

# Australia's Aviation Green Paper – *Towards 2050*

## Boeing Australia Submission November 2023





## Table of Contents

<b>Overview</b> .....	3
<b>Boeing in Australia</b> .....	3
<b>Maximising aviation’s contribution to net zero</b> .....	4
<b>Aviation regulation and airspace</b> .....	7
<b>Safety Data Sharing</b> .....	10
<b>Emerging aviation technologies</b> .....	11
<b>Future industry workforce</b> .....	12
<b>International aviation</b> .....	13
<b>Conclusion</b> .....	14



## Overview

At Boeing, with nearly a century commemorating our partnerships in Australia, we are proud of our contribution to Australian aviation's many and varied sectors. Looking forward to an exciting future, we will continue to be an integral part of Australian aviation's fabric. Leveraging our international reach and long-term relationships which have been built upon trust and performance, to work together to lead aviation's transformation for net-zero emissions and autonomous operations. Working in partnership to create the best policy and regulatory settings which will shape the aviation sector of tomorrow.

Our submission is written to not only highlight Boeing's advocacy and leadership across Australia's and the international aviation sector, but also to respond to important sections through the Aviation Green Paper process.

## Boeing in Australia

Boeing is one of the world's largest global aerospace manufacturers. We develop, manufacture and service commercial aeroplanes, defence products and space systems for customers in more than 150 countries. Our diverse team is committed to innovating for the future, leading sustainability, and cultivating a culture based on our company's core values of safety, quality and integrity.

Our Australian portfolio represents a very broad range of Boeing's world leading and wide range of services and products. It includes Australia's only designer and manufacturer of high-end composite aerostructure components for commercial and defence aircraft; defence systems design, development and support; research and development; modelling and simulation; support and training; as well as conceiving, designing and building uncrewed systems – Australia's own MQ-28 *Ghost Bat* the exemplar.

With a history dating back to 1927, Boeing is a significant contributor to Australia's economy. With more than 4,800 employees at sites across the country, Boeing sustains thousands of additional jobs across both our supply chain and other activities.

Boeing works closely with Australian commercial customers, such as Qantas and Virgin Australia, to deliver more than a product, but a comprehensive partnership that delivers domestic training and jobs, capability and sustainability initiatives.

In addition, Boeing has a number of subsidiaries who, in partnership, are delivering innovative aircraft and operating systems to market. In Australia and New Zealand, this includes Insitu Pacific and Wisk.

Insitu Pacific, based in Queensland, develops and delivers multi-sensor uncrewed aerial systems. Insitu platforms have flown thousands of hours in beyond visual line of sight operations in Australia, in partnership with CASA, testing and developing capabilities. While Wisk is a fully autonomous, electric, vertical take-off and landing passenger vehicle. Wisk has signed a Memorandum of Understanding with the South East Queensland Council of Mayors to deliver Wisk as an advanced air mobility service in Brisbane and beyond, as part of an innovative strategy for the 2032 Brisbane Olympic Games.

Boeing is also proud to partner with great organisations, such as our long-term relationship with the CSIRO, and universities, as well as organisations that support veterans and the communities we live and work in. For Boeing, working with community groups means not only choosing organisations who need financial support, but also in identifying thoughtful and impactful partnerships which offer opportunities to inform, inspire and engage others.



## Maximising aviation's contribution to net zero

In October 2021, aviation became the first global sector to commit to net-zero by 2050. Boeing was a proud signatory to this agreement and remains engaged with our Australian commercial aircraft operator customers to support and advance their energy transition journey.

Boeing believes the future of flight will take 'everything for zero.' Collaborations between industry and government partners that foster a diverse portfolio of technologies which mature at different times must be suitable for different aviation segments. At Boeing, these activities are based around four key strategies: fleet renewal, operational efficiency, the renewable energy transition, and advanced technologies:

**Fleet Renewal** – New and upgrades to conventional aircraft has seen emissions from air travel halve globally in the last 30 years. Deploying the latest generation of aeroplanes is one of the most significant contributions to CO<sub>2</sub> emissions reduction available over the next decade. New aeroplanes provide significant efficiency gains by embedding innovation that reduce fuel use and emissions by 15-25 percent.

