ATM and airspace regulation, passenger facilitation, security screening and safety oversight, require international collaboration between businesses and governments to design arrangements which work effectively and prioritise the safety and reliability of the industry for the those who depend upon it. Australia's aviation regulation needs to comply with our international obligations to effectively integrate the industry within the global economy.

Australia's National Aviation Safety Plan identifies the key agencies responsible for delivering action items under the plan. A range of additional agencies are also involved in other aspects of the sector. Australia has received a very high rating from the ICAO for the effective implementation of our civil aviation organisation arrangements, including the clear delineation between agencies of aviation policy, regulatory, service provision and investigation functions.

The Australian Government is currently undertaking the Australian Transport Safety and Investigation Bodies Financial Sustainability Review which will provide advice to on how best to ensure CASA, ATSB and Australian Maritime Safety Authority (AMSA) are operationally fit-for-purpose and sustainably funded to carry out their responsibilities. The continued achievement of high-quality safety outcomes will remain the key objective of the review. The review also provides an opportunity to consider potential efficiencies, and whether legislative or regulatory amendments are required in light of what other recommendations are made by the review.

As the aviation sector progresses on its journey to net zero carbon emissions by 2050, the sector has begun to engage with new policy agencies and regulators responsible for emissions reduction and energy policy. This work will increase over coming years. Stakeholders have already reported that the role of different agencies in these policies are not always clear, and that there are an increasing number of touchpoints for business with government. The Australian Government is committed to establishing a clear structure for this kind of regulation, with clear touchpoints for industry.

The Jet Zero Council will provide an additional avenue for the aviation industry to provide advice on how co-ordination across government and communication with industry might be improved. Views from a broader range of stakeholders on communication and structures are sought through this White Paper process.

State, territory, and local governments also manage the aviation sector on matters including aircraft noise, regional airport operation and development and supporting regional connectivity.



8.1 Role of government and agencies

Key issues

- Clear roles and responsibilities for government agencies help the sector take advantage of new technologies and the transition to net zero emissions.
- Current governance arrangements remain fit for purpose, but roles and responsibilities will need to evolve to respond to new challenges, new policy priorities, and changes in the industry, including the move to net zero emissions.
- The pace and extent of the uptake of new technologies such as drones and remotely piloted air systems is not known. The Australian Government's objective is to ensure safety and security of the aviation system is maintained as uptake increases, without creating barriers to potential productivity gains.

Stakeholder feedback

- Many stakeholders have called on government to provide strong policy leadership, particularly in relation to emerging technology, manufacturing, skills, achieving net zero and decarbonisation.
- Stakeholders also suggest industry would benefit from clarification and better coordination of the roles and responsibilities of government agencies on cross-cutting issues.
- Stakeholders have suggested the Aviation White Paper has a clear set of outcomes and timelines for implementation, as well as regular reporting against these.

The Australian Government has a key role in the aviation system

The role of government is to ensure safety, security, reliability and efficiency in the aviation system, which is unlikely to be effectively delivered by the market.

For the Australian Government, it is also informed by its constitutional responsibilities and its interest in matters of national significance.

The Australian Government's core focus is safety, security and environmental sustainability; ensuring markets operate efficiently and provide critical connectivity; and providing the leadership industry needs to innovate.

These activities are undertaken by departments and agencies with specialist knowledge and expertise, as well as intersecting with other areas of Government with an interest in aviation, across numerous portfolios as outlined below.





Key Australian Government agencies with an interest in aviation

While the Department maintains an overall market stewardship role for the sector, other key departments and agencies with responsibilities touching the aviation sector include:

- Civil Aviation Safety Authority (CASA) – safety regulation and education
- Airservices Australia – airspace management and aviation rescue and fire-fighting services
- Australian Transport Safety Bureau (ATSB) – safety investigations
- Australian Maritime Safety Authority (AMSA) – search and rescue
- Australian Communication and Media Authority (ACMA) – spectrum licence regulation
- Department of Defence (Defence) – military aircraft safety regulation and airspace management
- Department of Foreign Affairs and Trade (DFAT) – international travel documentation, capacity building in the Asia-Pacific region, international crisis coordination and foreign, trade and development policy advice
- Austrade – tourism policy, export and investment marketing and international education promotion
- Tourism Australia – international tourism promotion
- The Treasury – competition and consumer policy
- Australian Competition and Consumer Commission (ACCC) – airport and airline price monitoring
- Productivity Commission – airport economic performance monitoring
- Department of Employment and Workplace Relations – employment and workplace relations policy, skills and training
- Australian Skills Quality Authority (ASQA) – national vocational training regulation
- Jobs and Skills Australia (JSA) – workforce planning and vocational education and training
- Department of Health and Aged Care (Health) – health information and security measures for international travellers
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) – emissions policy and regulation, environmental regulation
- Clean Energy Regulator – administers schemes legislated by the Australian Government for measuring, managing, reducing or offsetting Australia's carbon emissions.
- Attorney-General's Department – human rights (including disability), counter-terrorism law
- The Australian Federal Police (AFP) – primary law enforcement at Australia's major airports
- Department of Industry, Science and Resources (DISR) – industry policy
- Australian Space Agency (ASA) – space launch regulation
- Geoscience Australia – lead agency on Satellite-Based Augmentation System (SBAS) services for Australia and New Zealand
- Australian Bureau of Meteorology (BoM) – aeronautical meteorological services
- Department of Agriculture, Fisheries and Forestry (DAFF) – biosecurity regulation
- Department of Home Affairs (Home Affairs) – transport security policy and regulation, border policy and regulation, migration policy, incorporating the Australian Border Force (ABF) – federal border law enforcement agency – migration and border enforcement and customs policy, regulation and enforcement. The Counter Terrorism Coordination Centre (CTCC) within Home Affairs also oversees all efforts to prevent and counter terrorism in Australia
- Australian Security Intelligence Organisation (ASIO) – identify and investigate threats to security.

State, territory, and local governments also have critical roles on a range of matters such as aircraft noise, regional airports and regional air services.

Current structures appear largely fit for purpose

The current structure distinguishes policy, regulatory, service delivery and investigation functions. This approach helps improve accountability, maintain organisational focus, and avoid conflict of interests. It is internationally recognised as best practice.

Roles and responsibilities need to evolve to respond to new challenges, new policy priorities, and changes in the industry. The most significant change since the 2009 Aviation White Paper was transfer of responsibility for aviation security policy and regulation to the Department to Home Affairs (Home Affairs).

For the most part, the Australian Government considers these structures appropriate and well adapted to supporting a safe, secure, efficient and environmentally sustainable sector. However, the Australian Government acknowledges some stakeholders advocate changes to parts of the framework.

Decarbonisation is managed across portfolios

The Australian Government has committed to reducing Australia's net greenhouse gas emissions to 43 per cent below 2005 levels by 2030, and to zero by 2050. The challenge of Australia reaching net zero by 2050 requires increased collaboration within government. This is a concerted effort, across portfolios.

The Minister for Climate Change and Energy leads development and implementation of economy-wide emissions reduction policy settings, supported by DCCEEW, the Clean Energy Regulator and other key government agencies within the climate change government portfolio. A range of other Ministers also have significant roles to play.

For the aviation sector, the Australian Government has established the Australian Jet Zero Council to bring together a cross-section of senior stakeholders from across the industry and its supply chains to inform the design of policy settings to encourage emissions reduction in the aviation industry. The Jet Zero Council will act as an advisory conduit between government and the aviation industry on emissions reductions policy settings for the industry, while also supporting consistency with economy-wide emissions reduction initiatives. The Jet Zero Council is also intended to galvanise private sector action (see Chapter 5 'Maximising aviation's contribution to net zero').

Responsibility for supporting the aviation industry

Issues related to growing an efficient and economically sustainable industry are a policy matter covered by the Department, alongside its market steward responsibilities.

Some stakeholders propose revising CASA's remit to place a greater emphasis on economic considerations, suggesting this would reduce regulatory burden and encourage growth. This view was a specific recommendation of an interim report of the recent Senate Inquiry into Australia's GA industry.

However, 2019 amendments to the *Civil Aviation Act 1988* (CA Act), as well as element 2 of CASA's regulatory philosophy, already require CASA to consider economic and cost impacts, along with the different risks associated with different sub-sectors when developing regulations.



The Department remains the appropriate entity to foster aviation industry development, in its role as the portfolio agency for advising the Australian Government on the policy and regulatory framework for international, domestic, and regional aviation. The Department also provides Government with holistic advice on the aviation industry through its many functions including safety, airspace and air traffic management, agency governance (CASA, Airservices Australia, ATSB), economic regulation, airport planning, environmental management and Australia's international aviation engagement.

A risk-based approach to safety investigation

The ATSB follows a risk-based approach to investigation. This allows the ATSB to investigate accidents and incidents with the potential to deliver the greatest public benefit through improvements to transport safety rather than trying to seek to investigate all accidents.

As recreational and sport aircraft have become a more common pathway for entry into the aviation sector, the risk-based approach has come into sharper focus and some stakeholders suggest widening the ATSB's remit to require an investigation of all fatal aviation accidents.

The Australian Government's view is that this approach would require significant additional resourcing which would not likely generate a significant benefit to safety or improve the operation of regulation, commensurate with this investment, and it may compromise the ATSB's ability to deliver on key priorities, including investigations into emerging threats to the aviation safety system.

Aviation security policy and regulation

Australia's strong security framework is essential to a viable aviation sector. A secure aviation network supports confidence in the network, and allows Australia to meet international security obligations set by ICAO. The Australian Government remains committed to keeping pace with new security threats, in partnership with industry, and reforming legislative, regulatory and policy frameworks in response.

Home Affairs is responsible for administering the security of the Australian aviation environment through the *Aviation Transport Security Act 2004* and the *Aviation Transport Security Regulations 2005*. This is done in accordance with the international standards as set out in Annex 17 of the *Chicago Convention* administered by ICAO.

Aviation transport is critical infrastructure. Home Affairs also administers the *Security of Critical Infrastructure Act 2018* (SOCIA Act), which is the primary legislation to protect Australia's critical infrastructure from security risks, including cyber risks.

Home Affairs, through the ABF, are also responsible for customs and immigration functions as well as managing both inbound and outbound national security risks across Australia's major international airports and airports that operate international sectors.

The Australian Government's view is that the approach to security regulation and the remit and frameworks of Home Affairs are appropriate to manage risks to aviation security, and are sufficiently robust to evolve to respond to new threats and to consider the implications the rise of new aviation technologies.



The Australian Government considers the current arrangement of roles and responsibilities within the Australian Government is generally fit for purpose, noting the framework will need to continue to evolve to respond to new challenges such as technological transformation and the transition to net zero emissions.

- Do you have concerns with current arrangements of roles and responsibilities within the Australian Government? Are there opportunities to improve these arrangements?

8.2 Safety regulation

Key issues

- Changes to safety regulation approaches cannot compromise Australia's internationally recognised high standards of safety.
- CASA is reviewing its processes and regulatory approach with a view to implement risk-based and outcomes-focused regulation where possible.

Stakeholder feedback

- Some stakeholders particularly in the GA sector have expressed concerns around the level and complexity of regulation, and the burden that compliance places upon the industry.
- Stakeholders have further expressed the view that there are significant opportunities for Australia's regulatory framework to be better aligned with those in comparable countries.
- In its submission, Boeing Australia spoke of how 'compatibility with international regulations, and effective bilaterals that maximise and streamline recognition and acceptance between international safety authorities, will be essential to realising opportunity for the Australia aviation industry'.¹⁵⁹

Aviation safety remains the priority

Australia's enviable safety record is a key element of the sector's social license to operate, and underpins the community's confidence in the industry and its commercial viability. Legislative and regulatory frameworks are at the core of this culture. As the sector grows and evolves, CASA will need to continue to identify opportunities to streamline regulatory requirements and processes while maintaining high safety standards.

Some parts of the aviation industry, such as the GA sector, have noted that they find regulatory arrangements challenging to their often-limited resources and tight profit margins.

There have been many reviews, inquiries and consultation into GA in recent years. A recurring theme raised by some, but not all, GA stakeholders is that the regulatory system does not appropriately balance safety and cost (see Chapter 7 'General Aviation').

¹⁵⁹ Boeing Australia (2023) *Aviation White Paper* | Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) *Boeing Australia submission*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.



Civil Aviation Safety Authority reforms are under way

CASA is reviewing its processes and approach to regulation with a view to implementing risk-based and outcomes-focussed regulation wherever possible, while avoiding prescriptive approaches and ensuring safety remains paramount.

Key elements of this process include the General Aviation Workplan,¹⁶⁰ and the Aviation Safety Advisory Panel (ASAP). The ASAP has been established to provide CASA's Chief Executive Officer and Director of Aviation Safety with informed, objective, high level advice from the aviation community on aviation safety matters including how CASA performs its functions. It is supported by Technical Working Groups comprised of industry participants as well as web-based consultation mechanisms.

The General Aviation Workplan outlines work underway to simplify and better target the approach to GA's regulation, including:

- reforming pilot licensing rules and adopting a more flexible approach for flight examiner qualifications
- simplifying the approach to aviation medical standards for private and recreational flying
- developing regulations aimed at reducing costs and improving flexibility and access to maintenance in regional and remote areas
- simplified application and fast-tracked assessment process for 'independent' flight instructors seeking to obtain training approval
- increasing the privileges of grade 1 flight instructors to train, assess and grant a range of endorsements for nominated activities.

This work supports 2019 amendments to the CA Act, which requires CASA to consider economic and cost impacts, and differing risks associated with differing aviation sectors, through its regulations.

Risk-based oversight is also being implemented. Risk-based oversight is the means by which the risk profile, safety performance and leading indicators of an organisation or sector informs the level of oversight required. The approach forms part of ICAO standards through Annex 19 to the *Chicago Convention* which became applicable in 2013. CASA applies a risk-based approach to the development of all regulation.

CASA, in collaboration with Airservices Australia and the Department and Defence, are currently in the process of developing a long-term strategic airspace implementation plan to develop a transparent, consistent, and scalable method to administer Australian airspace to support the implementation of advanced ATM and UTM. As part of this work CASA has developed the Airspace Risk Modelling System which incorporates a risk-based approach to airspace management.

¹⁶⁰ Civil Aviation Safety Authority (n.d.), *General Aviation Workplan*, Civil Aviation Safety Authority website.

Case Study: Airspace Risk Modelling System (ARMS)

CASA has recently developed the Airspace Risk Modelling System (ARMS), which is an evidence and risk-based approach to assessing airspace, utilising collision risk modelling, and data and risk mitigation strategies aimed at ensuring airspace remains safe for all users. ARMS utilises an ever-growing database of actual historical flight trajectories to provide quantitative risk modelling for a range of airspace scenarios.

CASA developed ARMS to examine international best practice for collision risk modelling and the potential utility of commercially available risk modelling software. CASA found that available software either relied heavily on artificially constructed flightpaths rather than real world historical flight trajectories or did not consider flightpaths at all, and only offered basic collision models, and could not provide a sufficient level of detail to inform decision making.

The continued development of ARMS is a collaborative effort between CASA and Airservices Australia. Airservices Australia currently provides the flight trajectory data to CASA and the methods used within ARMS are also used by Airservices Australia in its own analysis. Unlike the alternatives considered by CASA, ARMS utilises a range of modelling methods depending on the airspace use and available data. Methods used by ARMS are based on models developed by ICAO and adapted to the specific airspace being assessed. The methods used continue to be expanded as new modules for specific use cases are developed.

ARMS enables CASA to quickly compare how changes in air traffic mix, flightpath design or third-party service provision like ATC affect the likelihood of a mid-air collision. Additionally, ARMS allows rapid assessment of extant airspace risk across Australia, rapid comparison of airspace across Australia and visual access to historic flightpaths to support detailed analysis of airspace utilisation.

Data-sharing initiative

In the interests of sharing risk information and improving outcomes, some industry stakeholders have asked Government to implement a framework to facilitate voluntary sharing of safety data with each other and with Government. This framework would require investment in and development of infrastructure, policies, principles and legal frameworks. There will be a need to consider critical issues around data-sharing, including privacy, security and data information protection in its development. Another important matter would be who pays for its development and upkeep, and by what mechanism, given the benefits are largely gained by industry.

This industry proposal is separate to the Aviation Safety Data Sharing Platform used by CASA, ATSB, Airservices Australia and the Department.



Mutual recognition and international alignment remain a priority

The Australian Government is working towards mutual recognition of aviation regulation with foreign aeronautical authorities. Australia has a treaty agreement with the US on the promotion of safety and airworthiness certification. CASA is working with international partners to develop bilateral agreements and currently has agreements with eight countries which cover a broad spectrum of subjects including airworthiness certification, maintenance, recognition of qualified professionals, and promotion of aviation safety. These agreements involve Europe, the UK, Brazil, China, Japan, Korea and New Zealand. Further work is planned in the near future with the US, UK, Canada and New Zealand.

These arrangements support economic growth in the Australian aviation market and can reduce barriers to new entrants, and CASA will continue to work to identify opportunities to adopt or develop regulations in collaboration with international partners.

The small size of the Australian market can make it difficult to gain traction with large international partners, for what is effectively a complex and time-consuming treaty process. As a result, CASA typically pursues less formal regulator-to-regulator arrangements that are not binding under international law.

The process will continue as reforms mature

The safety regulation framework is transforming. A broad suite of macro and micro safety reforms are underway to ease the regulatory burden, better target risk oversight and help the industry grow.

The Australian Government will monitor the outcome of current reform processes. CASA will continue to work through the ASAP to identify further regulatory reforms, while maintaining safety as the paramount consideration.



The Australian Government considers that, while striking a balance between ensuring safety standards and assisting industry is vital, CASA's primary remit is to support safety outcomes.

The Australian Government will closely monitor the outcome of current reform processes and expect these to be fully evaluated to determine their outcomes for key stakeholders and different aviation sectors.

- Do you have any suggestions to improve current reform processes?



8.3 Airspace regulation and management

Key issues

- We need to optimise the safety, equity and productivity of Australia's airspace in the context of traffic growth from conventional and new aircraft types.
- A range of technologies can further improve the safety and efficiency of Australia's airspace management and achieve improved environmental, safety and economic outcomes.

Stakeholder feedback

- The commercial sector has highlighted the safety and efficiency that wide-scale adoption of ADS-B devices would bring, including the potential to phase out ageing ground-based aircraft tracking infrastructure.
- Qantas noted that ADS-B 'is a cost effective and globally-accepted standard for providing high fidelity surveillance for air traffic control' and that its limited uptake by aircraft flying under Visual Flight Rules 'has meant SSRs [Secondary Surveillance Radars] cannot be retired'.¹⁶¹
- Submissions noted the rollout of the SBAS will assist in improving navigation and in providing safe landings.
- The Australian Airports Association in particular, noted SBAS would allow for 'continuous vertical guidance for safe landings at airports without needing to install and maintain expensive fixed Instrument Landing System (ILS) infrastructure'.¹⁶²

Australia's airspace responsibilities are vast and unique...

Australia is responsible for managing 11 per cent of the world's airspace, exceeded in coverage only by the US. Australia's approach must accommodate large areas of rarely used outside of controlled airspace as well as some of the busiest air routes in the world. This contrasts significantly to the airspace profiles in other countries, in addition to varying regulatory and delivery models for air traffic services in different jurisdictions.

Airspace management can be improved through technology integration

While Australia's airspace management is effective, there are potential productivity benefits associated with new technologies that would further improve efficiency and assist in meeting carbon emissions targets.

