AAM

INDUSTRY VISION AND ROADMAP

AAUS

Contents

Introduction

We are in an era of rapid innovation.

Increasing digitisation, automation, electrification, and connectivity coupled with ongoing advancements in materials and manufacturing processes are creating all new possibilities for aircraft design and concepts of operation.

Advanced Air Mobility (AAM) is an emergent aviation sector that makes use of advancements in electric propulsion systems and novel aircraft designs capable of Short or Vertical Take-off and Landing (STOL / VTOL) to offer safer, cleaner, quieter and cheaper mode of air passenger and freight transportation.

Recognising the immense opportunity and benefit of the AAM sector to Australia, the Australian Federal[1] and State[2] and some Local Governments[3] have made a commitment to fostering the development of a local AAM ecosystem.

The Australian emerging aviation industry, represented by the Australian Association for Uncrewed Systems (AAUS), is committed to supporting Government in these important policy development and investment initiatives. Acknowledging the diverse and constantly-evolving nature of industry requirements, AAUS has undertaken to coordinate an all-of-industry position to guide Government in these efforts. This document represents industry's consolidated view of the future of the AAM sector, the challenges ahead, and the joint industry and Government activities required to address them.

[1] National Emerging Aviation Technologies (NEAT) Policy Statement, May 2021
https://www.infrastructure.gov.au/sites/default/files/documents/national-emerging-aviation-technologies-policy-statement.pdf

[2] Advanced Air Mobility in Victoria, Industry Vision Statement, August 2022
https://www.invest.vic.gov.au/opportunities/advanced-air-mobility

[3] South East Queensland Council of Mayors
https://seqmayors.qld.gov.au/news/advanced-air-mobility-presents-opportunity-to-bring-economic-social-and-environmental-benefits-to-south-east-queensland-20230203

1.1 How this Vision and Roadmap was developed

The development and oversight of the AAM Vision and Roadmap was led by the AAUS AAM Working Group. The contributing Working Group members, listed in Appendix B, represent a broad cross-section of the AAM Ecosystem, providing a holistic viewpoint on the future, the challenges, and the needs of the Australian AAM industry. AAUS acknowledges and thanks the working group members for their valuable contributions.

In addition to the input and expertise of the Working Group, AAUS has collected broad input from two national AAM Summits (2022 and 2023), reviewed relevant national and international published material, and drawn from its ongoing participation in national policy and regulatory development and consultation forums.

It is important to note that this document represents the consolidated views of industry, and does not reflect the view or position of any single contributing stakeholder or organisation they may represent.

AAUS would like to acknowledge Natasha Santha and the team from L.E.K. Consulting who played a pivotal role in the development of this document. AAUS valued the time and expertise L.E.K. kindly donated to this initiative, and would like to thank the entire team from L.E.K. Consulting for the energy, creativity and for their collaborative approach in working with industry to help produce this landmark document.

1.2 Who is AAUS

Founded in 2009, the Australian Association for Uncrewed Systems is Australia's oldest and largest industry advocacy group for uncrewed systems and the emerging Advanced Air Mobility (AAM) sector.

AAUS is a not-for-profit organisation, which represents the drone and AAM industry across three domains: land, sea, and air. AAUS' objective is to promote a safe, professional, and commercially viable uncrewed systems and AAM industry.

AAUS achieves this through its industry advocacy and promotion, education and outreach, and networking activities. AAUS provides a single representative voice for the full breadth of the uncrewed system and AAM industry.

AAUS' 4,000 members span small-to-large enterprise, manufacturers, licensed and unlicensed operators, training providers, academic institutions, Government, and other supporting technical and professional services in the Australian uncrewed systems and AAM industry.

Want to know more?

www.aaus.org.au

1.3 Who is L.E.K. Consulting

L.E.K. Consulting is a global strategy consultancy that uses deep industry expertise and rigorous analysis to help business leaders achieve practical results with real impact.

We are uncompromising in our approach to helping clients consistently make better decisions. We advise and support global companies that are leaders in their industries, including the largest private and public sector organisations, private equity firms, and emerging entrepreneurial businesses.