**Operational Efficiency** - Leveraging data, digital tools and platform modifications to improve the efficiency of the aircraft can also reduce emissions by approximately 10 percent. A modernised air traffic management system is a critical component of the civil aviation industry's commitment to meet net zero targets. Procedures such as continuous descent approaches and equipment upgrades such as GPS-based navigation for more direct routings, combined with leveraging data for fuel and flight efficiency, optimise flight planning and provide pilots with real-time weather and traffic information can achieve significant emission reduction impacts.

In 2023, Boeing launched Cascade<sup>1</sup> which examines the full life-cycle of alternate energy sources for aviation – from production through distribution and use – and quantifies possible methods to cut aviation's carbon emissions. The dynamic data modelling and visualisation tool also measures airplane fleet renewal, operational efficiency, renewable energy sources, future aircraft and market-based measures as pathways to decarbonization. Cascade is available to use to all aviation market operators.

**Renewable Energy Transition** – Over 90 percent of the carbon emissions emitted in the lifecycle of civil aviation products come from the aviation fuel used while the aeroplane is in use. As such it is critical to accelerate the development and use of low carbon fuel technologies. Boeing takes a holistic view to decarbonisation and when we do, it is clear that sustainable aviation fuels (SAF) are a necessary lever. However, it will take a 'SAF and' approach to achieving net-zero by 2050, meaning a diverse portfolio of technologies that mature at different times will be suitable for different aviation segments.

Since 2008, Boeing has been developing the global SAF market, from the first demonstration flight, to leading and supporting the technical work that has allowed eight 'SAF pathways' to be certified under the ASTM International standards, to operating the first 100 percent SAF demonstration flight in 2018, to committing that all in-production Boeing aircraft from 2030 will be 100 percent SAF compatible. This final reference is important given most aviation decarbonisation roadmaps show the requirement to replace the majority of conventional fossil kerosene with SAF by 2050 to achieve net-zero.

**Boeing recognises the importance of developing a domestic SAF industry**, particularly at a time when many countries are seeking to rapidly scale their SAF production potential. The recent International Civil Aviation Organisation (ICAO) Conference on Aviation and

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<sup>1</sup> More information about Cascade can be found at: <https://cascade.boeing.com/>



Alternative Fuel (CAAF) agreed that in order to support the long-term aspirational goal (agreed at ICAO Assembly 41 in October 2022), ICAO and its member states would strive to achieve a collective global aspirational Vision to reduce CO<sub>2</sub> emissions in international aviation by 5 percent by 2030 through the use of SAF, lower carbon aviation fuels and other cleaner aviation energies. This aligns with demand goals from several airlines, but also signals future expected demand from international aircraft operators when refuelling in Australia.

Boeing supports a technology and feedstock agnostic approach to scaling SAF. SAF should meet the technical fit-for-purpose criteria detailed in ASTM d7566 or Def-Stan 91-91 and feedstock should be judged on globally accepted sustainability criteria including a lifecycle improvement score, relative to a baseline value which we prefer as 89 gCO<sub>2</sub>e/MJ.

**Australian policy settings should encourage robust sustainability criteria for SAF.**

Multiple elements should be taken into consideration when determining the sustainability characteristic of SAF. The ICAO Carbon Offsetting and Reduction Scheme for International Aviation has established a comprehensive set of sustainability criteria, addressing issues such as life cycle emissions, direct and indirect land use change, water, air and soil considerations, as well as social factors. Drawing from international standards and aligning where practical is recommended, particularly given airlines operate internationally and may seek SAF compliance in different jurisdictions.

Globally the SAF industry is in its early stages. In 2023, less than 1 percent of jet fuel demand will be SAF. However, this presents significant opportunities, especially for countries like **Australia with access to sustainable feedstocks, a strong aviation market and high domestic skill level**. The global policy landscape is becoming increasingly competitive, with more than 40 countries having a SAF specific policy in place or under development. In the absence of policy, Australia will be at a significant disadvantage to see a domestic SAF industry develop.

Boeing emphasises that strong and effective policy support can position Australia to develop a domestic SAF industry and capture the environmental, social and economic benefits.