These technologies will need to be assessed against expected safety risk reductions and efficiency improvements to ensure the benefits outweigh financial costs and other implementation impediments.

¹⁶¹ Qantas Group (2023) *Qantas Group Submission To The Aviation White Paper Terms Of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

¹⁶² Australian Airports Association (2023) *Aviation White Paper – response to the Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.



Satellite-Based Augmentation System

SBAS is currently in the process of being implemented via the Southern Positioning Augmentation Network (SouthPAN), a joint venture between the Australian and New Zealand Governments, and is currently due for full operation in 2028.

SBAS is a navigational system that supplements the existing systems, providing a more accurate and reliable navigation service and without the need for ground-based infrastructure. In an aviation context, SBAS allows aircraft to conduct satellite-guided landing approaches which are operationally equivalent to current ILS Category 1 approaches guided by land-based infrastructure. ILS is a precision runway approach aid that uses two radio beams which together provide pilots with both horizontal and vertical guidance during the landing approach. The benefits of SouthPAN have the potential to be shared with the Pacific region.

Automatic Dependent Surveillance – Broadcast

ADS-B is a system in which electronic equipment onboard an aircraft automatically broadcasts the precise location of the aircraft via a digital data link. The data can be used by other aircraft and potentially air traffic control to show the aircraft's position and altitude on display screens without the need for radar.

The transmission of this data from an aircraft is referred to as ADS-B OUT. Some ADS-B devices also have the ability to receive transmitted ADS-B signals from other aircraft, this is referred to as ADS-B IN. ADS-B is able to be used as a collision avoidance system if both aircraft are fitted with ADS-B IN and OUT devices.

ADS-B EC is a low-cost, portable version of the technology that acts as an ADS-B IN/OUT device but does not have sufficient power to transmit to ATC. Aircraft equipped with such devices need to be tracked via conventional methods.

OneSKY

The 2009 Aviation White Paper identified that the separate air traffic management systems for both civil aviation and military aviation were approaching their end-of-life, and the opportunity existed to replace both with a single, unified, more efficient system, known as 'OneSKY'. OneSKY will implement a single advanced integrated system known as the Civil Military Air Traffic System (CMATS).

OneSKY is the most complex transformation of air traffic management in Australian aviation history. It has been designed to deliver economic benefits to airspace users over 20 years through route optimisation, trajectory-based operations, shared use of airspace, business continuity benefits and productivity improvements.

Satellite-Based Augmentation System can make landings more efficient

Australia's SBAS capability is scheduled to be fully operational in 2028. Aerodromes will be able to access SBAS assisted landing approaches by making relatively minor infrastructure upgrades, potentially resulting in productivity benefits from fewer diversions and delays caused by weather and more reliable services. This will primarily benefit regional Australia as regional aerodromes are generally not in a position to install the ground-based infrastructure required to support assisted landing approaches.

Automatic Dependent Surveillance-Broadcast offers safety and efficiency gains

Widespread adoption of ADS-B has the potential to vastly improve the management of airspace, by providing more accurate and timely tracking for air traffic control compared to conventional ground-based radar, and allowing reduced aircraft separation and greater use of fuel and time-efficient routes.

ADS-B, particularly ADS-B IN, also has the potential to reduce the risk of collisions between conventional aircraft. Drones, AAM and Uncrewed Aircraft System Traffic Management (UTM) systems can also be provisioned to receive information about the location of conventional aircraft fitted with ADS-B, further reducing collision risks. Further benefits include enabling aircraft tracking over areas inaccessible to traditional, ground-based radar and reduces the need for ground-based infrastructure. It can also provide for enhanced search and rescue capabilities.

ADS-B OUT fitment has been mandatory for aircraft operating under instrument flight rules and those operating above 29,000 feet since 2013, and a rebate is currently available for visual flight rule aircraft owners to promote uptake. It may be appropriate to introduce a wider fitment mandate in the medium-term, when the cost of the technology further reduces and the benefits of integration with UTM systems increases.

OneSKY can further optimise aircraft routes

OneSKY will accommodate growth in air traffic, facilitate advancements in aviation technology, reduce complexity for controllers and pilots, bolster air traffic service resilience, and enhance national security. Greater use of airspace as well as more efficient route planning and fuel planning will assist in reducing flight times, delays and the use of fuel and reductions in carbon emissions.

OneSKY has been subject to several delays. Despite various challenges, the project is expected to replace the legacy systems of Defence and Airservices Australia.

Further emission reductions via airspace optimisation may be limited

ATM optimisation is a mechanism to reduce aviation's environmental impact by reducing fuel burn, thereby lowering emissions and complementing other strategies such as SAF and fleet modernisation.

This approach is a key priority in jurisdictions such as the UK and the EU. The UK's 2022 Airspace Change Masterplan will pursue carbon savings through wholesale changes to its airspace management, while the EU's European Air Traffic Management Master Plan is targeting an aspirational goal of 5–10 per cent reductions in emissions through ATM modernisation. The US is also employing new initiatives aimed at reducing fuel use and emissions, including Performance-Based Navigation and Optimised Profile Descents.

This has also been an Australian priority for some time, such that many of the benefits have already been realised. Airservices Australia's analysis suggests further efforts may yield efficiencies of 1–2 per cent, in contrast to other jurisdictions with older systems.



The Australian Government is committed to providing long term leadership on airspace policy and regulation as aviation technologies evolve over the next 30 years, to ensure arrangements remain outcomes-focused, adaptable and flexible.

The Australian Government is seeking views on whether a mandate for ADS-B should be required over the medium term to manage increasing airspace congestion.

- What should the Australian Government consider in adopting technology to fully utilise airspace and ensure access for different parts of the sector?



8.4 Agency funding and cost recovery approaches

Key issues

- Continuing demands on the performance of critical safety regulatory, service and investigation functions will place funding requirements on government and industry.
- The impact of emerging aviation technology (particularly drones and AAM) will need to be factored into future agency operating models.

Stakeholder feedback

- Many stakeholders have expressed concerns on the sustainability of agency funding and cost recovery approaches. The Australian Airports Association have noted that ‘emerging technological changes are...[disrupting] the ability of the Australian Government to adequately fund their regulators through the erosion of existing funding sources (fuel excise)’.¹⁶³

As noted above, the Australian Government is currently undertaking the *Australian Transport Safety and Investigation Bodies Financial Sustainability Review* which will provide advice to on how best to ensure CASA, ATSB and AMSA are operationally fit-for-purpose and sustainably funded to carry out their responsibilities.

Government agencies are funded through a mix of government and industry funding.

Safety regulation

CASA receives the majority of its funding from three major sources:

1. Fuel excise: a 3.556 cent per litre excise on aviation fuel consumed by all domestic aircraft. This provides the majority of CASA’s revenue and is collected under the *Aviation Fuel Revenues (Special Appropriation) Act 1988*.
 - a. The fuel excise component of CASA’s funding covers most surveillance and regulatory oversight activities.
2. Regulatory services fees and levies in accordance with the *Civil Aviation (Fees) Regulations 1995* and the Commonwealth Performance Framework under the *Public Governance, Performance and Accountability Act 2013*.
 - a. Service fees and levies apply to CASA’s 260+ regulatory services to the aviation sector including licences, medicals operating certificates, permits and exemptions, commercial drone registration, and aircraft registration. Fees have not increased since 2007.
3. Government annual appropriation.
 - a. Annual government appropriation covers all remaining activities.

The Australian Government is reviewing funding arrangements for CASA to ensure its activities are commensurate with safety risks and to identify sustainable and long-term funding models. The review will consider a range of matters, including issues associated with the aviation fuel excise, and cost recovery for drone regulation.

¹⁶³ Australian Airports Association (2023) *Aviation White Paper – response to the Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Air traffic management and fire-fighting and rescue services

Airservices Australia raises revenue through:

- terminal navigation charges
- enroute charges
- rescue and firefighting charges
- training movement charges
- meteorological service charges (levied on behalf of the BoM).

These charges are largely on a regulated fee-for-service basis.

Planning is under way for the implementation of new services for drones and other emerging aviation technologies. As these services become available, new sources of revenue and charging models may need to be implemented to recover the costs of these services and the cost of establishing the supporting infrastructure. The initial costs of developing the physical and digital infrastructure to support these services is likely to be significant, and will need to support infrastructure for surveillance, safety assessments and safety promotion. There may be a role for industry to play in the provision of these services and the Australian Government is committed to ensuring the most efficient regulatory response is delivered, in consultation with industry and across government.

Border security and biosecurity

The departments and agencies that provide critical border security for aviation consist of Home Affairs (including ABF), DAFF and the AFP. They are largely funded by Government. Establishment costs when international airports make changes to infrastructure that effect border agencies are recovered from airport operators.

Border agencies require sufficient accommodation within airports to ensure the legitimate trade and travel of all passengers and cargo. Airports provide this space and critical infrastructure needed on a rent-free basis, noting that provision of border services (biosecurity, immigration, customs control and policing) are provided at no cost to the airport operator. Border agencies also require non-operational spaces to be provided by airports on a rent-free basis to support key operational functions such as on-site administration/management, preparation and pre-deployment facilities and facilities to support on-the-job training.

Issues relating to international airport designation and development are further explored in Chapter 11 'International aviation'.

Home Affairs also collect the Passenger Movement Charge (PMC) on behalf of the Australian Government which is applied to all passengers leaving Australia, with very limited exceptions. The charges collected go into consolidated revenue.



The Australian Government recognises continuing demands on the performance of critical safety regulatory, service and investigation functions will place funding requirements on government and industry. The impact of emerging aviation technology (particularly drones and AAM) will need to be factored into future agency operating models.

- What should the Australian Government consider when determining cost recovery arrangements to ensure a safe, equitable and accessible aviation system?



8.5 'All hazards' regulatory approach

Key issues

- Australia's aviation sector is facing new, complex and changing threats that, if left unchecked, could disrupt the efficient movement of people and goods, doing serious damage to the industry, economy, sovereignty and the national interest.

Stakeholder feedback

- Stakeholders broadly support a risk-based approach to security that considers multiple threats. For example, IATA, in its submission on the Aviation White Paper Terms of Reference noted 'an appropriate aviation security framework and policy needs to be in place to address new technologies that pose a threat to aviation safety. Aviation security is a top priority for governments, airlines, and airport operators. The government should consider a roadmap that will address cyber security.'¹⁶⁴

An 'All Hazards Risks' regulatory approach will respond to evolving threats

In the past, security legislation has primarily focused on 'unlawful interference to aviation', that is, the threat of people with intent harming aviation activities, and generally physical threats. However, in order to ensure our aviation systems are secure, it is appropriate to consider a wide range of threats, including espionage, foreign interference, cyber security attacks and climate change. This is the 'all hazards' approach. It is also important to consider aviation infrastructure alongside aviation activities – as the two cannot exist without each other.

Transport security settings in the *Aviation Transport Security Act 2004 (ATSA)* have not kept pace with the evolving threat environment. Recognising the importance of aviation to Australia's productivity and prosperity, the Australian Government has commenced consultation with the aviation industry to develop a strategic transport security reform agenda. A key focus is ensuring Australia's security settings need to also evolve, to protect the aviation infrastructure and services we rely on from all hazard security risks.

Government is seeking to align the ATSA with the *Security of Critical Infrastructure Act 2018* by introducing obligations for critical aviation infrastructure entities to manage all hazards and security threats. The reforms seek to modernise settings and ensure that security obligations lead to desired security outcomes being achieved.

Cyber security is a major focus...

Cyber security is a key evolving threat. Australia is facing increasing cyber security threats to essential services, industry and government. In recent years there have been cyber attacks on federal parliamentary networks, logistics, the medical sector and universities. In 2022, there were major cyber attacks on large Australian companies. The threat of similar attacks is likely to increase and could extend to cyber attacks on aviation.

¹⁶⁴ International Air Transport Association (2023) *Submission on the Aviation White Paper Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Reforms are proposed to ensure aviation regulated entities minimise, mitigate or eliminate residual and realised cyber risks. This also meets Australia's international ICAO aviation cyber security obligations. These measures will complement the development of the *2023-2030 Australian Cyber Security Strategy*,¹⁶⁵ which will help us achieve the Australian Government's vision of making Australia the most cyber secure nation in the world by 2030.

Alongside the strategy, the Australian Government has established a National Coordinator for Cyber Security, supported by a National Office for Cyber Security within Home Affairs, to ensure a centrally coordinated approach to deliver Government's cyber security responsibilities.

...along with natural hazards, physical, personnel and supply chain risks

A range of additional challenges will also be addressed through the 'all hazards' regulatory approach. The Government is considering the introduction of enhanced security obligations to manage risks arising from physical, personnel and supply chain threats and natural hazards.

Background screening

Aviation workers, including GA pilots at regional airports, do not consider that the risks they present are significant enough to be required to hold an Aviation Security Identification Card (ASIC).

Background screening is an important part of securing the aviation industry from acts of unlawful interference, and is currently used to periodically check if individuals with access to critical aviation assets have been involved in unlawful interference and criminal activities. AusCheck, within the Home Affairs portfolio, provides background screening services for security-sensitive critical infrastructure sectors in Australia, including aviation.

Government will not be changing regional GA ASIC requirements. Airports that receive regular public transport (RPT) or open charter aircraft are declared by Home Affairs to be 'security-controlled airports'. To access the sensitive areas of security-controlled airports (regardless of whether RPT services operate), a person must hold an ASIC if they have an operational need and require frequent, unescorted access.

Processing times have improved

Since the end of COVID-19 restrictions, ASIC processing times have improved. As at August 2023, Home Affairs reports that over the previous 12 months, AusCheck finalised 78 per cent of ASIC applications within 10 business days and 98 per cent within 4 weeks of receipt from the issuing body.



To ensure Australia's aviation systems are secure, it is appropriate to consider a wider range of threats including espionage, foreign interference, cyber security attacks and climate change under an 'all hazards' approach.

The Australian Government is considering the introduction of enhanced security obligations to manage risks arising from physical, personnel and supply chain threats and natural hazards.

- Do you support the Australian Government introducing enhanced security obligations?

165 Department of Home Affairs (2023) *Cyber Security*, Department of Home Affairs website.

8.6 Security screening

Key issues

- Ensuring public confidence in aviation by maintaining a risk based, proportionate security framework while maintaining a viable and sustainable aviation industry.

Stakeholder feedback

- Regional airports, and broader regional communities, continue to raise concerns at the costs of providing security screening. For example, in its Terms of Reference submission, the Regional Aviation Association of Australia noted 'The disproportionate costs [of airport screening] to small regional airports can make some regional air services unviable.'¹⁶⁶



¹⁶⁶ Regional Aviation Association of Australia (2023), *RAAA Submission on the Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Aviation security screening is essential for the safety and security of travellers

Passenger and baggage screening is one crucial mechanism against unlawful interference with aviation. The aim of passenger screening is to prevent weapons and prohibited items from being carried onto aircraft, where they could be used for ill intent. It involves the use of specialised equipment and screening personnel to detect and control those items.

Home Affairs sets the regulatory framework for passenger and cargo screening through its administration of the ATSA.

The Australian Government's risk-based airport categorisation model classifies airports into different tiers based on overall risk profile. This includes consideration of departing passenger numbers, aircraft size, individual airport operating environment and regional profiles.

It has been a longstanding policy that industry is responsible for the cost of security screening, including operating costs such as the employment and training of screening officers. Airport operators are responsible for screening, although they can outsource the function to third party providers. In most cases, airport operators charge airlines for the cost of security screening through commercial arrangements. The Australian Government does not play a role in negotiating commercial arrangements between airports and airlines, although during the COVID-19 pandemic provided substantial support to the aviation industry while air travel was so heavily impacted by border closures, including time-limited assistance to offset the costs of security screening. The Australian Government has also in the past provided one-off capital grants to assist airports upgrade their security screening infrastructure, through programs such as the Regional Airport Security Screening Fund and the Regional Airports Screening Infrastructure program.

The Australian Government is committed to ensuring that security regulations are proportionate to threats and risks, to ensure the ongoing security of Australian aviation. Future decisions to change security settings (either increase or decrease) will be evidence-based and will be in consultation with stakeholders.



The Australian Government is committed to ensuring that security regulations are proportionate to threats and risks, to ensure the ongoing security of Australian aviation. Any future decisions to change security settings will be evidence-based and will be in consultation with stakeholders.

- Do you have any comments about current security screening arrangements?



8.7 Passenger facilitation

Key issues

- New technologies have the potential to allow passengers to move more efficiently through airport checkpoints, improving the passenger experience, increasing airport capacity, and strengthening security.
- Strong cyber security controls that protect passenger data and improve security will be central to facilitation arrangements in the long term.
- The key challenge is to harness and invest in new technologies to build a system that provides simplicity, security and convenience. Industry and government partnerships are critical to achieving this.
- The roll-out of facilitation technology is expected to occur at different rates around the world and the Australian Government will have a measured approach with international partners. For example, recognising the unique challenges of the Pacific region where high tech solutions may not be feasible.

Stakeholder feedback

- There is support from airlines and airports for increased use of biometrics. Qantas Group noted in its Terms of Reference submission that 'The Department should consider how emerging biometric technology could be used to improve the customer experience, minimise the need for expensive infrastructure at land constrained airports and improve security outcomes.'¹⁶⁷



¹⁶⁷ Qantas Group (2023) *Qantas Group Submission To The Aviation White Paper Terms Of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Aviation will need investment in new systems for facilitation

As a passenger at an airport, we move through multiple processes as we make our way onto or off our flight – including check in, security screening, passport control, and biosecurity checks. Each of these processes has the potential to become more efficient – to ensure our airport infrastructure can accommodate long-term passenger and freight growth, and reduce unnecessary impost on passengers. There are also potential effectiveness improvements.

The introduction of e-passport smart gates, automated bag drops and online check-in for domestic flights over the last decade have helped to streamline passenger processing however, pressure around facilitation at airports continues to grow.

As the provider and/or regulator of many border services at airports, Government agencies working with airport and airline operators have a key role in pursuing further improvements in passenger facilitation. These improvements are likely to come through investment and partnership in automation and biometrics, such as facial scanning and advanced digital data collection. In partnership with industry, border agencies are planning and progressing integrated regulatory, digital, systems and data reforms that will modernise our border settings at international airports. The objective of reform initiatives is to enhance the digital collection of passenger data earlier in the traveller journey to better anticipate and manage risks at the border, to reduce the number of touchpoints for passengers, and move to contactless processes where possible.

New technologies offer a range of passenger benefits

New technologies under development could support improved passenger facilitation. Some of the practical applications could include:

- scans at airline check-in being used by security screeners, border protection and biosecurity
- real time tracking of passengers' checked luggage and more options for baggage processing including home-pick-up and drop-off
- security scans in one country being provided to the arrival country, which could mean transit luggage does not need to be claimed or re-screened for onward domestic travel
- off-site processing of passenger information being completed before arrival at the airport
- use of biometric information for passenger identification, such that checks occur in an unobtrusive and friction-less way while passengers are walking through airports, with passengers stopped by exception only, and
- real time but unobtrusive luggage screening using artificial intelligence.

These technologies are being deployed around the world including in Singapore and the Middle East and are exemplars of world leading passenger facilitation and security. Innovation of passenger and border processes requires investment and partnership between industry and government to enhance both security and facilitation outcomes.



The International Civil Aviation Organization has a key role

ICAO continues to promote the international adoption of the provisions of Annex 9 related to facilitation. Australia's approach to facilitation is generally consistent with the standards and recommended practices set out in Annex 9 to the *Chicago Convention* and Australia participates actively in the ICAO Council and Facilitation Panel consideration of updates to these standards and recommended practices.