Since 1983, our worldwide practice – spanning the Americas, Asia-Pacific and Europe – has guided leaders across all industries, from global corporations to emerging entrepreneurial businesses and private equity investors.

Looking for more?

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What is Advanced Air Mobility (AAM)?

Advanced Air Mobility (AAM) describes a new transportation ecosystem for the movement of people and freight by air in urban and regional areas, and the provision of services, utilising novel electric or hybrid-electric aircraft capable of vertical take-off and landing (VTOL) or short runway take-off and landing (STOL) operations.

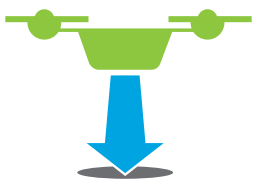
The Civil Aviation Safety Authority (CASA) describes AAM as comprising *a range of aircraft types (both crewed and uncrewed) which will transport passengers and larger freight*[4], with the CASA Emerging Technologies Program[5] further describing AAM aircraft as:

> *... vehicles not propelled using traditional hydrocarbon fuel sources and capable of carrying passengers using either:*

01

VTOL

Vertical take-off and landing

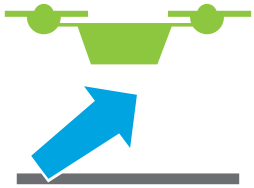


OR

02

STOL

Short runway take-off and landing



AAM vehicles may focus on battery electric power as a fuel option, but some may use hybrid or hydrogen fuel. The term AAM includes:

01

UAM
Urban Air Mobility

for very short intra-city journeys

AND

02

RAM
Regional Air Mobility

short to medium range journeys between distributed population centres

AAM utilises aircraft with advanced technologies that have the potential to be zero emission. They include all-electric or hybrid-electric aircraft that are capable of vertical take-off and landing aircraft (VTOL) or short take-off and landing (STOL) aircraft.

A critical differentiator lies in autonomy. AAM aircraft will span highly automated conventionally piloted aircraft (with a human pilot situated on board) through to self-flying aircraft supervised by a remotely located crew. Autonomy enables AAM operations at scale; reducing the complexity of the human piloting task, enabling concurrent operations[6], and strengthening the business case for AAM in an expanding array of civil, defence and commercial use cases.

[4] The RPAS and AAM Strategic Regulatory Roadmap (2022)
https://www.casa.gov.au/sites/default/files/2022-06/the-rpas-and-aam-roadmap.pdf

[5] CASA Emerging Aviation Technologies - Roadmap
https://www.casa.gov.au/resources-and-education/publications-and-resources/corporate-publications/emerging-technologies-program/advanced-air-mobility-aam

[6] Concurrent operation describes the situation where a remotely situated human crew simultaneously supervises the operation of multiple self-flying AAM aircraft.

2.1 What is an AAM Ecosystem?

AAM is more than just new and novel aircraft designs - it is a transportation system that is enabled by new technologies and is integrated into multi-modal transport networks.

The AAM industry ecosystem is comprised of many stakeholders including:

Airspace Users

The incumbent users of Australia's airspace system. AAM services will need to operate safely and efficiently alongside existing airspace users, which span light sport aviation to scheduled commercial passenger and freight operators.

AAM Pilots

The people trained and licensed to operate an AAM aircraft either conventionally (as a pilot situated on-board the aircraft) or remotely.

AAM Operators

The individuals and organisations approved to privately fly or provide commercial AAM services.

AAM Manufacturers

The approved individuals and companies who design and produce AAM aircraft or components. They are part of the domestic and international supply chain for the AAM industry.

AAM Maintainers

The individuals and organisations approved to provide (or oversee) the maintenance and repair of AAM aircraft and associated aviation products.

Operational Support Services

Describes an array of people and organisations who provide ancillary services including ground services (e.g., vehicle ground handling, passenger & baggage), and supply (e.g., catering, security) in support of AAM operations.