**Boeing recommends the Government deploy a national aviation decarbonisation policy framework** that can leverage the value and opportunity from Australia's agricultural sector, seek economic benefits of domestic production and reduced jet fuel imports, create new jobs and signal the opportunity for Australia as a new energy job market. While liquid fuel security may not be an initial primary driver for establishing a SAF market on its own, it is a valuable bi-product and will be valued by many of Australia's close partners and allies particularly as energy security and independence becomes increasingly competitive in the medium- and longer-term.

**Boeing recommends policy options that put the Australian production of SAF on a more equal footing with offshore production**, and with the production of renewable fuel for ground transport. Some of these options could include:

- Policy mechanisms that require a reduction in carbon intensity and allow aviation to opt-in to ground transport incentives
- SAF regulatory incentives including an energy multiplier
- Capital support and loan guarantees
- Feedstock subsidies or support mechanisms
- Tax relief policies and tax exemptions
- Financial market policies including green bond mechanisms and debt guarantees

- Accounting policies, including accelerated amortisation schedules and continue research and development programs.

If the objective is to develop Australian domestic SAF production capacity, policy should be judged on its effectiveness towards achieving this goal. Boeing recommends the following characteristics as possible indicators of overall policy effectiveness:

- **Stability:** Policy should be stable, predictable and consistent in implementation in order for the private sector to be willing to make investments
- **Technology-neutral:** This enables diverse production pathways and supply chains to develop. Policy should not pick winners.
- **Duration:** Policy should be of a sufficient duration to reflect project development timelines. Typically, this will be at least 10 years.
- **Stackable:** Policy support should be “stackable” with other incentives – i.e., allowing credit to be received from multiple reinforcing incentives at the same time.
- **Non-dilutive capital:** Policies should recognise needs of pre-revenue companies through clear access to non-dilutive capital via grants and loans.
- **Performance:** The most effective policies link incentives to performance (e.g. higher GHG emission reduction performance should be rewarded in policy design).
- **Compliance value:** Policy design should allow access to a compliance credit market to mediate prices between renewable fuels and fossil fuels by ascribing a compliance value. There are several examples of this globally, one such is the Low Carbon Fuel Standard in California, USA.
- **Scope:** Aim for the broadest scope possible, ideally national. This allows innovation and project development where most effective. Subnational (States or regions) may be useful, but should complement a national approach.
- **Customised:** Policy should be customised to the unique resources, economic and social factors, political barriers and existing regulatory structure. There is no single path to successful SAF policy implementation.

Boeing supports the recommendations from the joint **CSIRO – Boeing Sustainable Aviation Fuel Roadmap**<sup>2</sup>, released by Minister Catherine King in August 2023, which has recommended time periods:

Immediate term to 2025:

- Consider policy frameworks and tools that support domestic distribution and use of certified SAF with clear long-term support strategy for industry.
- Encourage the signalling of local demand for SAF across government, commercial and defence users, giving investors certainty to establish new plants.
- Educate consumers on the role and benefits of SAF, building social license for investment and demand for fuels
- Invest in R&D to support emerging technologies and improve feedstock availability and sustainability understanding.
- Scale-up of biogenic SAF production in appropriate locations, increasing market supply and driving cost reductions.

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<sup>2</sup> <https://www.csiro.au/safroadmap>



#### Medium term 2025-2035:

- Scale-up second-generation biogenic feedstock collection and processing.
- Invest in research and development to reduce the costs and logistical hurdles for biogenic supply chains and continue scaling up of power-to-liquids demonstrations

#### Longer term: 2035+

- Develop large-scale production of power-to-liquids at several locations across Australia

**Boeing recommends concurrently developing SAF accounting mechanisms:** This includes exploring flexible SAF accounting mechanisms that can allow the environmental attributes of SAF to be detached from the physical fuel. Further, being able to recognise scope 1 and scope 3 SAF credits can encourage participation of the corporate sector in helping accelerate commercial deployment of SAF. **SAF accounting, including ‘book and claim’ is being developed globally including in ICAO’s Fuels Task Group and Boeing recommends the Australian Government actively contributes to shaping this discussion.** A flexible but robust SAF accounting mechanism could open opportunities for Australia to explore bi-lateral SAF agreements or ‘green trade lane’ opportunities

Under any scenario for the introduction of future advanced aircraft products with new energy carriers, we will need significant amounts of SAF in order to meet the civil aviation’s commitment to net zero by 2050. The aviation sector needs access to renewable and sustainable fuels, green hydrogen and abundant renewable energy to make available these diverse technology options.