This includes work towards international standards for digital travel credentials (DTCs). A DTC is a digital representation of the traveller's passport which can temporarily or permanently substitute for a conventional passport.

The DTC can be used by the traveller to provide evidence of identity to support pre-border risk management, and prepare the airport for seamless flow. In the process of travel, a passenger would use their DTC by successfully matching to the biometric information included in the token in lieu of a physical passport.



The seamless passenger experience will require significant coordination

Modernised arrangements for passenger facilitation will require collaboration and investment across a range of Australian Government agencies, including:

- Home Affairs as the lead agency for overseeing aviation security in Australia and security screening of passengers and their baggage, and through the ABF, which protects Australia's border and enables legitimate travel and trade. Home Affairs is also responsible for digital and cyber security policy
- DAFF for biosecurity requirements
- ASIO to assess any threats to security, and the Australian Criminal Intelligence Commission (ACIC) to check criminal history, potentially in real time
- DFAT as Australia's Travel Document Issuing Authority, to support issuing of digital passports, and
- Health, for health information and security measures for international travellers.

Airports and airlines will need to securely share passenger information with border security agencies as appropriate. A heavily data driven seamless passenger capability will suffer when systems fail or when data is not available (for example, internet disruptions). This will require agencies to revert to business continuity procedures, which must be factored into any operating model.

The uptake of newer technologies to streamline the passenger (and potentially cargo) journey through airports needs to be paired with a concerted effort to discover and understand the risks and follow-on implications of such technologies, particularly from a security perspective. Supporting new technologies and methods will require consideration and funding of border agency systems upgrade/replacement. This could include continued investment in establishing legislation, policies, standards and systems for data connectivity, storage, processing and analytics, to ensure agencies can support aviation industry initiatives.

Close collaboration among international governments will also be necessary, with governments working closely through ICAO to settle details and standards for new arrangements as appropriate.



The Australian Government is committed to working through ICAO and with industry stakeholders to improve passenger facilitation arrangements.

- Are there any specific initiatives that should be supported globally, regionally and nationally to continue improvement in international passenger facilitation?
- How can Government optimise partnerships with industry to streamline the movement of passengers and modernise the border, while also enhancing security?



8.8 Air cargo facilitation

Key issues

- Under the Australian Government's Simplified Trade System agenda, the ABF, in consultation with DAFF, is proposing to re-engineer its cargo intervention model to improve the scalability, adaptability and security of intervention activities at Australia's high-volume airports and in doing so, support faster facilitation of legitimate cargo and more secure supply chains.
- Improved border agency business processes, embedded in the supply chain, along with new advanced detection technologies and automation, would enable the ABF and DAFF to inspect cargo at speed and scale, reducing delays for industry while maintaining the integrity of the border.
- A key step to achieving this future vision for air cargo is for airports, the air freight industry and border agencies to engage early when development or expansion is proposed, to co-design new processes and work together to realise efficiencies.

Stakeholder feedback

- There is support from industry for border agencies to modernise and reform business models along with use of technology to streamline cargo intervention processes and unlock efficiencies for the air freight industry and traders. The International Air Transport Association noted in its terms of reference submission that 'The acceleration and adoption of air cargo technology and the digitization of processes will be important, as well as addressing security and safety that includes the carriage of dangerous goods.'¹⁶⁸

Future air cargo business model must be scalable, adaptable and secure

Greater variation in the types and volumes of goods crossing the border, changing markets and rapidly emerging and evolving threats has reduced the effectiveness of border agencies in detecting border threats. A highly inter-connected and globalised world increasingly makes the job of risk and threat management more complex and challenging. Inbound international freight tonnage on scheduled flights grew an average of 3.5 per cent per year in the ten years up to 2018–19, but fell somewhat during the pandemic. In 2021–22 it was 96 per cent of its previous peak.

Government must adapt to address the constant and changing threat from sophisticated organised crime groups seeking to exploit and take advantage of vulnerabilities across the cargo continuum. One of the biggest risks to the integrity of Australia's cargo supply chains are malicious insiders that infiltrate and exploit vulnerabilities within cargo environments – posing significant risks to the integrity of supply chains. The trusted insider threat is pervasive, infiltrating knowledge and information systems, and operational and compliance processes, providing organised crime groups with deep knowledge about how to evade detection.

¹⁶⁸ IATA (2023) *IATA Submission To The Aviation White Paper Terms Of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

How border agencies intervene in cargo in the future must be scalable and adaptable to manage increasing volumes and evolving threats. Border agencies would intervene early to combat the malicious insider threat and embed processes and technology in the supply chain. Use of advanced detection technology and development of algorithms with artificial intelligence and machine learning to enhance threat detection will also play a key role in increasing speed, scale and accuracy of cargo inspection.

Close relationships between border agencies, airports and the air freight industry and investment will be vital to meet future challenges. Early consideration, thorough planning and co-design would minimise impacts on air freight operations and maximise the effectiveness and efficiency of border agency intervention activity.

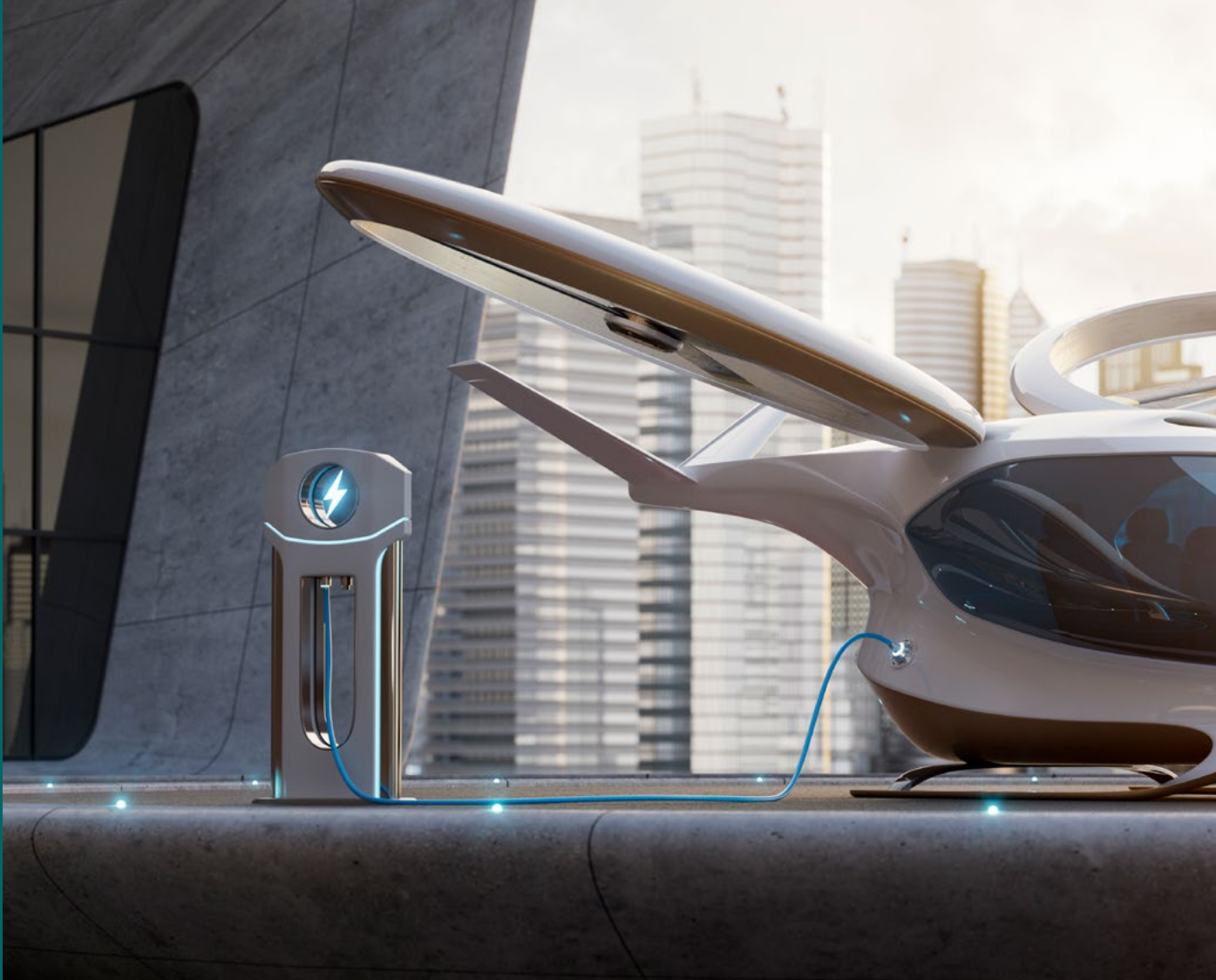


The Australian Government's Simplified Trade System agenda is designed to support faster facilitation of legitimate cargo and more secure supply chains.

- In the air cargo environment, how could industry and Government better work together to leverage advances in technology as well as industry investments in infrastructure and technology to streamline movement of cargo?



Emerging aviation technologies





Emerging aviation technology is expected to transform the aviation sector, although timing and pace of deployment are not certain. The latest developments in aircraft technology, particularly drones and AAM, have the potential to provide opportunities for Australia to become a leader in the sector, unlocking significant productivity benefits while contributing to a reduction in carbon emissions and potentially reducing infrastructure costs through intermodal shifts. It is essential our settings are right to encourage adoption in Australia so as to exploit the opportunities rapid technological change present for Australian jobs and growth, but also manage safety, security and community concerns.

The emerging aviation technologies considered in this chapter primarily refer to drones and AAM, though there are also opportunities to support the manufacture of new propulsion technologies. This chapter is primarily focussed on the broader challenges and opportunities associated with emerging aviation technologies, with issues associated with their role in reducing carbon emissions addressed in Chapter 5.

The term AAM is a new concept in air transportation most often connected to the use of electric vertical take-off and landing (eVTOL) aircraft. AAM is not a single technology, but rather a collection of new and emerging technologies being applied to the aviation ecosystem, particularly in new aircraft types and equipment. AAM aircraft have larger payloads than drones (approximately 50kg plus) and are able to take on a broader set of tasks, including passenger and heavy freight transport. By 2050, there could be around 37 million passenger trips annually made using AAM. This would drive an increase to 8–10 million annual aircraft movements, primarily through AAM replacing road-based modes of transport.¹⁶⁹

In Australia, drones are projected to deliver a \$14.5 billion benefit to GDP and create 5,500 jobs annually over the next 20 years to 2040,¹⁷⁰ part of the Australian Government's ongoing work towards reaching a target of 1.2 million tech-related jobs in Australia by 2030.¹⁷¹ This is expected to be driven by growth in the drone industry and expansion in industries using drones.¹⁷² There are opportunities for Australian companies designing or manufacturing component parts to participate in this growth.

It is expected that drones and AAM will primarily be electric battery-powered, offering emissions reductions opportunities. In addition to drones and AAM, emerging hydrogen-electric technologies such as Hydrogen Electric Propulsion (HEP) have the potential to deliver zero emission technologies, including drones and AAM, and compete on range with regional jets and narrow body aircraft.

Significant uptake of new propulsion technologies is plausible, with neutral and conservative assumptions suggesting approximately 50 per cent of propeller powered flights under 500km are likely to be flown by electric aircraft by 2050. Both government and industry will need to clearly articulate updated timeframes as the technologies develop and become available for use.

169 L.E.K. Consulting (2023), *Aviation White Paper Scenario Analysis of the Future of Australian Aviation Final Report*, report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting.

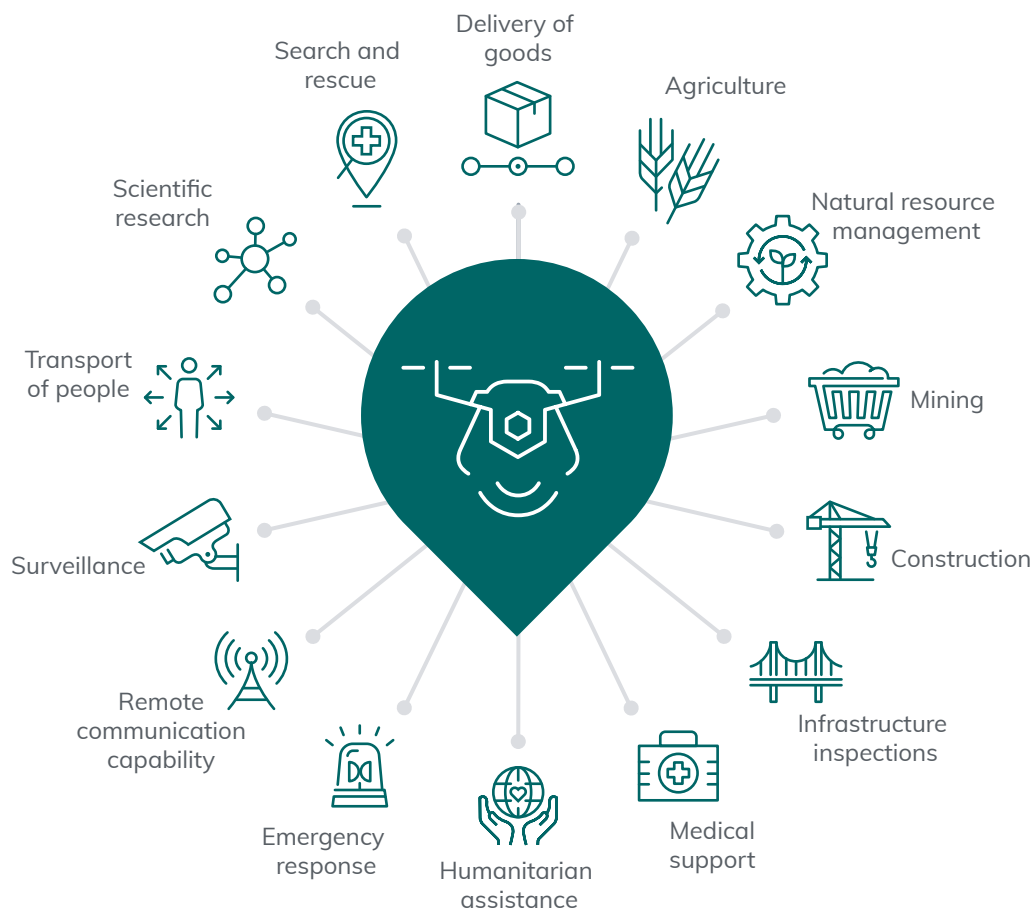
170 Deloitte Access Economics (DAE), *Economic benefit analysis of drones in Australia*, report to the Department of Infrastructure, Transport, Regional Development and Communications, DAE, 2020.

171 E Husic, *Mapping out Australia's path to tech jobs future* [media release], Australian Government, 2 August 2022.

172 PriceWaterhouseCoopers, *Skies Without Limits: the potential to take the UK's economy to new heights*, PriceWaterhouseCoopers UK July 2022.

Examples of current and potential future uses for drones and AAM are outlined in Figure 15 below.

Figure 15: Current and future examples of how drones and AAM may be used¹⁷³



However, new and emerging technologies also present challenges. Drones can be easy to misuse, with limited training or licence required to operate them recreationally and the ability to operate them anonymously. Parts of the community are suspicious of drones and concerned about privacy and noise impacts. Drones and AAM also present challenges for traditional air traffic management systems, which need to ensure they do not interfere with conventional aviation users in controlled airspace. Finally, emerging technologies like drones and AAM have the potential to be adapted and modified for criminal and malicious reasons such as drug smuggling, illegal surveillance or terrorist acts. Drones can also be susceptible to cyber-attacks themselves. All levels of government will need to invest in laws and regulations to ensure adoption of any new technology balances these concerns with any potential productivity gains achieved by their adoption.

¹⁷³ Department of Infrastructure, Transport, Regional Development and Communications (2020), *Emerging Aviation Technologies: national aviation policy issues paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

9.1 Emerging technologies: a leadership role for Australia

Key issues

- Australia has the potential to be a leader in the design, production and operation of the emerging aviation technology sector.
- Australia has a strong presence of businesses focusing on commercial and military aircraft and parts; design and systems engineering; maintenance, repair and overhaul services for airlines and manufacturers; and related training and research development. This creates a base for Australia to take advantage of the emergence of new aviation technologies and provide leadership in the development and manufacture of specialised, high-value added aviation technologies.
- Australia also has the potential to be a leader in the uptake of emerging technologies and become an advocate for their adoption in the Pacific.

Stakeholder feedback

- Stakeholders have noted that new technologies such as drones and AAM will fundamentally change the face of aviation and transport in Australia, and the need for Australia to be prepared for this transformation. For example, in its submission on the Aviation White Paper Terms of Reference, the General Aviation Advisory Network (GAAN) talked about enabling global participation in the opportunities provided by new technology.¹⁷⁴
- A significant volume of submissions expressed the need for further Government support for investment in the sector, particularly in relation to manufacturing.

There are opportunities to build on Australia's strengths in aviation manufacturing

Australia is well positioned to take advantage of the emergence of new aviation technologies and to leverage its strengths to become a leader in the development and manufacture of specialised, high-value added aviation technologies into the future, taking advantage of the:

- expected uptake in AAM
- further expansion of the use and capabilities of drone technology
- new propulsion methods such as electric, hybrid-electric, and hydrogen fuel cell systems.

Leadership in emerging aviation technology manufacturing will complement the uptake of emerging aviation technologies, and vice versa. Practical local experience in emerging technology use will inform the development of better manufactured products, and local manufacturing suited to the Australian market and conditions will support further growth in the sector.

¹⁷⁴ Andrew Andersen (2023), 'Terms of Reference, Aviation White Paper', General Aviation Advisory Network, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Australian companies are already making inroads. While Australia's emerging aviation manufacturing market is relatively small, and labour costs are relatively high on a global scale, we are ranked highly for research impact (ninth in the world), and relative venture capital investment for drones and collaborative robotics (eighth).¹⁷⁵ Australia also has the thirteenth largest number of patents relating to drones, swarming and collaborative robotics. CSIRO is at the forefront of the development and real-world operation of long-range fully autonomous drones, which focus on remote sensing in remote locations and inhospitable terrain.¹⁷⁶ The 2022 aerospace manufacturing attractiveness rankings ranked Australia the ninth most attractive country.¹⁷⁷ The United States Department of Commerce, International Trade Administration states that Australia's drone sector is dynamic, fast-growing and impacting numerous industries. It also notes that Australia has a small but growing space industry including one of the most active space start-up sectors worldwide.¹⁷⁸

The emergence of new technologies therefore provides an opportunity for Australia to grow its aircraft manufacturing and repair services industry following the impact of the COVID-19 pandemic. In 2020–21, this sector was worth \$861 million to Australia's GDP, down from \$1.5 billion in 2018–19, prior to the pandemic.¹⁷⁹

Australian businesses have a strong record leading the development of complex aviation technology, with around 600 Australian companies participating in aerospace manufacturing through global supply chains. High-profile examples include:

- Electro.Aero, a Western Australian based company, has been at the forefront in the development of charging and storage technologies for electric aircraft, including development of international standards.¹⁸⁰
- FlyOnE, a Perth based company, developed Australia's first electric aviation charge node network in 2022 and is currently developing an Australian-built long-range four-seat electric aircraft that allows for the establishment of electric air-taxi services.¹⁸¹
- Boeing Australia, in collaboration with the Royal Australian Air Force, developed the uncrewed 'Ghost Bat' aircraft that demonstrates the successful integration of autonomous systems and artificial intelligence.¹⁸²
- Boeing Aerostructures Australia manufactures the 'moveable trailing edge' control surfaces of the 787 using a unique carbon fibre production technology developed in Victoria.¹⁸³
- BAE Systems Australia manufactures parts for the aft fuselage and vertical and horizontal tails of the F-35 Lightning Joint Strike Fighter.¹⁸⁴
- Australia's reputation in aviation manufacturing is for high levels of safety and innovation.¹⁸⁵

175 Department of Industry, Science and Resources (DISR), *Critical technology profiles*, August 2022.

176 Department of Industry, Science and Resources (DISR) (2022), *Critical technology profiles*, Department of Industry, Science and Resources website.