Government

The Federal, State and Territory, and Local government bodies and associated Departments and agencies responsible for defining and implementing policy. This includes land use planning and investment.

Property Owners and Developers

The owners of the land and property used to support AAM operations (e.g., vertiport sites).

Standards Development Organisations

Technical standards development organisations developing consensus standards and industry best practices.

Transport Network Stakeholders

The owners and operators of the multi-modal transport and logistics systems into which AAM services must integrate (e.g., airport, maritime port, city bus and rail service providers).

Education and R&D

Vocational and higher education and research organisations needed to drive sector innovation and support workforce needs.

Training Providers

Individuals (instructors) and organisations approved to train AAM pilots, technicians, engineers, and operational crew.

Airservices Australia

Australia's Air Navigation Service Provider (ANSP) – responsible for the safe and efficient management of Australia's airspace.

Provider of Services to AAM

An approved organisation that provides a range of data and automated services in support of safe, efficient, secure and compliant AAM operations.

Australian Transport Safety Board (ATSB)

Australia's aviation accident investigation authority.

Civil Aviation Safety Authority (CASA)

Australia's national airworthiness authority responsible for the safety regulation and safety oversight of civil aviation.

End Users

The sub-set of the Australian Public and organisations who utilise, or directly benefit from the use of, AAM operations. For example, a fare-paying passenger, carried patient, recipient of AAM freight, etc

Digital Service Providers

The organisations providing the telecommunications, digital data products, digital assurance, and connectivity solutions needed for safe, efficient and secure AAM operations.

Energy Utility Companies

The providers of the necessary energy infrastructure for the safe and sustainable generation, transport, storage and distribution to AAM (e.g., green power companies, hydrogen).

Vertiport Owners and Operators

The organisations who design, build, own and/or operate vertiport infrastructure.

Professional Services

The legal, finance, insurance, risk, auditing, and technical consultancies that specialise in services to the AAM sector.

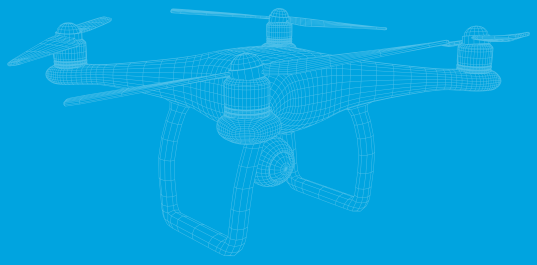
2.2 What are the potential use cases?

AAM aircraft will offer new, complementary, and, sometimes, competing services to existing transport modalities. The scope of use cases will progressively expand with improvements in AAM aircraft performance, industry scale, and and the reduction in procurement and operating costs.

While much attention is given to the use case of high frequency urban transportation of passenger and freight, AAM have a much broader range of potential use cases.

There are ten broad categories of use case for AAM:

Differences in the demand drivers and challenges will mean that these use cases won't be realised all at the same time. Further, the roll out of AAM uses cases is likely to differ from other countries due to use case drivers unique to Australia.



Private

AAM aircraft for private non-commercial use, recreation and sport

Aerial Work

Applications in agriculture, farming, media, survey, infrastructure maintenance and construction

Public Services

Including aerial firefighting, search and rescue, law enforcement, air ambulance and environmental management

Defence

Broad applications spanning reconnaissance, forward logistics, to casualty evacuation

Freight

Middle mile or high value delivery of freight by air

Tourism and Charter

Sightseeing, charter, and ecotourism flights

Experiential

Air shows and flight demonstrations

Training

AAM aircraft used for flight crew training

Urban Passenger Transportation

The transportation of fare paying passengers in urban and semi-urban areas, typically over short distances and at high tempo