As demonstrated with Boeing’s partnership with the CSIRO on the SAF roadmap<sup>3</sup> to chart a path to sustainable skies, feedstock must be allocated to the hard to decarbonise sectors and, in the ‘best use case’ for green hydrogen and renewable electricity, power-to-liquid represents the most promising long-term opportunity when applied to the development of SAF.

Advanced Technologies – Intersecting renewable energy carriers with advanced technology flying machines will enable a diverse portfolio of low carbon aviation solutions in the future. The future of flight will incorporate the latest digital design, test, and production tools, airframe innovation, propulsion and systems technology, and different power and energy solutions will apply to different market segments and aircraft sizes.

Alongside developing new propulsion and fuelling technologies, Boeing is partnering with NASA to develop a next generation Sustainable Flight Demonstrator<sup>4</sup>. The design incorporates a Transonic Truss Brace Wing which will significantly lower the amount of fuel required for flight. Boeing is also developing and maturing advance mobility technologies through Wisk<sup>5</sup>, a wholly owned subsidiary of The Boeing Company. Wisk is a fully electric, automated vertical take-off passenger aircraft.

## Aviation regulation and airspace<sup>6</sup>

Safe and sustainable growth of the aviation sector is contingent on an efficient and effective airspace system. Australia’s airspace system will continue to evolve to support growth in

<sup>3</sup> <https://www.csiro.au/safroadmap>

<sup>4</sup> <https://www.nasa.gov/directorates/armd/iasp/sfd/>

<sup>5</sup> <https://wisk.aero/>

<sup>6</sup> Responses in this section refer to specific sections of the Aviation Green Paper – including development of long-term airspace implementation plans – such as ADS-B (pg 134), Uncrewed Aircraft System Traffic Management (pg 169), and the impact of emerging aviation technology (pg 140).



existing aviation activities and support the introduction of new airspace users such as Uncrewed Aircraft Systems (UAS) and Advanced Air Mobility (AAM). A strategic approach, in conjunction with industry, to managing this evolution, is needed to maintain and enhance the safety, capacity, efficiency, resilience and sustainability of Australia's airspace system.

In this light, Boeing considers the current bilateral safety arrangements to be suitable but notes a need for review to ensure they continue to meet the changing needs of industry, in particular, reciprocal type acceptance/validation of UAS and AAM aircraft and associated equipment, and recognition of operational licenses.

Boeing welcomes the collective efforts of CASA, in collaboration with Airservices Australia, the Department of Infrastructure, and the Defence organisation, to develop a long-term strategic airspace implementation plan. To support this endeavour, we recommend this activity first define a long-term integrated operational concept for Australia's airspace system, the scope of which includes airports, airspace, operating rules, air traffic services, and wider infrastructure.

Industry can play an important role in supporting government in the development of this strategic vision and implementation plan. Boeing notes a current lack in formal industry engagement mechanisms for the provision of strategic-level input on airspace and Air Traffic Management (ATM). Boeing recommends industry should have an ongoing role in informing the development and review of Australia's strategic airspace and ATM plan. **Boeing recommends consideration of the formation of a representative industry body to ensure government has access to balanced industry advice on Government policy and decision-making concerning airspace, ATM and Unified Traffic Management (UTM).**

In relation to ensuring fair and equitable access to airspace, the continued growth in conventional air traffic, coupled with the addition of new airspace users such as UAS, AAM, very high-altitude aircraft, and sub-orbital and spacecraft, warrants a phased evolution of today's airspace operational concept. For example, the airspace management concept of UTM, while initially only applied to low altitude UAS operations, represents an important step in a transition towards a more integrated, digital, connected and automated airspace system for all airspace users into the future.