177 PricewaterhouseCoopers (2022) *Aerospace manufacturing attractiveness rankings*, PricewaterhouseCoopers website.

178 Department of Commerce (2022), *Australia – Country Commercial Guide*, International Trade Administration website.

179 Australian Bureau of Statistics (2023), *Australian Industry*, Australian Bureau of Statistics website.

180 C Hava (2022), *How electric aviation is approaching take-off speed*, Engineers Australia, Create website.

181 C Hava (2022), *How electric aviation is approaching take-off speed*, Engineers Australia, Create website.

182 Royal Australian Air Force (n.d), *Ghost Bat*.

183 Australian Advanced Manufacturing Council (n.d.), *Boeing*.

184 A Probyn (2023), *Australia begins its nuclear age as AUKUS overcomes years of submarine struggles*, ABC.

185 KPMG (2019), *Australia's aerospace industry capability*, report to the Department of Industry, Science and Resources, KPMG.

There are opportunities for Australia to play a leading role in the region

The emergence of new technologies also allows Australia to provide leadership in the region and strengthen our partnerships with like-minded governments in the Pacific and assist those in the region to share in the benefits offered by emerging aviation technologies. There is likely to be demand from these nations for the uptake of drones and AAM and Australia has already received requests from countries in the region for our support to facilitate these technologies.

There may be benefits in a whole-of-government approach to boost engagement in the Pacific to support the uptake of emerging aviation technologies across the region.



Australia is positioning itself to become a leader in the uptake and development of emerging aviation technologies. The Australian Government suggests there may be benefits in boosting engagement in the Pacific to support emerging aviation technology uptake across the region.

- How can we build on Australia's strengths to ensure that Australian industry in this sector is able to be competitive internationally?



9.2 Enabling the manufacture and uptake of emerging technologies

Key issues

- The pace and extent of the uptake of new technologies such as drones and AAM is not known. The Australian Government's objective is to ensure safety and security of the aviation system is maintained as uptake increases, without creating barriers to potential productivity gains.
- Private sector capital will need to drive innovation and manufacturing, but government may have a role creating a favourable investment environment.
- A skilled workforce will be a key enabler, and training frameworks will need to evolve to respond to changing industry requirements. Emerging technologies can create new job opportunities.
- Risk-proportionate regulatory frameworks for safety and security will be essential.

Stakeholder feedback

- A significant volume of submissions expressed the need for further government support for investment in the sector, particularly in relation to manufacturing. In its Terms of Reference submission, the Business Council of Australia spoke of the opportunities that component manufacture and new technologies provide, stating 'high quality jobs need not be linked to the manufacturing of the whole aircraft locally but can be supported as part of a broader component manufacturing process' as well as that 'advanced manufacturing and assembly process, particularly for smaller and uncrewed aircraft, also present new opportunities for local advanced manufacturing.'¹⁸⁶
- The need for regulatory alignment with international standards and recognition of Australian certification by other countries was a strong theme in Terms of Reference submissions, with many stakeholders noting how critical this is to ensuring the viability of Australian manufacturing businesses. The Australian Association for Uncrewed Systems identified the 'importance of reviewing bilateral and international agreements...to enable Australian business export opportunities (manufacturers and service providers) – particularly in emerging sectors.'¹⁸⁷
- Stakeholders have underlined the importance of early planning for AAM, particularly vertiport construction and the need to consider all provisions that electric aircraft will require. For example, in its Aviation White Paper Terms of Reference submission, Boeing Australia stressed that 'future air and vertiport infrastructure cannot be designed in isolation and existing infrastructure cannot be future proofed without acknowledgement of the planning and grid capability challenges to support both eVTOL and [Electric conventional take-off and landing] eCTOL craft'.¹⁸⁸

186 Business Council of Australia (2023) *Pre-Green Paper submission*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

187 Australian Association for Uncrewed Systems (2023) *AAUS Feedback on Aviation White Paper Terms of Reference (ToR)*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

188 Boeing Australia (2023) *Aviation White Paper | Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) Boeing Australia submission*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Investment will support growth in the sector

The Australian Government is committed to growing our local aircraft manufacturing capabilities through support for the changing aviation technology part of the manufacturing sector, and by facilitating growth in the changing aviation technology market.

The Australian Government is already directly investing in emerging technology through a range of programs and initiatives including:

- Maker Projects: Community STEM Engagement Grants
- Cooperative Research Centres Projects
- the Emerging Aviation Technology Partnerships (EATP) Program.

The EATP Program has been well received by the Australian aviation sector, with grant applications far exceeding the amount of funding available.

Government-industry partnership programs have the potential to grow Australia's future aviation technology sector; increase development and deployment of sustainable technologies; and advance low or zero emissions aircraft and supporting infrastructure. Government co-investment could help create viable pathways to market for Australian aviation technology developers and operators, and would also provide valuable continued exposure to new technologies for aviation regulators.

DISR has listed emerging aviation technologies, including radar, electric batteries, advanced aircraft engines, and drones on its 'List of Critical Technologies in the National Interest'. This means these technologies are either critical for Australia today, or are expected to become critical to Australia's economic prosperity, national security and social cohesion within the next ten years, allowing government to provide industry with early targeted support to protect and promote these technologies and realise significant benefits through their potential to grow our economy, provide well-paying jobs and improve the lives of Australians.

Once established, the National Reconstruction Fund (NRF) will be available to provide investment support to help create secure, well-paid jobs, secure future prosperity, and drive sustainable economic growth. The Australian Government has committed \$15 billion to establish the NRF, which will provide finance in various forms including loans, equity investments and guarantees. The NRF will provide financing to develop domestic capability in transport manufacturing (including aviation), and as well as for renewables manufacturing and the deployment of low emissions technologies across industry. While the NRF is being established by DISR, it will operate commercially and be governed by an independent board, which will decide which projects it invests in.

The Australian Government is also developing a National Robotics Strategy to promote the responsible production and adoption of robotics and automation technologies, including drones.

Skills and training will be important

In February 2023, the iMOVE Cooperative Research Centre reviewed aviation training schemes and programs relating to digitisation and automation. Its research suggested existing schemes and programs are insufficient to support expected growth in the sector.¹⁸⁹ Boeing Australia has partnered with universities that have been 'able to inform.... of the key skills needs and capture talent at the graduate and postgraduate levels' noting Australian aviation skill shortages in 'defence and space environment [including] software, modelling and simulation, human factors, robotics, autonomous systems and artificial intelligence, space and satellite communications, and cyberworthiness.'

¹⁸⁹ iMOVE Cooperative Research Centre (2023) *Creating our Future Transport and Mobility Workforce*, iMOVE CRC website.

It will be important to identify the skills and training likely to be most critical as the sector evolves, and how the training system could be more responsive to needs. Both industry and Government have a role in quickly identifying potential skills shortages and measures to avoid 'growing pains' which may impact competitiveness. The Australian Government has already released *Getting to 1.2 million: Our Roadmap to create a thriving tech workforce*. Jobs and Skills Australia (JSA) (in the Employment portfolio) has been established to understand and address national skills needs. It could consider undertaking a capacity study of the aviation sector as part of its forward work program. Jobs and Skills Councils are also being established, including a Transport Jobs and Skills Council (see Chapter 10 'Future Industry Workforce'). Once fully established, JSCs will be able to provide advice to government on what skills will be needed in the future and what additional training will be required to meet these needs. This would provide a firm evidence base for use in broader government planning and skills development.

Acknowledging the benefits that mutual recognition and international alignment of qualifications and regulation, the Australian Government is actively pursuing this where practical. Benefits to the Australian economy and national interest may also be realised through collaboration and sharing of technology, with trusted partners.

Safety regulation will continue to be innovative and proportionate to risk

Clear and stable regulations will be essential to support the increased uptake of drones and AAM. Australia's regulatory system applying to drones and other emerging aviation technology is well advanced. Australia was an early adopter of drone regulation, introducing legislation to govern drones as early as 2002. CASA continues to adjust the regulatory approach to ensure it is forward-focused and proportionate to risk.

To provide certainty about Government's approach to emerging aviation technology regulation, CASA has released *The Remotely Piloted Aircraft Systems (RPAS) and Advanced Air Mobility (AAM) Strategic Regulatory Roadmap*.¹⁹⁰ It identifies six regulatory areas:

1. Aircraft and aircraft systems
2. Airspace and traffic management
3. Operations
4. Infrastructure
5. People
6. Safety and Security

As part of *The RPAS and AAM Strategic Regulatory Roadmap*, CASA has already committed to develop clear pathways and regulations to certify drones and aircraft systems consistent with major international regulators (in particular the US Federal Aviation Administration (FAA) and European Union Aviation Safety Agency (EASA)) and use performance-based standards.

CASA, in collaboration with Airservices Australia and the Department and Defence, are developing a long-term implementation plan for an Australian Future Airspace Framework, that is transparent, consistent and scalable to support airspace administration which will comprise of an advanced air traffic management system and UTM.

¹⁹⁰ Civil Aviation Safety Authority (n.d.), *The RPAS and AAM Strategic Regulatory Roadmap*, CASA website.

Case study: Creating opportunities for manufacturers through regulatory sandboxes

A regulatory sandbox is a framework within which selected participants can operate to test innovative concepts, outside of the standard regulatory requirements, proportionate to risk.

This is one way in which CASA is fostering growth in emerging aviation technology.

CASA is partnering with drone operators to facilitate trials involving goods transport, agricultural surveys, medical supply transport and law enforcement monitoring to inform future regulatory development. These trials support private sector innovation while helping to design effective regulatory frameworks.

Related to this work, CASA is also partnering with international regulators to support better practice in Australia and overseas. Initiatives include:

- developing a joint training product with Transport Canada Civil Aviation for assessment of entrants into the drone field
- building on a cooperative relationship with the US FAA to promote collaboration on drones through information exchange, and
- assisting the Civil Aviation Safety Authority of Papua New Guinea with their implementation of drone regulation.

Alignment of regulation can support export opportunities

Mutual recognition arrangements, whereby CASA and foreign aeronautical authorities accept and recognise each other's regulatory approvals, have the potential to streamline approval processes, reduce costs and duplication for new market entrants, and open up export opportunities for Australian manufacturing. Mutual recognition can be a challenging process due to the relatively small size of the Australian market in the international context and subsequent lack of negotiating power. However, the Australian Government is committed to pursue this wherever possible.



Case Study: Swoop Aero

Swoop Aero is a Melbourne based company specialising in drone operations which operates across the globe.

The company's latest generation aircraft, Kite, will provide safe, reliable and sustainable payload delivery of up to 5kg, across both challenging landscapes and congested urban environments. Kite will be manufactured in Melbourne.

Swoop Aero has applied for type certification in the United States through the FAA and for product certification in Australia through CASA.

CASA and the FAA are working in collaboration on this certification project under the CASA-FAA Bilateral Aviation Safety Agreement (BASA) and CASA is concurrently validating the FAA type certification to allow CASA to issue a type certificate shortly after the FAA issues their own, allowing duplication to be avoided and to expedite type certification across jurisdictions.

This project will bolster Australia's development, manufacturing and development capabilities in the sector, and will further strengthen CASA's relationship with the FAA on airworthiness matters and the application of these regulations to emerging aviation technologies. The process further provides CASA a first-hand insight into the FAA's type-certification process.

The project could also serve as a model for future Australian industry applications seeking FAA type certification of their aircraft employing emerging aviation technology.

Collaboration and coordination between and within governments will be essential

While responsibility for aviation safety and security sits with the Australian Government, in practice, the management of new and emerging technologies will require coordination between all tiers of Government, consistent with Australia's federal system of Government.

Case Study: Commonwealth, States and Territories Drones Working Group

The Commonwealth, States and Territories Drone Working Group (the Working Group) is responsible for contributing to the ongoing management of drone operations in Australia in those areas where multiple jurisdictions may have roles or responsibilities.

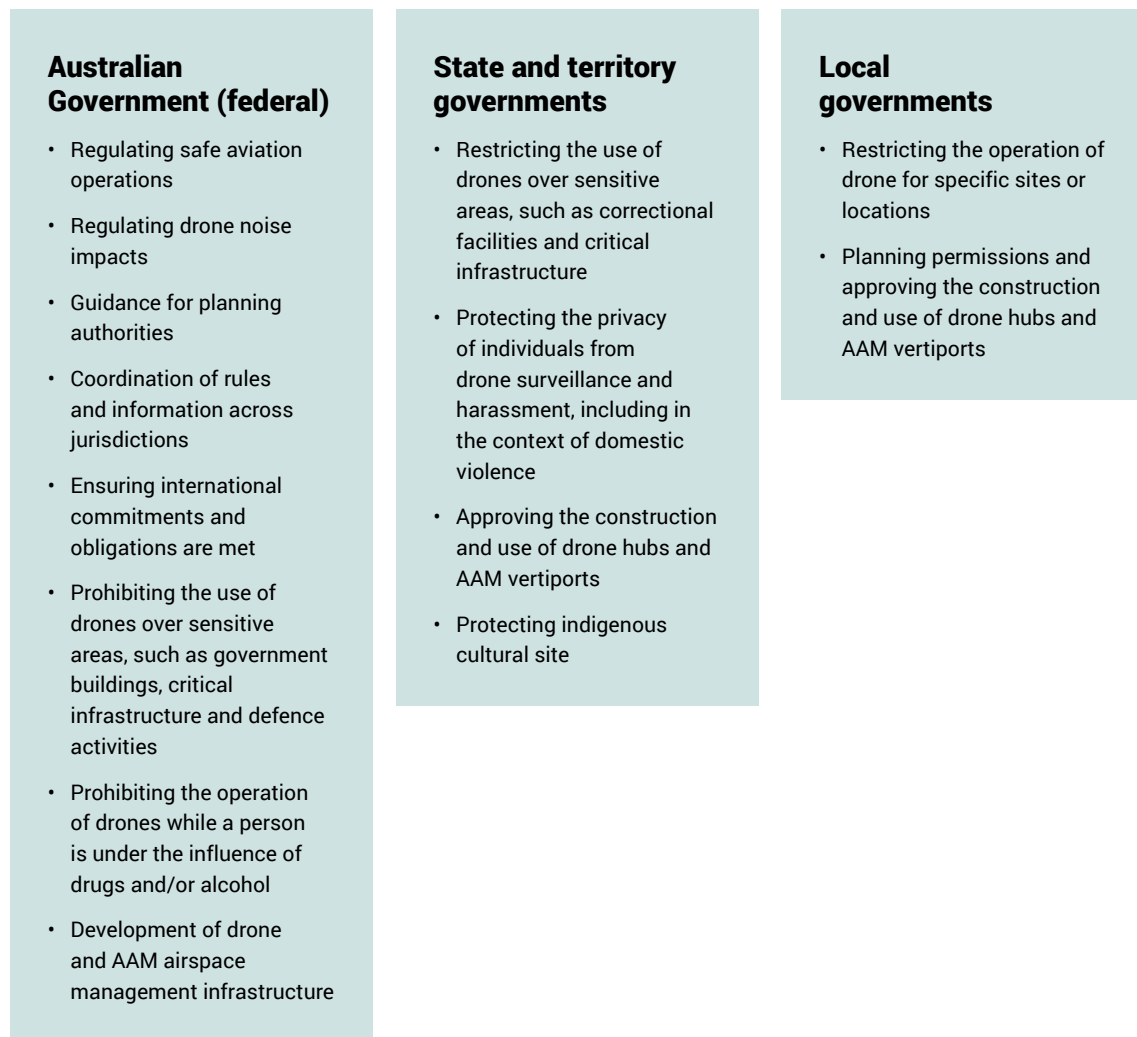
The Working Group is chaired by the Department and comprises representatives from all states as well as the ACT and NT.

Challenges considered by the Working Group include managing rules addressing environmental impacts and security concerns. The digitising drone rules project is working iteratively to improve how such rules are communicated, through a geospatial map. Jurisdictional rules around national parks or other sites can be collated allowing users to understand immediately what rules might apply in addition to CASA safety rules. The map will be provided as open data, which will enable CASA-approved drone safety apps to integrate the rules into their apps used by drone pilots in operation. This open and collaborative approach will provide consistency and greater awareness to support compliance across the country.



While shared responsibility and interests across different levels of government is not new, managing the introduction of drones and AAM and promoting further growth of this sector will require a greater level of intergovernmental coordination on aviation matters than has previously been the case. While airspace management will remain the responsibility of the Australian Government, improved coordination and collaboration could be facilitated by a national approach to managing drone rules between the Australian Government, and state, territory and local governments. This work would build upon work already underway in the Commonwealth, States and Territories Drones Working Group to consider a framework to allow for collaboration and coordination across all levels of Government on the development, management and enforcement of rules related to drones across jurisdictions.

Figure 16: Example of airspace use and airspace users: government responsibilities



Enabling infrastructure will play a key role in growth

The Australian Government has a role to play in supporting the growth of the sector in providing coordination and leadership to all tiers of government and industry to allow for the development and implementation of supporting infrastructure for emerging aviation technology.

Vertiports placed at convenient, practical locations will be essential to fully realise the benefits of AAM, and Government will have a role in ensuring appropriate guidance, standards and regulation are in place to ensure the highest levels of safety but also to ensure they are properly equipped to support the technology. This will also need to include electric charging infrastructure, and be flexible to support other technology as it evolves and matures. Drone and AAM delivery take-off and landing sites may require the development of similar facilities and associated guidance. Hydrogen storage, communication infrastructure and access to renewable electricity will all be important. But all levels of government will need to be involved in planning decisions that position Australia to take advantage of the opportunities emerging aviation technologies offer.

Case Study: Preparing for vertiports

Vertiports are a new type of take-off and landing site designed to service next-generation vertical take-off and landing (VTOL) capable aircraft (VCA). Vertiports could be built on the sites of existing airports but also in both urban and regional locations not easily accessible by conventional aviation.

To support deployment of commercial AAM operations, estimated to commence from 2025, CASA has established the Vertiport Design and Operations Technical Working Group to ensure CASA is able to proactively provide suitable aviation safety guidance to industry to support them in the identification, procurement and design of vertiports in time for the estimated mid-2025 commencement of commercial operations.

The working group will also advise on options for regulatory oversight of vertiports that will provide a safe environment for AAM aircraft, provide industry sector insight and understanding of future needs and challenges, and provide technical expertise in the development of regulation, guidance materials and other supporting materials for vertiports.

CASA has released an advisory circular, *Guidelines for vertiport design*, to provide initial guidance in the planning and design for vertiports to support safe and efficient operation.¹⁹¹

¹⁹¹ Civil Aviation Safety Authority (2022), *Advisory Circular AC139.V-01v1.0, Guidelines for vertiport design*, Civil Aviation Safety Authority website.