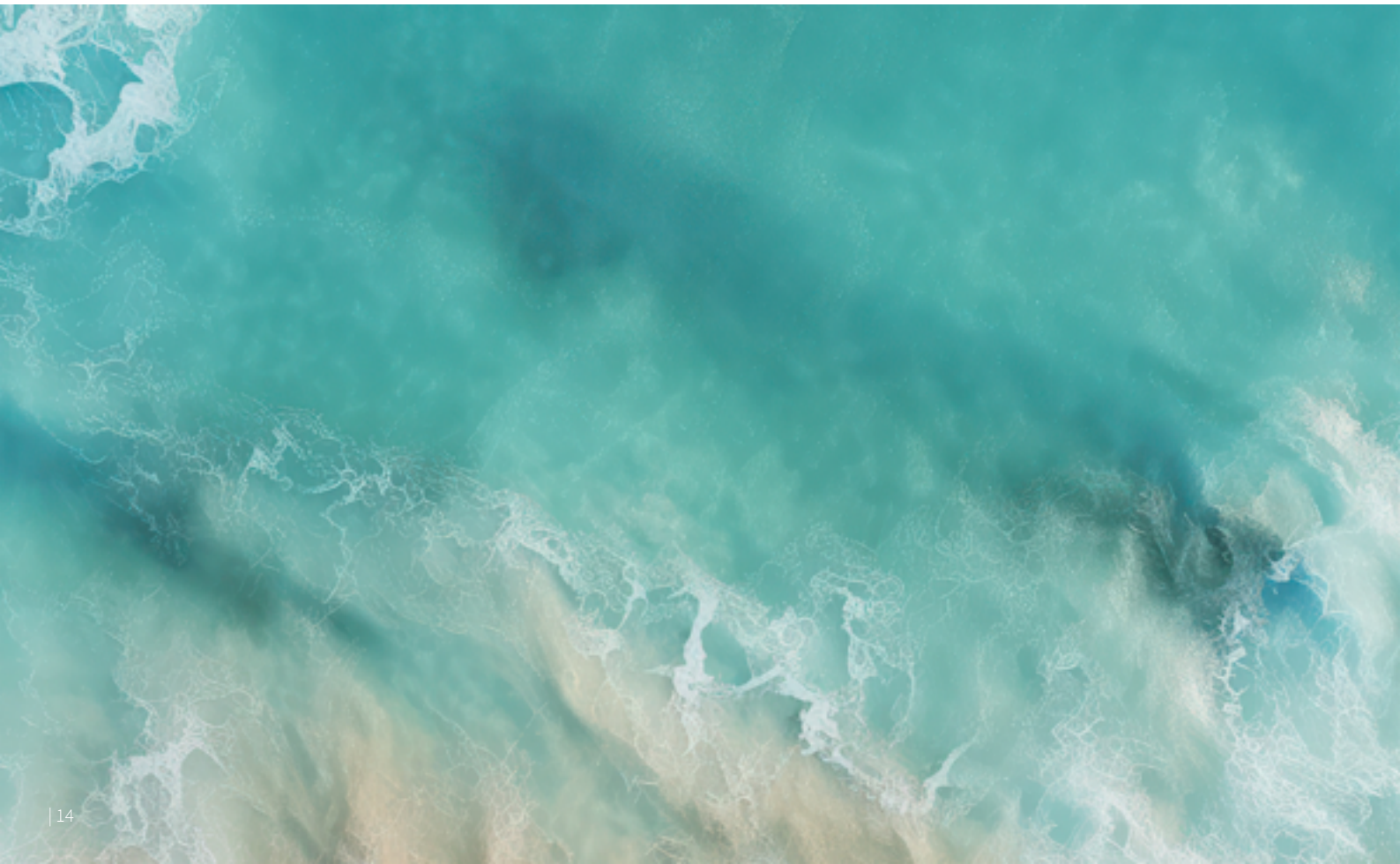
Regional Passenger Transportation

Longer range transportation of fare paying passengers, connecting regional to urban centres, and creating regional hubs

2.3 What can AAM Deliver?

There are triple bottom line (economic, social and environmental) benefits to the realisation of the AAM sector that extend far beyond those associated with the services they provide. These include:

	Upstream	Operational Services	Downstream
Economic	• Job creation in manufacturing and supply chains • Foreign investment • Export opportunities	• Job creation • Commercial economic activity / development (wealth generation, revenues, tax)	• Induced industry efficiency & productivity gains • Reduced required land infrastructure expenditure
Social	• Employment opportunities	• Safer & efficient transport options • Enhanced community services • Expansion of transport networks / coverage and accessibility to services • Reduced traffic congestion	• Service benefits (e.g., improved medical outcomes)
Environment	• Demand for green energy	• Noise and emission reductions	



2.4 Demand drivers for the uptake of AAM Services

There is an array of potential drivers for the adoption of AAM use cases. The attractiveness and viability of use cases is unlikely to be determined by economic factors alone. Further, the relative importance of use case adoption is likely to change over time. For example, novelty will be a key driver in many early use cases.

Less Expensive

- To own and operate
- To maintain

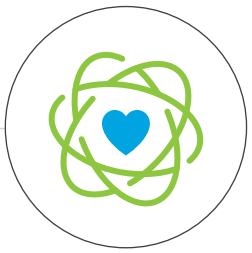
Safer

- Fewer moving parts & distributed propulsion systems
- Commercial aircraft safety standards
- Automated safety systems

Reduced Community Impact

- Quieter
- Less visible
- More environmentally sustainable

Social Values



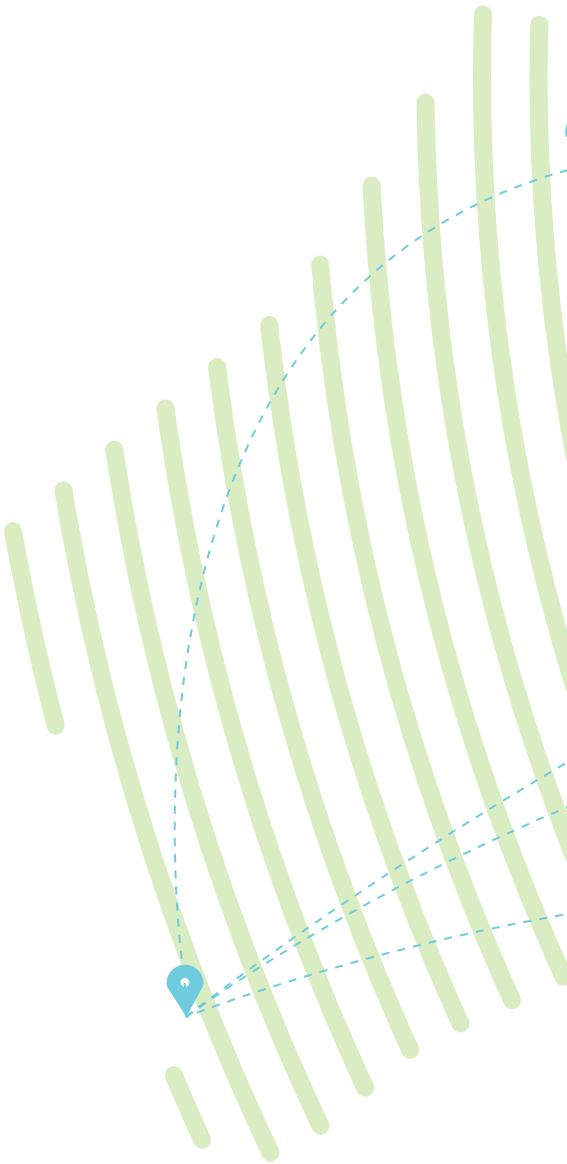
- Broader community benefit
- Novelty
- Status and prestige
- More scenic

Performance of Services

- Faster
- More dependable (predictable and reliable)
- High availability
- More secure / privacy
- Ease of integration (transfer between modalities)
- Unique connections / destination

Why Australia?