Planning the future airspace system access is a global challenge. To assist, **Boeing and Airbus jointly defined a high-level vision for the future airspace system.** This vision paper<sup>7</sup> has led to other global initiatives including the Complete Air Traffic System (CATS) Global Council initiative of the Civil Air Navigation Services Organisation<sup>8</sup> (CANSO). These and other initiatives may be of use to the Department, CASA, Airservices Australia, and Defence in their efforts to develop a long-term strategic airspace implementation plan for Australia.

Regarding potential mandates for ADS-B, Boeing strongly supports initiatives that seek to improve airspace situational awareness for the safety and efficiency benefit of all airspace users. Increasing the proportion of the Australian aviation fleet equipped with **Automatic Dependent Surveillance-Broadcast (ADS-B) and Electronic Conspicuity (EC) devices is a safety enhancement that will improve traffic awareness of Air Traffic Control (ATC) and operators (for appropriately equipped aircraft).** Greater airspace awareness will also

<sup>7</sup> "A New Digital Era of Aviation: The Path Forward for Airspace and Traffic Management." <https://storage.googleapis.com/blueprint/Airbus%20Boeing%20New%20era%20of%20digital%20aviation.pdf>

<sup>8</sup> The Complete Air Traffic System Global Council was launched by CANSO <https://canso.org/vision-for-the-skies-of-2045/>





contribute to the safe and timely integration of UAS into non-segregated airspace. For this reason, Boeing is supportive of measures that seek to increase ADS-B and EC equipage rates not only in Australia but globally.

Boeing recommends government consider stronger mechanisms to encourage equipage of not only ADS-B OUT and EC transmitters, but also ADS-B IN and the necessary equipment for the cockpit display of ADS-B and EC traffic information. The inclusion of ADS-B IN will provide added benefit of pilots having improved local traffic awareness, further enhancing the safety benefit of ADS-B OUT / EC transmitter equipage.

In relation to resourcing and cost recovery arrangements, Boeing welcomes the review of the resourcing model for CASA and other aviation agencies, such as the ATSB. There are a number of governments around the world endeavouring to address issues regarding the sustainable and resilient funding of aviation agencies.

A resilient resourcing model is needed to ensure the authority has the capacity and expertise to meet growing demand for regulatory reform and safety oversight in a timely manner. The most likely solution is a hybrid funding model comprising activity-based funding, cost recovery, core funding and appropriations. The balance across lines of funding will need to change to match with the authority or agency's strategic corporate plan and Government's direction (e.g., Minister's Statement of Expectations). Government-provided core funding should proportionately reflect the significant economic and social contribution a safe and prosperous aviation industry makes to Australia.

In responding to the question as to what government should consider when determining cost recovery arrangements it is important to remember that complete cost recovery can sometimes be an impediment to compliance, particularly if the cost of services is disproportionate to the particular sector's/applicant's ability to pay. Services/applications where there are elements of strategic cost (e.g., the development of new regulatory processes or systems to support new aviation activities) should not be borne entirely by industry, as it can sometimes serve as an impediment to both industry and agency innovation.

It is important that new resources be made available to CASA to enable it to meet new demands such as those presented by the growing UAS sector, and to ensure there is no detriment to the level of regulatory services and oversight provided to other aviation sectors or to strategic activities.

Boeing considers additional resourcing to be only part of the solution. CASA has made significant strides in its efforts to digitise, automate and streamline workflows, adopting more responsive regulation, exploring opportunities for administrative delegation, coordinating and sharing learnings with other authorities, and adopting risk-based entry control and oversight practices without detriment to safety standards. Boeing commends CASA for these initiatives and references CASA as a model for many other global authorities facing the same resourcing challenges.

Boeing supports CASA's use of Regulatory Sandboxes and 'Test and Learn' environments to work more closely with industry as a way to learn, explore, and expand solutions while maintaining safety. Regulatory Sandboxes and 'Test and Learn' environments support informed regulatory ecosystem development and a better understanding of the safety related risks associated with a particular innovation.