In January 2023, the Australian Government established the Advanced Air Mobility Consultative Committee to develop an Advanced Air Mobility Strategy. This strategy will, amongst other matters, consider appropriate mechanisms to ensure both the needs of the sector are met while also ensuring safety and community amenity are appropriately considered in vertiport planning and development, and AAM operations. The Committee is chaired by the Department and provides the key liaison point for Government to engage with industry on the emergence of AAM. It includes representatives from prominent AAM industry groups, as well as CASA as an observer.

These initiatives will help give more clarity and certainty for planning authorities and the emerging aviation sector, but there may be a further role for Government in leading whole-of-government coordination with local, state and territory governments on these issues.

Airspace management will increase in complexity

New aircraft technologies such as drones and AAM are expected to increase the volume and complexity of aviation activity. As growth in these activities continues, the requirement to access airspace will increase. The outcome will be a busy airspace with a mix of these automated technologies seeking access to airspace traditionally occupied by crewed services. While principles for airspace management should not change significantly, the key focus will be the safe integration and access of these technologies into the different classes of airspace and interaction with conventional airspace management. How access to airspace is managed while ensuring equitable access, safety and efficiency will be key issues for industry and government to navigate.

The Australian Government is leading the development of an Uncrewed Aircraft System Traffic Management (UTM) ecosystem that is scalable, efficient and adaptable as the emerging aviation technology sector evolves. It has established an industry working group under the National Emerging Aviation Technologies Consultative Committee, helping development and supporting the management of risks and impacts associated with increased airspace activities.

The UTM ecosystem is expected to support a mix of centralised government services and service delivery by industry providers operating in an open and competitive market. The Australian Government's role in supporting the safe and efficient integration of new and emerging airspace users will include specified services delivered by a Flight Information Management System (FIMS) currently under development by Airservices Australia to support safe integration of the new technologies into airspace; and appropriate regulatory oversight frameworks, like those identified through CASA's Australian Future Airspace Framework, to support airspace administration.

The Australian Government has developed principles to guide the development and implementation of UTM. The high-level principles are that UTM:

- minimises costs for end-users where possible
- is supported by efficient, outcomes-based regulation
- is risk-based and proportionate, with service sets mandated where required in order to manage risks
- allows for graduated interventions for non-safety risks (noise, privacy, security, etc)
- supports integration of emerging technologies and conventional aviation and integration with ATM systems
- seeks consistency with international approaches where in Australia's best interests
- supports innovation and not impose unreasonable barriers to entry
- is fair and transparent in how it prioritises and manages access to airspace.

A market driven graduated, fair and transparent ecosystem would see services mandated in areas commensurate to risk in those areas, and a system that encourages industry to offer UTM services with appropriate levels of government oversight.

Industry views on how a safe, open, competitive, commercial UTM market could operate would be welcome. Ideally, such a market would provide services which are both safe and efficient at a low-cost to users, to support the development of the emerging aviation technology sector. The development of a UTM ecosystem will be guided by the implementation of a long-term, strategic framework to support advanced ATM and UTM.

The Australian Government is addressing security concerns

Home Affairs manages the security for Australia's critical infrastructure, including aviation transport. As drones and AAM become more prevalent, the cyber and digital security implications for critical infrastructure, such as the introduction of UTM, will also require greater consideration and regulation.

Drones, AAM, and their supporting infrastructure can provide opportunities to threaten people and infrastructure – either by operators with ill-intent or via a cyber-attack.

The Australian Government is addressing the possible criminal and unlawful use of drones. Work is underway between Australian Government and state and territory government agencies on:

- **Security:** work with state and territory law enforcement agencies to develop a framework which will enable local police response capabilities to respond to unlawful drone and criminal drone use, including at major events and crowded places. This may include legislative reform to address barriers to the appropriate use of counter-drone capabilities by police and security agencies. This would involve working closely with critical infrastructure security, in the cyber policy and digital policy areas within the Home Affairs and Defence portfolios.
- **Enforcement:** to understand how respective legal and regulatory environments support enforcement activities, and working with CASA to develop processes for efficient, fit-for-purpose and less burdensome enforcement of CASA regulations.
- **Drone detection:** to form policy facilitating drone detection capabilities to protect assets (including critical infrastructure), activities and events (in air and on land). This work explores requirements for a coordinated national system and legislative options. A national platform could enable data sharing where appropriate and strengthen existing and future detection capabilities.
- **Drone rule transformation:** the Department is working across Commonwealth, state and territory agencies on a national approach to managing non-safety drone rules. Consultation on policy and legal options with states and territories in late 2022 identified priority actions including the geospatial publication of security and environmental rules, and impact assessments required to support a national approach.

Further work is needed to clarify who has enforcement authority to deal with dangerous drone use creating security risks. A national approach on drones and AAM could help address these issues.



Social licence is the essential element

New aviation technologies will use airspace in very different ways to conventional aviation, especially in urban areas, resulting in implications for both noise and privacy and there will be a need for airspace regulation to consider these in a manner that has not been needed in the regulation of traditional aircraft.

As take-up continues to increase, legislation and regulation will need to remain proactive and manage risks prior to their realisation. The number of incidents and accidents involving drones may increase as the technology becomes more widespread and the sector attracts low-cost entrants. Consideration may need to be given to implementing a regime to manage third party damage from such accidents, this may need to take the form of a legislated scheme to ensure risks are suitably mitigated. The Australian Government would be interested in views on what form this might take.

With safety remaining the Australian Government's highest priority, risks may need to be managed through the proper registration of operators, as well as associated licensing arrangements where appropriate, which will require finding a balance between an effective framework to ensure the responsible operation of drones, with the ability of CASA and Airservices Australia to be able to cost recover, without placing Australian operators and manufacturers at a competitive disadvantage.

The risk will remain that community concerns could increase in proportion to the uptake of drones and AAM. While emerging aviation technologies offer a dividend to the community beyond those who utilise them directly, acceptance of them will hinge on effective management of these risks and negative community impacts such as noise and intrusion.

The Australian Government will continue to encourage industry to engage with the broader community in order to limit negative impacts, help the community appreciate the benefits of new aviation technologies, and to build community support.

If these risks cannot be managed, the sector will fail to reach its potential.





Areas where government could show leadership in the emerging aviation technology sector could include fostering investment, and skills and training and regulation.

- How could the Australian Government create an environment that fosters private investment in emerging aviation technologies?
- What skills are needed for the emerging aviation technology sector workforce?
- How can the Australian Government best work with states and territories to foster a supportive environment for investment in manufacturing of these technologies?
- What regulatory roles in particular do stakeholders see as critical for the Australian Government to lead to enable the advantages of new technologies while managing the risks?
- How will priorities of government agencies need to evolve as the uptake of emerging aviation technologies continues?
- Do Government policies and regulations need to change to better support growth in emerging aviation technology manufacturing?
- As competition for access to airspace is expected to increase, how can government ensure fair and equitable access while maintaining safety and efficiency of this public use asset? How could a safe, open, competitive and commercial UTM market operate?
- How do we achieve a balance between mitigating the negative impacts of drones and AAM while realising the potential benefits?
- What form should a legislated scheme to mitigate risks of third-party damage from drone accidents take?
- What frameworks does the Australian Government need to ensure community acceptance as the sector continues to develop, and particularly if it reaches some of the more optimistic growth projections?



Future industry workforce





Worldwide, the aviation industry is facing increased skills demand. Australia is no exception. Shortages appear to be particularly noticeable in regional areas. Stakeholders have also identified challenges in lengthy and fragmented qualification pathways. In the medium- and longer-term the introduction of new propulsion technologies, increasing automation and new fuels will require new skills to enter the sector.

Analysis has shown 2.3 million jobs were lost globally across airlines, airports and civil aerospace groups following the outbreak of COVID-19.¹⁹² In Australia, approximately one third of the workforce left the aviation sector. During the pandemic many skilled aerospace workers moved into other industries or retired as they were uncertain about their career prospects in the sector. When restrictions began to lift and demand returned, many parts of the sector struggled to get their workforce back in a timely way.

Aviation has been a cyclical industry, with growth closely related to global economic conditions.¹⁹³ Demand for skills has followed this pattern, with surplus labour during periods of industry contraction, and shortages during growth periods. However, industry anticipates a change in this cyclical nature in the next two decades. Expected worldwide growth in aviation would mean strong demand out to 2050 for aviation skills.¹⁹⁴



192 N Fearn (20 July 2022) *Aerospace industry grounded by lost jobs and lack of staff*, Financial Times.

193 Expert Panel on Aviation Skills & Training (2018) *Report of the Expert Panel on Aviation Skills & Training*, Department of Infrastructure, Transport, Regional Development, Communications and Arts website.

194 International Air Transport Association (2022) *Global Outlook for Air Transport Sustained Recovery Amidst Strong Headwinds*, International Air Transport Association website.

10.1 Current challenges and outlook

Key issues

- The Australian aviation sector is struggling to attract a range of personnel including pilots and aircraft engineers.
- Global demand for these personnel further challenges Australia's ability to attract and retain these personnel.
- New skills will be required to produce, operate and maintain new aviation technology and fuels.

Stakeholder feedback

- Skills was a feature in 33 out of the 192 Aviation White Paper Terms of Reference public submissions and workforce was the subject of 38 submissions.
- Boeing Australia noted 'arrangements with training colleges need to be developed to create programs which train future technologies to ensure workers are future ready.'¹⁹⁵
- The Australian Association for Uncrewed Systems submission calls for the 'need to start provisioning for future workforce requirements now – for example, vertiports, remote operators, ground crew, licensed Aircraft Maintenance Engineers (LAMEs), etc. recognising the changing needs.' They also noted the need for greater flexibility for trades and universities to be more responsive to the changing skill needs of industry.¹⁹⁶
- The Transport Workers' Union (TWU) has raised the need for Government to consider how to manage the transition of today's workforce to the workforce for net zero by 2050. Other unions have pointed to the need to ensure that workers impacted by the net zero transition are supported into decent work and quality jobs with adequate training for new technologies.
- Stakeholders, state and territory governments expressed the need to develop aviation related vocational education and training to transition the industry to more sustainable models of aviation.
- Industry noted LAMEs and pilots are required to work irregular hours to meet the needs of a 24/7 industry. The disruptive nature of these working arrangements can make the roles unattractive.
- Multiple stakeholders expressed concern about the availability of pilots to support industry growth in the short- to medium-term. Airlines report pilots are being recruited by international carriers offering significantly higher salaries.
- Stakeholders have raised frustrations with the lack of clarity around training pathways. The Regional Aviation Association of Australia reports some arrangements are unclear to apprentices who are leaving the industry as a result.

¹⁹⁵ Boeing Australia (2023) *Aviation White Paper | Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) Boeing Australia submission*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

¹⁹⁶ Australian Association for Uncrewed Systems (2023) *AAUS Feedback on Aviation White Paper Terms of Reference (ToR)*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Challenges in the domestic pilot pipeline

A tight market for pilots has resulted from a number of factors including pilots exiting the sector during the COVID-19 pandemic, the retirement of older pilots and a failure to train sufficient new pilots. By some estimates, hundreds of Australian pilots relocated overseas in the past year.¹⁹⁷

The costs involved in obtaining a Commercial Pilot Aeroplane Licence are high, at upwards of \$95,000 – significantly more than many other undergraduate and postgraduate courses.¹⁹⁸ Once qualified, junior pilots need to gain a significant number of hours experience, which has often traditionally been done by relocating to regional areas and working in GA. Some stakeholders suggested this GA pathway has become less attractive and is no longer attracting enough new entrants to meet future demand for commercial pilots.

Global demand for pilots has led to some Australian pilots taking up positions overseas. As COVID-19 related restrictions eased at different rates in different countries, countries like the US saw sharp increases in demand. This led to US and other overseas carriers approaching Australian pilots and offering large incentives to relocate.¹⁹⁹

During pilot shortages it can also become more difficult to retain flight instructors. Working as a flight instructor is often a part of a pilot's early career, to gain hours of experience before moving into flying larger commercial aircraft. The current demand for commercial pilots has seen some pilots make this transition earlier than was previously typical. Stakeholders have reported that the current tight labour market for pilots has seen a decline in the number of flight instructors, and a decline in candidates undertaking flight instructor courses, which could have flow on consequences for efforts to train additional pilots in response to the current shortage.

From July 2022, CASA has allowed experienced industry examiners to apply for approval to conduct flight examiner proficiency checks. This allows flight examiners to undertake checks either with CASA or with another examiner with appropriate approval. CASA has also reduced fees for part of its Flight Examiner Rating Course.

Industry is taking steps to respond to the challenge

Australian airlines and industry are responding to the demand for more pilots. In March 2023 the Qantas Group announced a major jobs, training and growth plan in which it aims to train 1600 pilots over the next decade.²⁰⁰ In 2022 Qantas Group confirmed a new purpose-built flight training centre in Sydney which would 'provide training for up to 4,500 new and current Qantas and Jetstar pilots and cabin crew each year from early 2024.'²⁰¹ The use of flight simulators allow a greater number of students to access training facilities. In 2019, Regional Express bought a flight training school based in Ballarat from Singapore-based ST Engineering to complement its existing training operations at Wagga Wagga (NSW).²⁰² In preparation for the growing demand for pilots, in 2023 RMIT University established a new Aviation Academy in 2023 which will be an extension of its pilot training programs at Point Cook and Bendigo (both in Victoria).²⁰³

197 L.E.K. Consulting (2023), Aviation White Paper: Scenario Analysis of the Future of Australian Aviation, report to the Department of Infrastructure, Transport, Regional Development, Communications and the Arts, L.E.K. Consulting

198 Study Australia (n.d.) *Certificate IV in Aviation (Commercial Pilot Aeroplane Licence)*, Study Australia website.

The list of eligible aviation courses is found in the *FEE-HELP Guidelines 2017* made under the *Higher Education Support Act 2003* s 238-10.

199 A Thorn (5 December 2022) *Exclusive: 12 US airlines now poaching Aussie pilots*, Australian Aviation.

200 Qantas Group (3 March 2023) *QANTAS GROUP ANNOUNCES MAJOR JOBS, TRAINING AND GROWTH PLANS* [media release], Qantas Group.

201 Qantas Group (19 May 2023) *QANTAS CONFIRMS NEW FLIGHT TRAINING CENTRE IN SYDNEY* [media release], Qantas Group.

202 Regional Express (19 November 2019), *Regional Express Acquires Pilot Academy in Ballarat, Victoria* [media release], Regional Express.

Regional Express Acquires Pilot Academy in Ballarat, Victoria [media release], Regional Express.

203 Australian Flying (2023), *RMIT launches New Aviation Academy*, Australian Flying.

The aircraft maintenance engineer pipeline is also shrinking

Aircraft maintenance engineers (AMEs) are responsible for conducting the physical maintenance of aircraft – including the inspection and repair of engines and other aircraft components. Licensed Aircraft Maintenance Engineers (LAMEs) have additional qualifications and are authorised to check, or direct the checking of, the condition of the aircraft engines and other components, and certify that repairs have been done correctly.

The number of apprentice aircraft maintenance engineers has declined steadily since the early 2000s: between FY2007–16, an average of 297 licences were granted per year, compared to an average of 135 between FY2017–21.²⁰⁴ Stakeholders report that many apprentice aircraft engineers left the industry after changes to qualifications in 2011. These changes stipulated that to become officially licensed (i.e. to transition from an AME to a LAME), apprentices were required to complete a Diploma of Aeroskills, either instead of, or in addition to the traditional four-year apprenticeship for a Certificate IV in Aeroskills. The additional time, cost and uncertainty over the licensing pathway has reportedly proved off-putting to many new entrants.²⁰⁵

In March 2023, the regulations were further amended to allow LAMEs to be licensed in a modular fashion. This permitted engineers to be licensed without having to study a wide range of aircraft systems that may not be required for their intended careers. The Australian Government seeks the views of stakeholders on where licensing and training requirements could be better aligned.

Industry feedback has suggested one of the largest barriers to attracting workers to aircraft maintenance engineering careers is a lack of visibility of the training pathways and available course information. In addition, the maintenance engineer role is not as high profile as other aviation roles, such as pilot. In 2022, the former National Skills Commission (succeeded by Jobs and Skills Australia (JSA)) found that aircraft maintenance engineers were in shortage nationally.²⁰⁶ The National Skills Commission also projected an increase in the number of aircraft maintenance engineers needed from 8,000 in 2021 to 9,400 in 2026. Due to their inclusion on the JSA skills shortage list, AME apprenticeships are eligible for subsidies under the Australian Apprenticeships Incentive System.

With an average age of over fifty years, the number of LAMEs moving towards retirement in the next decade will be sizeable. The COVID-19 pandemic accelerated this process, with some LAMEs exiting the sector during the downturn and not returning during the recovery. Similar to the situation for pilots, strong industry demand for maintenance engineers can make it difficult to find qualified instructors to train new entrants.

204 Regional Aviation Association of Australia (2022), *Aircraft maintenance engineer shortage – crisis and opportunities*, Regional Aviation Association of Australia website.

205 Regional Aviation Association of Australia (2022), *Aircraft maintenance engineer shortage – crisis and opportunities*, Regional Aviation Association of Australia website.

206 National Skills Commission (2022) *Skills Priority List*, National Skills Commission website.

Industry and government need to prepare for future skills needs

In the long term, new technologies may change skills requirements for the aviation sector. These skills will be necessary to respond to developments in net zero technologies, future fuels, automation and more advanced digitisation. While widespread adoption of new technologies will take time and involve significant investment from industry and governments, unions have expressed concerns about how the workforce transition to a net zero economy will be managed, particularly given the trend of casualisation. There will also be a need to ensure that workers impacted by the net zero transition are supported into decent work and quality jobs with adequate training for new technologies.

While the introduction of new technologies is likely to be a gradual, iterative process, drones and AAM can assist in the transition to net zero and potentially improve productivity outcomes in a wide array of industry sectors. One forecast projects they could generate over 10,000 jobs by 2040 and deliver a \$14.5 billion benefit to Australia's GDP, \$4.4 billion of which is expected to be in Australia's regions²⁰⁷.

These new technologies – as well as new radar, electric batteries and advanced aircraft engines – will need different skills, with the aircraft engineering workforce requiring a broader skillset than the existing maintenance, repair and operations workforce. New skills will be required to produce, maintain and operate these aircraft.

The Australian Government has established JSA to provide independent advice to government and industry on current, emerging, and future workforce, skills, and training needs. It will work with unions, employers, state and territory governments, and education and training providers in providing the advice needed to improve skills development, employment opportunities and economic growth.

The Australian Government has also established 10 Jobs and Skills Councils (JSCs) under the JSA. The Transport and Logistics JSC – Industry Skills Australia – covers aerodrome operations, aviation transport security protection, search and rescue, air traffic control, and flight operations including remotely piloted operations. The JSC will identify skills and workforce needs, map career pathways across education sectors, develop contemporary VET training products, support collaboration between industry and training providers to improve training and assessment practice, and act as a source of intelligence on issues affecting industry.

JSCs will have a strong connection to JSA. JSCs will draw on JSA's workforce analysis and projections to undertake planning for their industry sectors, creating a consistent understanding of the skills landscape and how skill gaps can be addressed.

Analysis undertaken for the Department indicates the future aircraft engineering workforce will require a broader skillset than the existing maintenance, repair and overhaul workforce.²⁰⁸ Potential new skills for engineers could include caring for digital, maintaining electrical, hydrogen and other renewable powered systems, and maintenance of automated systems. Ground handling staff may need to undertake training to work with increasingly automated ground operations. The Manufacturing JSC will have the responsibility for identifying any skills gaps and advising on updating qualifications for this sector or employees if required. Regulating, certifying and licencing emerging technologies will also require new skill sets within government.