## Safety Data Sharing<sup>9</sup>

Boeing welcomes the inclusion of safety information sharing as a key policy area within the Green Paper, particularly noting calls by the United States' Federal Aviation Administration (FAA) for greater safety information sharing between nations, with the intent to further enhance global safety. Boeing reiterates its importance as a critical enabler to the continued enhancement of aviation safety in Australia, and in time, the region. The establishment of a safety information sharing initiative aligns with the Australian government's commitment to invest in data collection, analysis and implementation of risk mitigation (per Australia's Aviation State Safety Program); CASA's continuing effort to become a contemporary data-driven authority, and presents an opportunity to move towards a more proactive approach in managing aviation safety risk.

Boeing considers the current bilateral safety arrangements to be adequate but notes the potential need for review to ensure it continues to meet the changing needs of industry, in particular, reciprocal type acceptance / validation of UAS and AAM aircraft and associated equipment, and recognition of operational licenses.

Boeing makes specific reference to the Aviation Safety Information Analysis and Sharing (ASIAS) System in the US<sup>10</sup>, and the successful contribution it has made to furthering safety, safety regulation and the oversight of aviation in the US. Specific examples include the Wrong Runway Departures Study enabled by ASIAS and the use of ASIAS as a safety benchmarking tool in support of the State Safety Program (SSP) and operator-led safety management systems. Boeing notes that while Australia should look to leverage the experience of overseas programs, there is an opportunity to specifically develop a system that is fit for purpose for the Australian environment. Importantly, compatibility with international programs (such as data formats and policy to enable shared learnings) are essential.

As such, government and industry must jointly develop the policy and governance frameworks to ensure adequate oversight and controls are in place for the collection, storage, access, and appropriate use and distribution of shared data and safety information. Success requires a critical mass of participation, which in turn, is contingent on mutual trust between industry, government, regulatory authority, accident investigation boards and air navigation service providers.

Boeing welcomes the opportunity to work with government and other industry stakeholders to further advance this important national aviation safety initiative, with **suggested next steps being:**

- A statement of intention by Government and industry to establish a specific Aviation Safety Data Sharing Initiative in the White Paper
- Funding and support for the establishment of a government-industry steering committee to oversee the co-development of an initiative responsible for, but not limited to, capturing a joint vision and implementation roadmap, governance model, and resource and engagement plans.
- Opportunities to co-fund a pilot program to validate proposed frameworks, value and business case.

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<sup>9</sup> Response to questions posed by the Aviation Green Paper at pg 135

<sup>10</sup> <https://www.faa.gov/newsroom/aviation-safety-information-analysis-and-sharing-program-1>



## Emerging aviation technologies<sup>11</sup>

Boeing recognises the many advantages to the Australian aviation ecosystem and has invested accordingly through its local subsidiaries, Insitu Pacific and Wisk. Boeing shares the government's view that Australia is well placed to capitalise as an early mover in the emerging aviation sector and notes the national policy approach, forward leaning regulatory environment, existence of local technical capability and suppliers, and early market/use cases as some of the key drivers.

Boeing acknowledges Australia's early role as a world leader in fostering the uptake of the Remotely Piloted Aircraft Systems (RPAS) sector. Continued investment and partnerships with industry with a view towards the advancement of appropriate policies, safety regulations, airspace integration, as well as radiofrequency spectrum access and infrastructure is needed for Australia to be able to maintain its leadership and to realise new opportunities in emerging sectors such as AAM.

Boeing supports the whole-of-government, national and industry-collaborative approach being adopted by the Australian government towards the development of national policy relating to emerging aviation. This approach has the potential to give Australia a competitive advantage globally. Boeing thanks the government for providing industry the opportunity to contribute and welcomes the opportunity to discuss how this important Department-led work could be accelerated which is informed by world-leading collaborative industry programs.

For example Boeing and Wisk, in conjunction with Insitu Pacific, have been working with the New Zealand Airspace Integration Trials<sup>12</sup> programme, which is testing the operational integration of an uncrewed aircraft flying beyond visual line of sight (BVLOS) into controlled airspace, following instrument flight rules (IFR). In late November and early December 2023, the trials programme were undertaken near **Christchurch, New Zealand, involving a UAS fully integrated into Class C controlled airspace – alongside crewed aircraft – and operating under instrument flight conditions**. The program has been a culmination of over two years of investment in co-developing appropriate safety and approvals processes with various regulators and the New Zealand Air Navigation Service Provider (ANSP) and is exploring airspace integration concepts (in real conditions) to contribute towards a shared goal of integrating autonomy into controlled airspace by 2030.

Boeing makes specific reference to the efforts of CASA in developing "The RPAS and AAM Strategic Regulatory Roadmap", which was released in 2022. Since the release of CASA's RPAS and AAM roadmap, EASA has released Opinion No 03/2023<sup>13</sup> and the FAA has developed an AAM Implementation Plan<sup>14</sup> (i.e., Innovate28). These plans put forward the establishment of potential regulatory frameworks to address innovative UAS concepts such as UAM/AAM, eVTOL UAS and certification. Boeing welcomes the opportunity to work with CASA and other agencies in providing recommendations in reviewing and refreshing the existing RPAS and AAM Strategic Regulatory Roadmap, emphasising the importance of addressing key areas including autonomy.

Boeing commends the recent aviation industry workshops with the Australian Communications and Media Authority (ACMA) in addressing spectrum requirements and planning for the emerging aviation sector and encourages ongoing engagement in this area.

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<sup>11</sup> Recommendations in this section refer to pg 158 from the Aviation Green Paper

<sup>12</sup> The programme is a four-year, world-first program to ensure airspace systems maintain exceptional levels of safety while balancing aviation advancements, community expectations (social and environmental), and realising economic benefits. More information can be found at <https://www.mbie.govt.nz/assets/airspace-integration-trials-programme.pdf>

<sup>13</sup> <https://www.easa.europa.eu/en/document-library/opinions/opinion-no-032023>

<sup>14</sup> <https://www.faa.gov/air-taxis/implementation-plan>



The growth in network enabled technologies and solutions in the aerospace sector place a very high demand on the already saturated and finite spectrum resource. In a similar way to airspace, Boeing would also like to emphasise the importance of maintaining equity in, and cost-effective delivery of, spectrum access for both safety applications and general payload communications.

## Future industry workforce<sup>15</sup>

Boeing has developed strategic alliances with several Australian universities to develop a skilled and fit-for-purpose workforce for the aviation industry. By partnering with universities, Boeing is able to inform the key skill needs and capture talent at the graduate and postgraduate levels. However, there remains shortages in key technology skill areas across commercial, defence and space environments including in software, modelling and simulation, human factors, robotics, autonomous systems and artificial intelligence, power and electrical systems, space and satcom, and cyber-worthiness.

Beyond formal arrangements with Australian universities, the Government's 2022 Skills Priority List<sup>16</sup> from the National Skills Commission highlighted a number of occupations which are experiencing shortages, particularly in the aviation industry. Specific examples include engineers, maintenance personnel, air crew, support staff, and ground crew. In the near to medium term, Boeing anticipates increased demand for demand for pilots, cabin crew, engineers, technicians, ground support, and air traffic controllers to support expected continuation of aviation industry growth.

Boeing Aerostructures Australia in Melbourne is embarking on an apprenticeship program to foster talent through a dedicated woman in aerospace program which is growing the number of females in manufacturing. The apprenticeship pipeline program is open to all genders and focusses on a range of skills which are required to design and build aircraft structure, including aerospace roles, as well as specialist tooling such as CNC machining.

Australia's regions empowered through new skills and qualification routes will be critical to ensuring a robust future workforce. This includes upskilling opportunities for existing workforce participants to meet the unique technical and engineering demands of the emerging aviation industry. Specific formal skills sought include aerospace engineering, manufacturing and mechanical engineering, materials engineering, mechatronics, software, artificial intelligence, and automation engineering; while formal skills are also needed in aerospace trades as well as quality and inspection trades. **Government programs and incentives can be implemented through institutions such as TAFE for individuals to explore these skills in educational settings and employers to facilitate upskilling.**

New pathways to accelerate training are required, as is a concerted effort to encourage school leavers to join a trade. Further, a concerted focus on non-traditional entrants is also needed to encourage women and indigenous workers to consider aircraft maintenance as a career. Recently two important reports<sup>17</sup> have been published providing potential roadmaps to continue to connect and integrate related initiatives which are related across the aviation sector.