207 Deloitte Access Economics (DAE), *Economic benefit analysis of drones in Australia*, report to the Department of Infrastructure, Transport, Regional Development and Communications, DAE, 2020.

208 iMOVE Cooperative Research Centre (2023) *Creating our future transport and mobility workforce*, iMOVE Cooperative Research Centre website.

Commercial pilots have also been identified as roles with a high probability of automation (55 per cent probability).²⁰⁹ While this does not mean their roles will disappear, the iMOVE study suggests the way their roles are carried out could fundamentally change.

The aviation industry may need to undertake workforce planning with JSCs to transition, retrain and reskill its workforce in preparation for future technologies, thereby ensuring Australia's aviation sector is prepared for widespread adoption of new technologies. Successfully building a future aviation workforce could deliver substantial employment opportunities, potentially revitalising aviation as a career in Australia. The JSCs will have an important role in representing the voice of industry and acting as a source of intelligence to government.



The Australian Government considers there may be opportunities to work with industry to help position the aviation workforce to develop skills necessary for emerging technologies and transition to net zero.

- Can alignment of training with regulatory and licencing requirements be improved?
- How can government policy enable industry to support the net zero economy and the future skills, training, and workforce needs that entails (including future fuels)?
- Would an analysis of future skills and workforce needs help position the aviation industry to pre-emptively respond to emerging needs?



209 iMOVE Cooperative Research Centre (2023) *Creating our future transport and mobility workforce*, iMOVE Cooperative Research Centre website.

10.2 Regulatory and cultural barriers

Key issues

- Diversity remains a problem in the aviation sector, impacting on its attractiveness to employees.
- Requirements to obtain skills and training hours (which are often done in regional areas) create barriers to entry for new employees.

Stakeholder feedback

- The TWU highlighted issues such as the ongoing impacts of job insecurity, wage decline and the erosion of safe work conditions on the aviation workforce (in the context of the pandemic and the sector's recovery).²¹⁰

A lack of diversity is restricting the talent pool across technical aviation roles generally

Research from the Workplace Gender Equality Agency (WGEA) shows in 2020-21 women represented between 4.5 per cent and 22.8 per cent of employees in technical roles in the aviation sector, such as air traffic control, pilots, mechanics and engineers. An iMOVE study explored the barriers to women entering and progressing in transport roles including aviation²¹¹. The study highlighted that success in increasing diversity in transport will depend on improving workplace culture, with a role for both government and industry.

The Australian Government's Women in the Aviation Industry Initiative was given \$4 million in the October 2022–23 Budget. The Initiative aims to encourage more women to pursue one of the many dynamic, rewarding and long-term career opportunities in aviation and improve diversity in the sector.

Work undertaken through the Women in Aviation Industry Initiative has so far indicated that diversity issues in the aviation industry are not solely the result of a lack of awareness of the careers on offer. Retention of women has been identified as a problem, with evaluation identifying discrimination, sexual harassment and cultural issues as drivers of women leaving the industry.²¹² Research from the initiative so far indicates there should be a particular emphasis on transforming workplace culture to be an inclusive and safe environment for all.

The *Fair Work Legislation Amendment (Secure Jobs, Better Pay) Act 2022* amended the *Fair Work Act 2009* to include a prohibition on sexual harassment, increasing protections against workplace sexual harassment and providing workers a new way to deal with sexual harassment complaints. Workers now have the choice to pursue their dispute through the Fair Work Commission, the Australian Human Rights Commission or applicable state and territory anti-discrimination processes.

210 Transport Workers' Union (2023) *TWU Submission: Aviation White Paper*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

211 iMOVE Cooperative Research Centre (2022) *The barriers to women entering and progressing in transport roles*, iMOVE Cooperative Research Centre website.

212 *BARRIERS TO THE PIPELINE RESEARCH PROJECT* (aviationaerospace.org.au)

This amendment contributes to the Australian Government's commitment to fully implement all 55 recommendations of the Respect@Work: Sexual Harassment National Inquiry Report (2020) and complements other legislative amendments made by the *Anti-Discrimination and Human Rights Legislation Amendment (Respect at Work) Act 2022*.

The Australian Government also wants to encourage the sector to lead efforts to deliver improved representation of women in its workforce, consistent with its Women in Aviation Initiative. Embedding cultural change in the sector is an important element of this. There are opportunities for the industry to more actively seek to address gender barriers, for example, by adopting the approach in the UK's Women in Aviation and Aerospace Charter.²¹³

Opportunities for the inclusion of First Nations peoples

The aviation industry has taken steps to increase the number of First Nations people it employs in the sector.

In May 2023 Qantas announced a \$1.5 million investment over five years to provide 50 scholarships for female students and First Nations Australians to the airline's Pilot Academy. Each scholarship is worth up to \$30,000 and covers accommodation at the Academy, meals and utilities. However, tuition fees are additional. Qantas said it wanted to 'tap into a broader, more diverse talent base and through our scholarship program we're encouraging more Aboriginal and Torres Strait Islander people and women to pursue a career in aviation.'²¹⁴

The closing the labour hire loophole proposal will help make the sector more attractive

The Australian Government is committed to preventing bargained wages from being undercut by the use of labour hire arrangements (the 'closing the labour hire loophole' proposal).

Some stakeholders in the aviation industry have raised concerns that introduction of the 'closing the labour hire loophole' proposal could pose a challenge for airlines with multiple legacy enterprise agreements, which may struggle to compete, and that airlines without legacy conditions may struggle to attract suitably skilled workforces. The Australian Government has consulted widely on this proposal in drafting the legislation so that the proposal will provide job security and ensure that bargained wages cannot be undercut by the use of labour hire arrangements.

Aviation skills reforms will complement the Employment White Paper

The Jobs and Skills Summit, held in September 2022, brought together Australians including unions, employers, civil society and governments and acknowledged the need to address skill shortages and get our skills mix right over the long term.

Building on the Summit, the Employment White Paper has an overarching focus on the objectives of sustained and inclusive full employment, enabling sustainable wages and productivity growth for the benefit of all Australians, addressing skills needs and building our future labour force and broadening opportunity.

The Australian Government will look to align Aviation White Paper skills proposals with the Employment White Paper's policy direction and our broader skills and education reform agenda.

213 Women in Aviation & Aerospace Charter, *Women in Aviation & Aerospace Charter*, Women in Aviation & Aerospace Charter website.

214 Qantas Group (2 May 2023), *THE QANTAS GROUP TO HELP GET MORE FEMALES AND INDIGENOUS AUSTRALIANS IN THE FLIGHT DECK* [media release], Qantas Group; Australian Government (n.d.), *Aircraft Maintenance Engineers*, Labour Market Insights website.

Attracting new entrants to the aviation industry can help expand the skills pipeline

With Australia's aviation safety record, skilled workforce and access to student visas, it is a good place to train pilots and other aviation occupations. There is potential to make training in Australia an export opportunity by expanding mutual recognition through bilateral agreements with like-minded states, which will also increase the supply of skilled aviation workers. This would complement actions to increase domestic workforce supply.



The Australian Government considers there may be opportunities to work with industry to help position aviation as an employer of choice.

- How can industry and Government help industry to attract a more diverse workforce, and increase the number of women and young employees who pursue aviation careers?
- What role can reforms to skilled migration pathways play in addressing immediate aviation personnel shortages?
- Are there opportunities to improve recognition of overseas training qualifications?





International aviation





International aviation is an integral part of the Australian aviation landscape, maintaining connectivity with the rest of the world and attracting visitors from abroad to our shores. The revitalisation of international markets following the pandemic will continue to ensure growth for Australian business, trade and tourism.

Historically, governments across the world have been heavily involved in international aviation markets. Access to routes and air fares were tightly regulated through a complex regulatory framework, with most governments owning a national 'flag carrier' airline.

Over the last 30 years, Australia has been at the forefront of international market deregulation and liberalisation by privatising Qantas and our major airports, and removing impediments to competition while protecting the national interest. This approach has delivered more flights, lower prices and more innovation, and has helped facilitate substantial growth for our visitor economy.

While the Australian Government privatised Qantas in the mid-1990s, foreign ownership restrictions continue to apply to Australian international airlines to protect the national interest and ensure access to traffic rights agreed under the bilateral framework are limited to 'Australian' airlines.

Australia is significantly involved in helping to shape the international aviation regulatory framework through our active participation in the ICAO, and helping to promote improved safety, security, sustainability and connectivity outcomes in the Asia-Pacific region, including through capacity and capability building programs and assistance.

The new routes and passenger growth that has accompanied liberalisation has placed additional demands on government border processing services (customs, immigration, security and biosecurity), as have industry requests for consideration of major expansions to, or new, international airports considered through a national interest framework.



11.1 Bilateral settings

Key issues

- COVID-19 has been the most devastating external shock to international aviation in its history, but the industry is bouncing back and by September 2023 around 91 percent of pre-COVID international scheduled flights are expected to operate to Australia.
- Inbound and outbound aviation capacity should be ahead of demand to ensure it is not an impediment to future growth which can deliver economic and connectivity benefits to Australia.
- The Australian Government negotiates bilaterally with foreign governments to agree access rights for international airlines.
- Through bilateral negotiations, the Government seeks to advance Australia's national interest, including looking to enhance Australia's international aviation capability, and access to key international passenger and freight markets.
- Australia's negotiation approach takes into account the views of a range of government, industry and community stakeholders including our international airlines and airport operators, tourism and trade operators representing passenger and freight interests.

Stakeholder feedback

- Many stakeholders saw benefits in ensuring ample capacity is available well in advance of demand. For example, Melbourne Airport recommended 'the Green Paper also considers the efficacy of the Bilateral Service Agreements (BSA) process to ensure the forward negotiation frameworks are future focused as opposed to a just-in-time policy approach.'²¹⁵
- Some stakeholders suggested bilateral settings support a strong Australian-based industry. For example, Qantas Group suggested the Australian Government ensure its approach 'does not compromise the national interest inherent in the development and maintenance of a strong Australian aviation sector.'²¹⁶

The bilateral system is the global framework for international aviation

Under the global bilateral system, international flights between markets cannot occur unless their respective governments provide market access. Australia has bilateral air services arrangements with over 100 countries.

Successive governments have sought 'capacity ahead of demand'

The policy of successive Governments has been to negotiate bilateral agreements that provide 'capacity ahead of demand'. In a number of cases, Australia has secured an 'open-skies' style agreement with major aviation markets, which remove restrictions on flights.

215 Melbourne Airport (2023) *Aviation White Paper – Terms of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

216 Qantas Group (2023) *Qantas Group Submission To The Aviation White Paper Terms Of Reference*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Capacity is negotiated on a reciprocal basis as part of an approach which focusses on progressive liberalisation benefitting our tourism and trade interests, as well as leveraging better access and opportunities for Australian airlines.

Some agreements also include limits on capacity that airlines can operate to specific major gateways in each country – in Australia these gateways are Sydney (KSA), Melbourne (Tullamarine), Brisbane and Perth airports.

Australia's 'capacity ahead of demand' approach has meant that airlines have the ability to plan to access future routes subject to their own commercial considerations and subject to meeting the safety and security requirements of both countries. In only a handful of cases, airlines are unable to access sufficient capacity under the bilateral arrangements to meet their commercial requirements.

Australian capacity is allocated by the International Air Services Commission

The International Air Services Commission (IASC), an independent statutory authority, allocates capacity entitlements to existing and prospective Australian international carriers for the operation of scheduled international services. The IASC's role is set out in the *International Air Services Commission Act 1992*.

In considering applications for capacity, the IASC uses public benefit criteria set out in a policy statement issued by the Minister. These criteria include the applicant's reasonable capability to obtain the necessary regulatory approvals and licences to operate the route, and its ability to implement the proposed services, competition, consumer benefit, promotion of tourism and trade and any other relevant information.

The Australian Government has a forward program of negotiation priorities

The Australian Government has established a bilateral air services forward negotiating program to deliver on the Government's policy agenda for international aviation, prepared in consultation with government and industry stakeholders. The forward program is not publicly available.

The program has identified opportunities that can benefit the Australian economy, increase connectivity, encourage greater tourism, trade and investment, and enable future growth and competition in Australia's international aviation markets. The Department seeks to hold discussions with a range of countries, including those with capacity pressures under the bilateral arrangements.

The current approach to bilateral air services negotiations appears well adapted to continue to seek benefits in the national interest including providing further opportunities for our aviation, tourism and trade industries and providing connectivity and competition benefits for passengers.

The approach has already facilitated strong growth in our international aviation market pre-COVID and is expected to do so as the market recovers over the short, medium and long term.

Over time it is proposed to look to increase the level of capacity ahead of demand and, where it is in the national interest and with the agreement of our bilateral partners, seek to remove airport specific limitations.



The Australian Government proposes to continue the current 'Capacity ahead of Demand' approach, and negotiate 'Open Skies' style agreements where it is in the national interest and can be bilaterally agreed.

- Are there other issues or concerns associated with the Australian Government's approach to negotiating aviation bilateral agreements that you wish to highlight?
- What opportunities exist to improve the approach to international negotiations?

11.2 Foreign investment in Australian international airlines

Key issues

- Majority Australian ownership has been an ongoing requirement for Australian international airlines while allowing for the provision of some foreign capital.
- The Australian Government would welcome views on whether any changes should be considered to current provisions on foreign investment in Australian international airlines to protect the national interest.

Stakeholder feedback

- The Australian Government received limited feedback on foreign investment issues in response to the Terms of Reference. The Business Council of Australia suggested 'government should review and potentially revise any barriers to the access of capital in the aviation industry', including 'foreign ownership restrictions that are currently in place for some parts of the industry.'²¹⁷

Foreign investment is governed by Australian laws and bilateral air services agreements

Foreign ownership requirements for Australian international airlines (other than Qantas) are governed by the *Air Navigation Act 1920* (ANA). Section 11A stipulates the Minister may require no more than 49 per cent of the total value of the issued share capital of the airline to be held by foreign persons.

Ownership restrictions on Qantas are included in the *Qantas Sale Act 1992*, along with a range of additional operational restrictions intended to maintain the company's Australian character. Following amendments in 2014, the foreign ownership elements are consistent with the ANA restrictions applicable to other Australian international airlines.

Ownership restrictions may also be included in air services arrangements, which contain ownership and control restrictions to ensure only airlines 'belonging' to the countries party to the agreement can access the traffic rights granted under the agreement.

Australia facilitates the more liberal 'incorporation and principal place of business' (IPPB) criteria which are focussed on where an airline is based and which country has effective regulatory oversight of the airline rather than on who owns the equity of the company.

All foreign investment is subject to consideration by The Treasury

In addition to the requirements under the QSA and the ANA, all foreign investment in Australian international and domestic airlines is subject to foreign investment screening under the *Foreign Acquisitions and Takeovers Act 1975* (the Act).

²¹⁷ Business Council of Australia (2023) *Pre-Green Paper submission*, Department of Infrastructure, Transport, Regional Development, Communications and the Arts website.

Under the Act, the Australian Government reviews foreign investment proposals on a case by case basis to ensure they are not contrary to the national interest. In assessing the national interest, a range of factors are considered (including the character of the investor, competition and national security), and the relative importance of these will vary depending upon the nature of the target being acquired.

The Foreign Investment Framework from 1 January 2021, provides that a foreign person (either private or government) must seek foreign investment approval prior to starting or acquiring a direct interest (a 10 per cent or more interest) in an entity that is an aircraft operator.

Current settings are appropriate for facilitating access to capital and protecting the national interest

There is little evidence to support changes to existing arrangements, noting the current framework does not appear to be impeding the ability of Australian international airlines to access capital.

The Australian Government continues to have a legitimate policy interest in scrutinising foreign investment in Australian airlines. The current foreign investment screening process enables the Australian Government to address the national interest in this context.



The Australian Government proposes to maintain the current legislative settings for foreign investment in Australian international airlines under the *Air Navigation Act 1920*, the *Qantas Sale Act 1992*, and the *Foreign Acquisitions and Takeovers Act 1975*. Where possible, the Australian Government will also continue to seek to include the 'incorporation and principal place of business' criteria in bilateral agreements.

- Are there problems or potential improvements related to the Australian Government's approach to managing foreign investment in Australian international airlines?



11.3 Aviation International Engagement

Key issues

- Australia can further build on its strong record of international engagement to promote the safety and security of aviation in the Asia-Pacific, and to help shape global and regional aviation frameworks to reflect our strategic interests.
- International aviation engagement can be resource intensive, seek difficult to measure outcomes, and require perseverance and sustainability in approach.
- A key challenge is for Australia to maximise its international and regional engagement in aviation, including in Pacific capability and capacity building.

Stakeholder feedback

- The Australian Government received limited feedback on Australia's overall approach to international engagement in response to the Terms of Reference, noting that these roles are largely being performed by Government agencies.

Australia has maintained a strong record of global aviation leadership...

Since the ICAO's inception in the 1940's, Australia has demonstrated strong commitment and leadership in the international civil aviation sector, working collaboratively globally, with our regional neighbours and with industry on standards and recommended practices (SARPs), guidance and advisory material.

ICAO's strategic objectives cover aviation safety, security and facilitation, air navigation, economic development and environmental protection.

Australia also actively participates in the Asia-Pacific region where air travel is vital to economic development and social connectivity, working closely with our neighbours to provide aviation capacity and capability building assistance.

...in both the International Civil Aviation Organization...

Australia maintains a Permanent Mission in ICAO's Montreal headquarters and was successfully re-elected to Part I of the ICAO Council at the 41st Assembly in Montreal in October 2022 as one of 11 States of chief importance in air transport on the 36-member Council.

Australia, as a member state of ICAO, makes financial contributions to ICAO to help sustain its ongoing global and regional operations noting the ever-increasing demands being placed on the Organization.

Officials and experts from a number of Government agencies also make a significant technical and leadership contribution to a wide range of ICAO panels, working groups and task forces.

Our ongoing active engagement with ICAO will be critical in the development of global policies and advice on key emerging challenges in areas such as the environment and facilitation, as well as in aviation safety, air navigation and aviation security.



...as well as in regional capacity building

Australia continues to provide assistance to regional partners, including established programs in Indonesia and Papua New Guinea.

Targeted transport safety assistance has been provided to Indonesia since 2007 under the Indonesia Transport Safety Assistance Package (ITSAP).

Since the program's inception, key outcomes have been achieved with Indonesia including:

- development of Indonesia's own flight data recorder facility for the download and analysis of aircraft Cockpit Voice Recorder and Flight Data Recorder 'black boxes', and
- establishing an autonomous, self-funded air navigation service provider (AirNav) and improved sharing of transboundary flight information between both countries.

The Australian Government also provides funding and expertise to Papua New Guinea including building agency capability in the PNG transport sector.

More broadly, the Australian Government currently provides a significant amount of assistance across the aviation sector to Pacific Island countries such as the Federated States of Micronesia, Fiji, Kiribati, Nauru, Palau, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu. The Australian Government is currently investing in a multi-year Sustainable Pacific Aviation program that will grow to reflect Australia's commitment to assist in the coming years.

In addition, Australia provides financial and technical assistance to Pacific States including through DFAT-funded support to the Pacific Aviation Safety Office (PASO). PASO provides regulatory aviation safety services for 10 Pacific island states.

Australia has also enabled secure aviation travel and trade in the South-East Asia and South Asia region through its Transport Security International Capacity Building (TSCIB) program. The TSCIB program helps deter in-bound security risks to Australian airports and improves security standards for passengers travelling in the region, through targeted activities to uplift the security skills, governance and processes of aviation transport security regulators and operators in partner countries.