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<sup>15</sup> This section is to address opportunities of working with government to help position aviation as an employer of choice by signaling key areas of focus from pg 180 of the Aviation Green Paper.

<sup>16</sup> <https://www.nationalskillscommission.gov.au/topics/skills-priority-list>

<sup>17</sup> Engineers Australia: *Women in Engineering Report*

<https://www.engineersaustralia.org.au/sites/default/files/women-in-engineering-report-june-2022.pdf>

Department of Infrastructure, Transport, Regional Development, Communications and the Arts - *Women in the Aviation Industry Initiative*: <https://www.infrastructure.gov.au/infrastructure-transport-vehicles/aviation/women-aviation-industry-initiative>



In addition, Boeing refers government to an international discussion paper titled “Promoting Gender Equality and Supporting the Development of Next Generation of Aviation Professionals (NGAP) in Asia Pacific”<sup>18</sup> as presented by India, the United States of America and the International Coordinating Council of Aerospace Industries Associations (ICCAIA) at the 58<sup>th</sup> Conference of Directors General of Civil Aviation Asia and Pacific Regions in October 2023.

Boeing recommends consideration of the development of specific policies to ensure a sustainable pipeline of workers by both targeted migration but also through the education and skills system such as accelerated vocation pathways and the development of specific new talent pathways. Further, Boeing recommends arrangements with training colleges need to be developed and matured to create programs which train future technologies to ensure workers are future ready (this includes software-based systems and repair of robotic manufacturing equipment).

### **International aviation<sup>19</sup>**

Boeing recognises the important role the government has played in the advancement of the safety and regulatory outcomes in the region and globally, through bodies such as ICAO. Boeing acknowledges the challenges in the region, particularly those faced by Pacific nations and developing states (termed by the United Nations as Pacific Small Island Developing States or PSIDS<sup>20</sup>). We recognise the support the government provides to these nation states directly and through initiatives like Pacific Aviation Safety Office that complement industry-driven efforts. The Government may wish to consider the following region-specific recommendations:

- Increased material and technical support to assist Pacific Aviation Safety Office in building its capability in support of PSIDS.
- Renewed participation and direction on the Cooperative Development of Operational Safety and Continuing Airworthiness Programme – South Asia (COSCAP-SA) and Cooperative Development of Operational Safety and Continuing Airworthiness Programme – South East Asia (COSCAP-SEA).
- Continuation of Australian support for Asia Pacific Regional Aviation Safety Team (APRAST) and the Regional Aviation Safety Group Asia and Pacific Regions (RASG-APAC).

Boeing Australia participates as a member of Australian Government delegations and as an industry sector member in regional and international spectrum regulatory forums including the Asia-Pacific Telecommunity and the International Telecommunications Union’s (ITU) Radiocommunication Sector and World Radiocommunication Conferences. Our participation promotes new spectrum opportunities for domestic, regional and global harmonised spectrum while ensuring protection of existing aviation allocations from competing radiocommunication services. New spectrum access is increasingly important to support evolving aviation applications.

Boeing would welcome relevant government agencies including the Department of Infrastructure, Transport, Regional Development, Communications and the Arts and the ACMA, to continue to be cognisant of the critical spectrum requirements of domestic and global aviation and proactively engage directly with industry to support these objectives.

<sup>18</sup> DGCA 58/DP/1/04 - [https://www.dgca58.gov.bd/assets/document/58-DP-01-04\\_IND-USA-ICCAIA\\_231013\\_PROMOTING\\_Ge.pdf](https://www.dgca58.gov.bd/assets/document/58-DP-01-04_IND-USA-ICCAIA_231013_PROMOTING_Ge.pdf)

<sup>19</sup> Aviation Green Paper pg 191

<sup>20</sup> <https://sdgs.un.org/statements/pacific-small-island-developing-states-psids-11452>



## Conclusion

Boeing is proud of our long aviation partnership with Australia. From important beginnings in 1927 to leading the world in Australian designed and built autonomous platforms, to critical collaborations with Australia's leading scientific organisations in mapping out practical policy approaches to address the challenges of net-zero aviation and autonomous aircraft operations. In looking to addressing the policy challenges of today for tomorrow, Boeing looks forward to our continuing partnership with Australia in leading the aviation world together.