International engagement is challenging but can achieve multiple benefits

It remains strategically important for Australia to maintain our active participation and aviation leadership globally. Australia has maintained a strong record of aviation leadership and is well regarded as a global leader that provides important, valued, and high-quality assistance to regional partners.

Maintaining Australia's ICAO Council position puts us in a position to significantly influence the priorities of ICAO, and the development of SARPs to benefit our national, regional and global interests.

Recent experience demonstrates the importance of our ICAO engagement. For example:

- Australia has been a proponent and supporter of the ICAO established Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) since its inception in 2016, which provides a global framework for reducing global international aviation emissions.
- Australia supported the establishment of a long-term aspirational goal (LTAG) for international aviation of net zero carbon emissions by 2050, which was agreed at the ICAO Assembly in October 2022.
- Australia was an active member of the ICAO Council's Aviation Recovery Task Force (CART) which developed a range of practical, aligned guidance material to support States and industry manage and respond to the international aviation impacts of COVID-19.

- Australia co-chaired with industry, an Asia-Pacific regional taskforce that shared experiences and lessons learnt from COVID-19, which will help with future management of pandemics in international aviation.

In the Pacific region, during COVID-19 DFAT assured connectivity to and from 13 countries in the Pacific and Timor-Leste, through the Pacific Flights Program, by supporting over 600 flights.

Following the progressive return to a more stable international aviation operating environment, the Australian Government is focusing on opportunities to enhance its longer-term aviation support in the Pacific, including enhancing regional safety, connectivity and sustainability outcomes. The development of a strong aviation industry is vital for Pacific economies and livelihoods – increasing interconnectedness and people-to-people links across the region and with Australia. A stable, peaceful and resilient Pacific region is central to Australia’s interests and national security.



The Australian Government proposes to continue its program of international and regional aviation engagement including capability and capacity building in the Asia-Pacific. The Australian Government will also consider additional opportunities to provide support, such as a targeted Pacific program that collaborates closely with other countries and Pacific aviation organisations.

- What areas should Australia target through its international aviation programs?
- Are there opportunities for improvement and where would the greatest benefits be achieved?



11.4 International airport designation and development

Key issues

- A sustainable network of international airports provides access to international tourism and trade markets for our major capital and regional cities and surrounding communities.
- Border agencies face increasing resourcing pressures to continue to provide services at all designated international airports.
- The challenge is to ensure international airport policy settings reflect available border agency resourcing and maintain Australia's internationally recognised security and biosecurity standards while facilitating international tourism and trade development.

Stakeholder feedback

- Some stakeholders emphasised the benefits of policy settings that support the dispersal of tourists beyond the major capital cities.

Access to border agency services – the New and Redeveloping International Ports Framework

The *Air Navigation Act 1920* requires international flights to take off and land at airports designated for such purposes under section 9. This provides an administrative mechanism to ensure international flights only operate at airports with appropriate border services (biosecurity, immigration and customs control).

Airport operators seeking to introduce international services at an airport where no border services are provided, or where there is a change to an existing business model that impacts border services capabilities, apply to the Department to obtain agreement in accordance with a national interest New and Redeveloping International Ports Framework.

The Framework establishes a process to help ensure that border services are available at airports when they are required. Airport operators are advised that they are responsible for costs associated with relevant infrastructure and facilities required to support international services. This includes any costs associated with establishing or redeveloping a border services capability at the port incurred by the Australian Government.

Proposals are assessed to determine whether they are in the national interest. The Department coordinates advice to the Australian Government on proposals in consultation with Home Affairs, DAFF, and other relevant agencies.

Criteria for the national interest assessment include:

- Financial sustainability and expected economic benefits
- Alignment with Australia's strategic interests (which include biosecurity, national and border security)
- Expected tourism, trade and investment benefits
- Expected rural and regional benefits

- Expected social benefits
- Appropriate infrastructure in place and regulatory approvals obtained
- Funding and resourcing

Increased numbers of international airports place pressures on border agencies...

Growth in the network of Australian international airports (increasing from 9 in 2009 to 16 in 2019), has placed ongoing resourcing pressures on border agencies to facilitate international services.

This includes border agency engagement in a range of activities, including the finalisation and approval of terminal design, well ahead of construction being commenced. Accordingly, effective border agency engagement from the early planning phase of airport development is critical to ensure fit for purpose facilities are completed and to minimise any additional expenses of remediating issues later in the completion of international airport terminal projects. Border agencies also require significant lead-time around ongoing staffing and recruitment to facilitate airport redevelopment.

The criteria, process and/or cost recovery arrangements may require refinement to ensure future decisions on proposals for new or expanding international airports reflect the national interest. This is particularly the case for airports that have only occasional international scheduled services and where there are resourcing and cost recovery issues for intermittent border agency requirements.

The expected future growth in international airline services will place further demands on border agencies.

...and pressure on our security and biosecurity arrangements

COVID-19 and concerns over biosecurity threats, such as Foot and Mouth Disease, have given rise to concerns over security and biosecurity risks associated with further increasing the number of international airports in Australia and the demands these are placing on our border agencies.

Noting that international airports facilitate trade and travel, but also potentially provide a gateway for illegal activity to be undertaken, the Australian Government will explore new technologies to automate processes and separate those wishing to undertake legitimate trade and travel from those who are not.

Changes to the current arrangements may be appropriate

The Australian Government is considering changes to the current Framework for the Provision of Border Services at New and Redeveloping Ports, having regard to the benefits and costs of border services arrangements at international airports, the roles of Government agencies and industry, funding arrangements and mitigating risks to Australia's border protection arrangements.



The Australian Government is considering changes to the Framework for designating international airports and associated funding issues.

- What issues should be considered in changing the Framework for the Provision of Border Services at New and Redeveloping International Ports?



Next steps – how to have your say





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Next steps – how to have your say



A safe, efficient, sustainable and competitive aviation sector is critical to the economy and the standard of living of all Australians.

The Aviation White Paper will clearly articulate the Australian Government's policies on desired aviation outcomes in relation to efficiency, safety, sustainability and competitiveness to ensure the sector is appropriately positioned to deliver aviation services for the Australian public and international visitors out to 2050.

In the 2022–23 Budget, the Australian Government committed \$7 million over 2022–23 to 2023–24 to deliver the Aviation White Paper.

The Terms of Reference for the White Paper were released on 7 February 2023.

Stakeholders were invited to make initial submissions on the Terms of Reference by 10 March 2023.

The Australian Government received a total of 192 submissions, with 110 provided by organisations and 82 submissions from the general public. Submissions covered topics including regulators and regulation, airports, General Aviation, airlines, decarbonisation and aircraft noise.

The Department undertook stakeholder roundtables and individual consultations throughout March 2023 across Sydney, Melbourne, Brisbane, Perth, Darwin and virtually. These consultations were attended by 142 individuals from 97 organisations. Roundtable discussions included the transition to net zero, industry sustainability, technological change, international competitiveness, and workforce and skills.

Feedback from stakeholders on the Terms of Reference informed drafting of the Aviation Green Paper.

In the lead up to the release of the Terms of Reference, the Department reviewed 749 submissions across 13 report and inquiry processes that have commenced since 2015, with input included from government, peak industry bodies and individuals.

The Green Paper was also informed by the Scenario Analysis of the Future of Australian Aviation report undertaken for the Department of Infrastructure, Transport, Regional Development, Communications and the Arts by L.E.K. Consulting.

The Australian Government invites comments on the Green Paper to be considered in the development of the White Paper. Comment is sought in particular in response to the questions posed throughout the Green Paper, and summarised in Appendix A – Summary of questions.

Submissions on the Green Paper are now open and can be made by visiting the Department's 'Have Your Say' page on our website.

Submissions may also be provided by mail to:

Director, Aviation White Paper Project Office

Aviation White Paper

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

GPO Box 594

Canberra ACT 2601

or by emailing aviationgreenpaper@infrastructure.gov.au.

We are seeking your views by Thursday 30 November 2023.

In addition, the Australian Government will engage with stakeholders through a series of roundtable sessions in October and November 2023. You can register to receive updates on the public consultation events by emailing aviationgreenpaper@infrastructure.gov.au.

The White Paper will be released in mid-2024. It will provide an authoritative, in-depth report, drawing on feedback from the Green Paper.



Appendices





Appendix A – Summary of questions

Chapter 2 – Likely future directions out to 2050

- What emphasis should the Australian Government place on these trends to help guide the future of the sector? Are there any other trends the Australian Government could add?

Chapter 3 – Airlines, airports and passengers – competition, consumer protection and disability access settings

- What types of data and analysis should the Australian Government produce to support aviation competition outcomes?
- Would the Australian Government's publication, in consultation with industry, of a decision-making framework and guide for short term cabotage dispensations support clarity of current processes to manage future decisions to implement longer-term cabotage arrangements?
- What should the Australian Government take into account in designing the terms of reference for the proposed Productivity Commission Inquiry?
- Should the Australian Government look to revise current consumer protection arrangements and, if so, through existing or new mechanisms?
- Would an expanded remit for the Airline Customer Advocate to educate customers on their legal entitlements be useful?
- Previous consultation processes have explored options to refine the passenger liability and insurance framework under the *Civil Aviation (Carriers' Liability) Act 1959* – do stakeholders still consider amendments to this framework are needed?
- Would policies pursued in other jurisdictions – such as a Passenger Bill of Rights or a stronger ombudsman model – deliver benefits to Australia's aviation sector?
- What further improvements can be made to the Disability Standards for Accessible Public Transport to accommodate the unique requirements of air travel?
- What improvements can be made to aviation accessibility that are outside the scope of the Disability Standards for Accessible Public Transport?
- What are the specific challenges faced by people with disability wishing to travel by air in regional and remote areas?
- How can Disability Access Facilitation Plans by airlines and airports be improved?
- How should the Aviation Access Forum (AAF) be restructured to be more effective and better able to drive and enforce change to address issues faced by travellers living with disability?
- What measures should be taken to ensure Australian aviation markets operate efficiently, improve competition settings, and deliver optimal consumer outcomes?
- Are the Aeronautical Pricing Principles fit-for-purpose? How could they be improved?
- Should the Australian Government mandate use of the Aeronautical Pricing Principles? Why or why not?



Chapter 4 – Regional and remote aviation services

- Where should the Australian Government focus its engagement in regional and remote aviation, including helping achieve Closing the Gap outcomes, noting established state, territory and local government responsibilities and programs?
- Traditionally, subsidies for intra-state aviation services have been carried by state and territory governments. Does this remain the best structure?
- What opportunities do emerging aviation technologies present for regional and remote Australia?
- What are specific issues experienced by the regional and remote aviation sector in the context of decarbonisation? What elements should the Transport and Infrastructure Net Zero Roadmap and Action Plan include to recognise the specific circumstances of the regional and remote aviation sector?
- What opportunities are there to develop domestic bioenergy feedstock production and collection in Australia's regions, and what policy settings from Government would support this?
- What are the challenges faced by regional and remote aviation and airports posed by our changing climate?
- How do local governments and aerodrome operators consider climate resilience when managing their aviation assets?

Chapter 5 – Maximising aviation's contribution to net zero

- How can Government work with industry to ensure a strong and sustainable aviation sector that supports emissions reduction targets while growing jobs and innovation?
- Given there are a number of measures that industry and government could pursue to help achieve net zero by 2050 in aviation, are there specific measures that more emphasis and support should be given to?
- What should be included in relation to aviation in the Australian Government's Transport and Infrastructure Net Zero Roadmap and Action Plan (including for sectors, such as GA and airports)?
- How can the Australian Government ensure all emitters in the aviation sector play a role in meeting Australia's emissions reduction targets?
- What are the benefits and risks associated with updating the National Greenhouse and Energy Reporting (NGER) scheme and/or other policy mechanisms to enable unique claims on sustainable aviation fuel (SAF) sourced through common infrastructure? How can risks be managed?
- What types of arrangements are necessary to support industry confidence in the quality standards and sustainability certification of SAF?
- Should policy and regulatory settings be refined to support development of domestic SAF production capability and industry take-up of SAF?
- What are the current and future challenges in developing an Australian SAF production industry, including challenges associated with growing, refining and consuming feedstocks?
- How can policy and regulatory settings support research and development and subsequent investment in emerging low and zero emission technologies and related infrastructure?
- What information and guidance is needed to support regional aviation's net zero transition in the context of these emerging technologies?



Chapter 6 – Airport development planning processes and consultation mechanisms

- Do you have comments on how the operation and effectiveness of the Noise Complaints Information Service could be improved?
- How could the Australian Noise Exposure Forecast, and use of the ANEF in Government planning processes, be improved?
- What are appropriate, modern noise metrics that should be used to communicate aircraft noise impacts?
- How can governments better communicate with potential purchasers of properties which will be affected by aircraft noise in the future?
- How can new and different types of noise impacts from projected growth in drone use best be managed?
- Do these processes provide sufficient opportunity for impacts on the community to be identified and taken into account? How can they be improved?
- What can be done to proactively mitigate noise impacts by better informing residents and land-use planners?
- What else can airlines and airports do to support better management of aircraft noise?
- What can be done to facilitate increased adoption and implementation of the National Airports Safeguarding Framework principles for land planning to optimise land-use activity and reduce community impacts?
- Could governance arrangements for the Aircraft Noise Ombudsman be improved to provide greater independence, including publishing its findings and reports?
- Are there opportunities to improve transparency by publishing information about other decisions made by CASA, Airservices or airports around flight paths, and how aircraft approach and depart airports?
- How can the flight path design principles be improved?
- How can the existing consultation framework be improved to facilitate efficient planning and development, while preventing environmental harm and ensuring continued access for aviation users?
- Are Community Aviation Consultation Groups (CACG) working for the community? What are good aspects, and what can be improved?
- How could the Australian Government improve regulation to facilitate efficient planning and development while preventing environmental harm and protecting airports for aviation use?
- Is a monetary threshold still an appropriate mechanism for determining a 'major airport development' requiring an Major Development Plan (MDP)? What other significance tests could the Australian Government consider?
- Do current master planning processes adequately account for climate risks and if not, how could they be improved?
- Do the current master planning processes support all airport users, including general aviation?

Chapter 7 – General Aviation

- Do policy and regulatory settings adequately facilitate the General Aviation (GA) sector's evolving role in Australian aviation?
- Are there any changes to policy and regulatory settings that might facilitate the GA sector's evolving role in Australian aviation including through protections at GA airports and supporting the transition to a sustainable, net zero GA sector?
- Are existing consultation mechanisms, including the General Aviation Advisory Network (GAAN) and CASA-led Aviation Safety Advisory Panel (ASAP) and Technical Working Groups (TWG), appropriate?

Chapter 8 – Fit-for-purpose agencies and regulations

- Do you have concerns with current arrangements of roles and responsibilities within the Australian Government? Are there opportunities to improve these arrangements?
- Do you have any suggestions to improve current reform processes?
- What should the Australian Government consider in adopting technology to fully utilise airspace and ensure access for different parts of the sector?
- What should the Australian Government consider when determining cost recovery arrangements to ensure a safe, equitable and accessible aviation system?
- Do you support the Australian Government introducing enhanced security obligations?
- Do you have any comments about current security screening arrangements?
- Are there any specific initiatives that should be supported globally, regionally and nationally to continue improvement in international passenger facilitation?
- How can Government optimise partnerships with industry to streamline the movement of passengers and modernise the border, while also enhancing security?
- In the air cargo environment, how could industry and Government better work together to leverage advances in technology as well as industry investments in infrastructure and technology to streamline movement of cargo?

Chapter 9 – Emerging aviation technologies

- How can we build on Australia's strengths to ensure that Australian industry in the sector is able to be competitive internationally?
- How could the Australian Government create an environment that fosters private investment in emerging aviation technologies?
- What skills are needed for the emerging aviation technology sector workforce?
- How can the Australian Government best work with states and territories to foster a supportive environment for investment in manufacturing of these technologies?
- What regulatory roles in particular do stakeholders see as critical for the Australian Government to lead to enable the advantages of new technologies while managing the risks?
- How will priorities of Government agencies need to evolve as the uptake of emerging aviation technologies continues?
- Do Government policies and regulations need to change to better support growth in emerging aviation technology manufacturing?
- As competition for access to airspace is expected to increase, how can government ensure fair and equitable access while maintaining safety and efficiency of this public use asset? How could a safe, open, competitive and commercial Uncrewed Aircraft System Traffic Management (UTM) market operate?
- How do we achieve a balance between mitigating the negative impacts of drones and Advanced Air Mobility (AAM) while realising the potential benefits?
- What form should a legislated scheme to mitigate risks of third-party damage from drone accidents take?
- What frameworks does the Australian Government need to ensure community acceptance as the sector continues to develop, and particularly if it reaches some of the more optimistic growth projections?



Chapter 10 – Future industry workforce

- Can alignment of training with regulatory and licencing requirements be improved?
- How can government policy enable industry to support the net zero economy and the future skills, training, and workforce needs that entails (including future fuels)?
- Would an analysis of future skills and workforce needs help position the aviation industry to pre-emptively respond to emerging needs?
- How should governments and industry prepare Australian workers for the new skills required for the technological transition and net zero fuels?
- What role can reforms to skilled migration pathways play in addressing immediate aviation personnel shortages?
- Are there opportunities to improve recognition of overseas training qualifications?

Chapter 11 – International aviation

- Are there other issues or concerns associated with the Australian Government's approach to negotiating aviation bilateral agreements that you wish to highlight?
- What opportunities exist to improve the approach to international negotiations?
- Are there problems or potential improvements related to the Australian Government's approach to managing foreign investment in Australian international airlines?
- What areas should Australia target through its international aviation programs? Are there opportunities for improvement and where would the greatest benefits be achieved?
- What issues would be important to cover in a review of the framework for New and Redeveloping International Ports?



Appendix B – Glossary of terms

AAF	The Aviation Access Forum is a consultative forum on disability access issues in Australian aviation, comprising government agencies, the disability community and airline and airport operators.
AAM	In this document, the term Advanced Air Mobility is used to describe a new concept in air transportation most often connected to the use of electric vertical take-off and landing (eVTOL) aircraft. AAM is not a single technology, but rather a collection of new and emerging technologies being applied to the aviation ecosystem, particularly in new aircraft types and equipage. AAM aircraft have larger payloads than drones (c.50kg plus) and are able to take on a broader set of use cases, including passenger and heavy freight transport.
ABF	<p>The Australian Border Force is part of Home Affairs. It is Australia's frontline border law enforcement and international customs agency. As stewards of one of Australia's greatest strategic assets "the border", the ABF is committed to implementing Government policy and ensuring a safe, prosperous and united Australia.</p> <p>The ABF supports national security by protecting our border and national prosperity by facilitating legitimate trade and travel through its functions across the border continuum – pre-border, at the border and post-border. The ABF also plays a crucial role in maintaining the integrity of Australia's migration system.</p>
ACA	Airline Customer Advocate. The ACA provides a free and independent service to eligible customers of major Australian airlines by facilitating the resolution of current unresolved complaints about airline services. The ACA is funded by the participating airlines (Qantas, Jetstar, Regional Express and Virgin Australia).
ACCC	Australian Competition and Consumer Commission. The ACCC promotes competition in markets to benefit consumers, businesses, and the community.
ACMA	The Australian Communications and Media Authority is the regulator for communications and media in Australia. ACMA manages spectrum licences in Australia. The <i>Radiocommunications Act 1992</i> defines 'apparatus licences' and 'spectrum licences' as the two types of licences that can be purchased from ACMA.



ACL	Australian Consumer Law. The ACL is enacted in the <i>Competition and Consumer Act 2010</i> . It sets out consumer rights and business obligations. The ACL is enforced by the Australian Competition and Consumer Commission and state and territory fair trading agencies. It applies to all Australian businesses, including airlines.
ADS-B	Automatic Dependent Surveillance – Broadcast is a system in which electronic equipment onboard an aircraft automatically broadcasts the precise location of the aircraft via a digital data link. The data can be used by other aircraft and potentially air traffic control to show the aircraft's position and altitude on display screens without the need for radar. When ADS-B has both data transmission and reception modes fitted it is also able to be utilised as a collision avoidance system if both aircraft are fitted with ADS-B IN and OUT devices.
AFP	The Australian Federal Police is the primary law-enforcement agency at the nine major Australian airports: Adelaide, Brisbane, Cairns, Canberra, Darwin, Gold Coast, Melbourne, Perth and Sydney. The AFP is part of the Attorney-General's portfolio.
Airports Act	<i>Airports Act 1996</i> , the Commonwealth legislation that regulates the 22 LFAs.
Airservices Australia	Airservices Australia is Australia's independent air navigation service provider and provides related airside services to the Australian aviation industry. Airservices Australia is an Australian Government owned corporation. Airservices Australia operates under the <i>Air Services Act 1995</i> . Airservices Australia is responsible for the provision of ARFFS at Australia's major passenger airports.
ALC	Airport-lessee company. ALCs are the operators of LFAs under the <i>Airports Act 1996</i> . There are 22 such airports: the ALCs of 21 are privately owned; the Commonwealth owns WSA Co, the ALC of Western Sydney International (Nancy-Bird Walton) Airport (WSI).
AMSA	The Australian Maritime Safety Authority is the national safety agency responsible for maritime safety, protection of the marine environment, and aviation and marine SAR. It is a statutory authority established by the <i>Australian Maritime Safety Authority Act 1990</i> . AMSA's primary areas of responsibility to the aviation community include operating the joint aviation and maritime rescue coordination centre (JRCC), providing a ground station and a Mission Control Centre for the Cospas-Sarsat satellite distress beacon system, and leading the National SAR Council which is responsible for Australia's national SAR response arrangements in cooperation with the Australian Defence Force and State, Territory and Federal Police.
ANEF	The Australian Noise Exposure Forecast is a land-use planning tool to measure aircraft noise exposure in the vicinity of airports. An ANEF chart shows a forecast of aircraft noise levels based on approved flight paths. ANEF noise contours are formally endorsed for technical accuracy and practical operational application by Airservices Australia. ANEFs are published for all LFAs.



ANO	The Aircraft Noise Ombudsman (ANO) is an independent advisory body within Airservices Australia. The ANO conducts independent reviews of Airservices Australia's and Defence's management of aircraft noise-related activities, including, the handling of complaints, community consultation processes related to aircraft noise and the presentation and distribution of aircraft noise-related information.
APPs	Aeronautical Pricing Principles is an Australian Government framework, established to guide commercial negotiations between airlines and airports for aeronautical charges, such as movement charges and terminal usages fees.
ARFFS	Aviation Rescue Fire Fighting Services (ARFFS) are provided by Airservices Australia at 27 of Australia's busiest airports. Regulated by CASA under the Civil Aviation Safety Regulations Part 176.
ARMS	The Airspace Risk Modelling System recently developed by CASA is an evidence and risk-based approach to assessing airspace, utilising collision risk modelling, and data and risk mitigation strategies aimed at ensuring airspace remains safe for all users. ARMS utilises an ever-growing database of actual historical flight trajectories to provide quantitative risk modelling for a range of airspace scenarios.
ASA	Air Services Arrangements are normally made up of an Air Services Agreement (the agreement) and a Memorandum of Understanding (MoU). The Agreement is a high-level, legally binding and enforceable treaty between two countries. Key provisions include nationality provisions (substantial ownership and effective control, or incorporation and principal place of business), application of national laws, airlines' rights to establish offices, deploy staff, remit currency, customs duties, safety and security frameworks, and the routes that may be operated. MoUs are lower-level, and reflect a 'shared understanding' but are not technically legally binding at international law.
ASAP	The Aviation Safety Advisory Panel has been established to improve CASA's organisational culture and its engagement with industry. It is supported by Technical Working Groups and other web-based and ad-hoc consultation.
ASIC	The Aviation Security Identification Card (ASIC) is required for most workers at major airports across Australia. The cards certify that the relevant person has had a security background check and they are not considered a threat to aviation.
ASIO	The role of Australian Security Intelligence Organisation is to identify and investigate threats to security, wherever they arise, and to provide advice to protect Australia, its people and its interests. ASIO's functions are set out in the <i>Australian Security Intelligence Organisation Act 1979</i> .



ASQA	The Australian Skills Quality Authority is the national regulator for Australia's vocational education and training sector. ASQA delivers certificate II in aviation and line maintenance (through registered training organisations). ASQA operates under the <i>National Vocational Education and Training Regulator Act 2011</i> .
ATSA	The <i>Aviation Transport Security Act 2004</i> establishes the regulatory framework to safeguard against unlawful interference with aviation. The ATSA establishes minimum security requirements for civil aviation in Australia by imposing obligations on persons engaged in civil aviation related activities. In particular, it obliges certain aviation industry participants to develop, and comply with, aviation security programs. The Act is supported by the <i>Aviation Transport Security Regulations 2005</i> .
ATSB	The ATSB is Australia's independent no blame safety investigator and operates under the <i>Transport Safety Investigation Act 2003</i> . The ATSB is responsible for the independent investigation of accidents and other safety occurrences involving civil aircraft in Australia, and takes part in the investigation of accidents and other occurrences involving Australian aircraft overseas. The ATSB is also responsible for Australia's system for mandatory reporting of all aviation safety occurrences and operates schemes for voluntary and confidential reporting of aviation safety concerns.
ATM	Air Traffic Management is the combination of the airborne functions and ground-based functions (air traffic services, airspace management and air traffic flow management) required to ensure the safe and efficient movement of aircraft during all phases of operations.
BASA	CASA-FAA Bilateral Aviation Safety Agreement to provide for cooperation to sustain equivalent levels of aviation safety and accept of each other's approvals, evaluation and monitoring of civil aeronautical products, personnel and facilities.
BITRE	Bureau of Infrastructure and Transport Research Economics. Provides economic analysis, research and statistics on infrastructure and transport issues to inform Australian Government policy development and wider community understanding. BITRE is part of the Department of Infrastructure, Transport, Regional Development, Communications and the Arts.
BoM	The Bureau of Meteorology is Australia's national weather, climate and water agency and operates under the authority of the <i>Meteorology Act 1955</i> and the <i>Water Act 2007</i> . BoM is the aeronautical meteorological service provider for Australia.
BVLOS	Beyond Visual Line of Sight is a drone operation whereby the drone pilot is not able to maintain visual unaided contact with the aircraft at all times.



CA Act	The <i>Civil Aviation Act 1988</i> is the primary civil aviation safety legislation in Australia. The main object of this Act is to establish a regulatory framework for maintaining, enhancing and promoting the safety of civil aviation, with particular emphasis on preventing aviation accidents and incidents.
CAR	The <i>Civil Aviation Regulations 1988</i> provide regulatory controls over civil aviation safety. They set out the required safety standards for: airworthiness; licences and ratings for flight crew and maintenance personnel; air traffic control; rules of the air; dangerous goods; other aviation safety issues.
CACG	Community Aviation Consultation Groups are a mechanism to ensure appropriate community engagement on airport planning and operations.
CASA	The Civil Aviation Safety Authority is an independent statutory authority established in 1995 under <i>the Civil Aviation Act 1988</i> and is responsible for maintaining, enhancing and promoting the safety of civil aviation, with particular emphasis on preventing aviation accidents and incidents. CASA is also responsible for regulating aspects of the administration of Australia's airspace under the <i>Airspace Act 2007</i> .
CASR	The <i>Civil Aviation Safety Regulations 1998</i> provide regulatory controls over civil aviation safety. They set out the required safety standards for: airworthiness; licences and ratings for flight crew and maintenance personnel; air traffic control; rules of the air; dangerous goods; other aviation safety issues.
Chicago Convention	The Convention on International Civil Aviation, signed in Chicago on 7 December 1944, came into force on 4 April 1947, establishing the International Civil Aviation Organization (ICAO). The legal instrument that gives effect to this in Australia is the <i>Air Navigation Act 1920</i> . The Convention established certain principles and arrangements so international civil aviation can develop in a safe and orderly manner, and that international air transport services be established on the basis of equality of opportunity and operated soundly and economically.
CMATS	The Civil Military Air Traffic Management System is an advanced integrated system that will replace the current independent civil and Defence air traffic management systems it is being implemented in Australia under the name OneSKY.
CORSIA	Carbon Offsetting and Reduction Scheme for international Aviation is a global market-based measure designed to offset international aviation CO ₂ emissions in order to stabilise the levels of such emissions.
COVID-19	COVID-19 is short for coronavirus disease of 2019, SARS-CoV-2.



CSIRO	The Commonwealth Scientific and Industrial Research Organisation is an Australian Government corporate entity which carries out scientific research to support Australia. In the aviation sector the CSIRO is supporting the Australian Government's net zero initiatives through the <i>Sustainable Aviation Fuel Roadmap</i> and research into <i>Opportunities for hydrogen in commercial aviation</i> .
DAFF	The Department of Agriculture, Fisheries and Forestry enhances Australia's agricultural industries and trade, and manages the threat of biosecurity risks to Australia. All aircraft arriving in Australian territory from overseas are subject to Australian biosecurity requirements. Airlines and aircraft operators flying into Australia from overseas must meet biosecurity requirements under the <i>Biosecurity Act 2015</i> .
DCCEEW	Department of Climate Change, Energy, the Environment and Water leads Australia's response to climate change and sustainable energy use, and protects our environment, heritage and water and administers the <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
Defence	The Department of Defence is responsible for safety and airworthiness of military aviation systems. Defence cooperates with Australia's civil aviation agencies to harmonise its Safety Management System and associated regulations where appropriate.
DFAT	The Department of Foreign Affairs and Trade promotes and protects Australia's interests internationally and economic growth. DFAT is responsible for the provision of passport and international travel documentation for Australian and specified non-citizens and providing guidance on international interests that may impact engagement on ICAO matters.
DISR	The Department of Industry, Science and Resources supports the aviation industry through its broad mandate of building a better future for all Australians by enabling a productive, resilient and sustainable economy, enriched by science and technology.
DITRDCA	The Department of Infrastructure, Transport, Regional Development, Communications and the Arts is the portfolio agency responsible for advising the Australian Government on the policy and regulatory framework for international, domestic, and regional aviation elements (not including security).
DDA	<i>Disability Discrimination Act 1992</i> . Commonwealth legislation which aims to eliminate discrimination against people with disabilities, including in the provision of services such as public transport and access to premises.



Drones	Drones are a colloquial term for what are referred to as Remotely Piloted Aircraft Systems (RPAS) in Australian legislation. ICAO also uses the term RPAS in its materials. Other common terms include Uncrewed Aerial Systems (UAS). RPAS is the correct Australian legal terminology, however, drones will be used in this document as it is the term most commonly understood in the broader community. Drones typically have a freight capacity of up to c.10kg and have use cases involving aerial surveillance and photography, or last mile delivery of small parcels and consumer goods.
DTC	A Digital Travel Card is a digital representation of a traveller's identity which can temporarily or permanently substitute a conventional passport.
EASA	European Union Aviation Safety Agency, the European Authority for aviation safety for passengers, EU citizens and the general public. It performs a similar role to Australia's CASA.
Electric powered aircraft	Electric powered aircraft use battery electric propulsion systems and are initially aimed at replacing traditional fuel powered turboprop engines. Electric powered technologies offer zero emissions aviation, when powered by sustainable electricity sources.
eCTOL	Electric conventional take-off and landing aircraft are conventional aircraft operated by electric engines. The future use cases for these craft more clearly align with conventional aviation, but there are still new uses that may be enabled by adoption of this technology.
Emerging aviation technology	In this Green Paper, Emerging Aviation Technology is used as a general description covering drones and AAM. This includes any supporting airspace, safety and security regulations, and infrastructure such as Vertiports. <i>Note: For the Green Paper, Electric and Hydrogen powered aircraft are largely described separately and are considered under aviation's contribution to net zero.</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> , the Commonwealth legislation that regulates environmental matters on Commonwealth land (including LFAs) and matters of national environmental significance both on and off Commonwealth land.
eSTOL	Electric short take-off and landing craft are fixed wing aircraft requiring short runways to take-off and land. They typically require less energy than eVTOL craft and therefore may be able to carry heavier payloads.
eVTOL	Electric Vertical take off and landing. Small, remotely operated eVTOL craft are typically referred to as drones, and are in use today. Early versions of larger, passenger-carrying eVTOLs are expected to be piloted by a human onboard, but future versions are expected to be operated without a pilot. This will reduce weight in the craft and open up myriad new use-cases.



HEP	Hydrogen Electric Propulsion is a zero emissions system that uses an electrochemical process that combines hydrogen and oxygen as the electrical energy source to power propulsion.
FAA	The Federal Aviation Administration is the civil aviation safety regulator for the United States. It performs a similar role to Australia's CASA.
GAAN	The General Aviation Advisory Network (GAAN) provides advice to the Minister for Infrastructure and Transport on matters affecting the GA sector and will continue to be a key consultation mechanism to help guide the Australian Government's approach to these and other issues. Members come from a cross section of the GA sector including training, manufacturing, maintenance, sport and recreation, rotorcraft and fixed wing aircraft, aerial application, remotely piloted aircraft systems and medical operations.
GDP	Gross Domestic Product refers to the size of an economy, typically measured by the total production of goods and services in the economy.
General Aviation	The International Civil Aviation Organization (ICAO) classifies General Aviation (GA) as covering a range of operations that are not commercial air transport services. This includes aerial work (such as agriculture, photography, surveying, search and rescue), instructional flying and recreational flying.
Health	The Department of Health and Aged Care develops and delivers policies and programs and advises the Australian Government on health, aged care and sport. In the aviation sector, Health provides information and security measures for international travellers.
Home Affairs	The Department of Home Affairs is responsible for immigration and customs border policy. Within Home Affairs individual areas have responsibilities for managing aspects of Australia's aviation sector including the National Office for Cyber Security, Australian Border Force and Immigration.
Hydrogen powered aircraft	Hydrogen aircraft use hydrogen-powered fuel cells to power propellers in smaller planes, or burn hydrogen to power jet engines in larger aircraft.
IATA	The International Air Transport Association is an international airline trade association.
ICAO	The International Civil Aviation Organisation is a United Nations specialised agency. It is funded and directed by 193 national governments to support their diplomacy and cooperation in air transport as signatory states to the Chicago Convention.



ILS	Instrument Landing System is a precision runway approach aid that uses two radio beams which together provide pilots with both horizontal and vertical guidance during the landing approach.
LFA	Leased federal airport regulated under the <i>Airports Act 1996</i> . The Commonwealth owns 22 LFAs and has privatised the operations of 21 of these airports to operators, known as airport-lessee companies (ALCs), which are privately owned. The LFAs are Adelaide, Alice Springs, Archerfield, Bankstown, Brisbane, Camden, Canberra, Darwin, Essendon Fields, Gold Coast, Hobart, Jandakot, Launceston, Melbourne, Moorabbin, Mt Isa, Parafield, Perth, Sydney, Tennant Creek, Townsville and Western Sydney International (Nancy-Bird Walton) airports. Western Sydney Airport Company Ltd, the ALC of WSI, is fully owned by the Commonwealth.
LTAG	Long-term aspirational goal for international aviation of net zero carbon emissions by 2050.
MDT	A Major Development Plan is a proposal for major development at federally leased airports.
MRO	Maintenance Repair and Overhaul refers to the specific maintenance, service, inspection, or repair of an aircraft. This is done to ensure the safety and airworthiness of an aircraft or its components.
NGER	The National Greenhouse and Energy Reporting Act 2007 (NGER Act) introduced a single national framework for reporting and disseminating company information about greenhouse gas emissions, energy production and energy consumption.
NOTAM	Notice to Airmen, containing contemporary information about airspace filed with Airservices Australia in accordance with international standards.
NRF	The Australian Government is establishing the \$15 billion National Reconstruction Fund to support, diversify and transform Australia's industry and economy to help create secure, well-paid jobs, secure future prosperity, and drive sustainable economic growth.
OneSKY	OneSKY is the name of Australia's new air traffic management system. See CMATS for further information.
Passenger load factor	Measures the percentage of available seating capacity that is used by passengers.
RPAS	RPAS, or Remotely Piloted Aircraft Systems, is the Australian legal term for drones. In this document, we use the term 'drones' to refer to RPAS.



RPT	The term RPT is regularly used in aviation to refer to Regular Public Transport operations, that is, commercial airline services operating to a regular schedule. Amendments to the CASR in 2021 removed references to RPT and introduced the term 'air transport' to cover charter, RPT and air ambulance services when conducted for hire or reward. However, other legislation, such as the Aviation Transport Security Regulations 2005, still uses the term.
SAF	Sustainable aviation fuel is produced from sustainable feedstocks and is very similar in its chemistry to traditional fossil jet fuel.
SBAS	Satellite-Based Augmentation System is a navigational system that supplements the existing systems, providing a more accurate and reliable navigation service and without the need for ground-based infrastructure. In an aviation context, one benefit of SBAS is that it allows aircraft to conduct satellite-guided landing approaches which are operationally equivalent to current Instrument Landing System (ILS) Category 1 approaches guided by land-based infrastructure.
SOCI Act	The <i>Security of Critical Infrastructure Act 2018</i> is designed to strengthen the Australian Government's capacity to manage the national security risks of espionage, sabotage and coercion arising from foreign involvement in Australia's critical infrastructure. This legislation is administered by Home Affairs.
STEM	STEM is a common abbreviation for related subjects of study: Science, Technology, Engineering and Mathematics.
THRIVE	THRIVE 2030 is Australia's national strategy for the long-term sustainable growth of the visitor economy.
TWG	CASA establishes Technical Working Groups as required to support the work of the ASAP. Members of these groups are industry and technical experts and they contribute their insights to help CASA ensure its regulation is fit-for-purpose.
UTM	Uncrewed Aircraft Systems Traffic Management is a system that will manage the integration of uncrewed aerial systems safely, economically, and efficiently into Australian airspace.
VCA	VCA are aircraft capable of taking off and landing vertically.
Vertiports	Vertiports are a new type of take-off and landing site designed to service next-generation vertical take-off and landing (VTOL) capable aircraft (VCA). Vertiports could be built on the sites of existing airports but also in both urban and regional locations not easily accessible by conventional aviation.
VET	Vocational Education and Training. This is education that allows people to learn specific and practical job skills.



VDOTWG	The Vertiport Design and Operations Technical Working Group was established and operates in accordance with the Terms of Reference of the Aviation Safety Advisory Panel, established by CASA. The VDOTWG advises options for regulatory oversight of vertiports that will provide a satisfactorily safe environment for AAM aircraft. The working group also provides industry sector insight and understanding of future needs and challenges.
VTOL	VTOL aircraft (alternatively referred to as VCA) are those with the capability for to take off and land vertically, instead of using a runway (Vertical Take-off and Landing). Helicopters are a prime example, and eVTOL are an emerging technology in this sector.



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