3.1 What are the drivers for AAM in Australia?

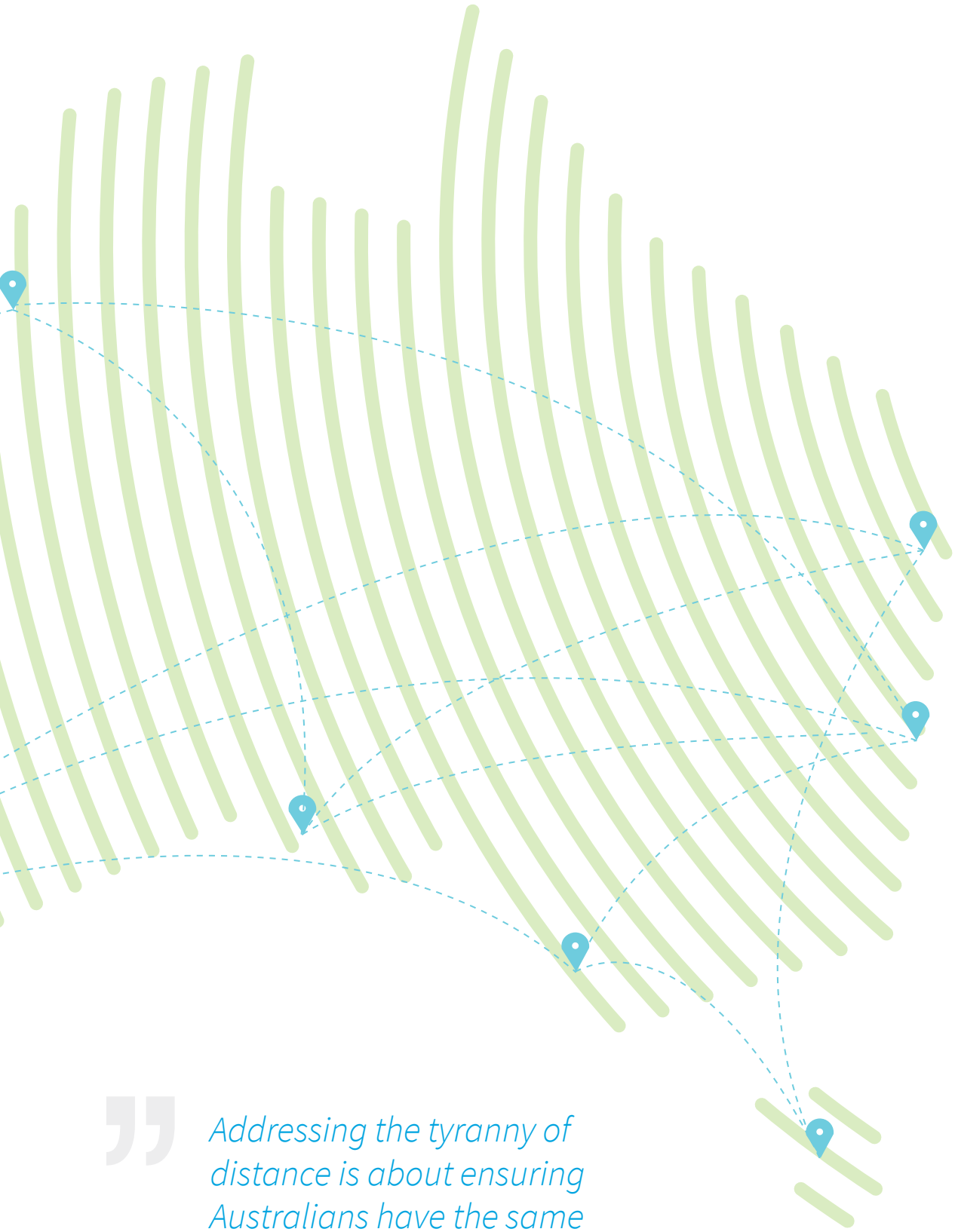


Addressing the "tyranny of distance" - a compelling and enduring challenge for Australia

- Australia has a relatively small population distributed over a vast geographical area. Our GDP is not proportionate to our land area and consequently, it is not practical nor economically possible to establish and maintain the necessary land-based infrastructure needed to connect all Australians.
- This has significant economic and social impacts felt most by our regional and remote communities through increased living costs and reduced access to essential services like healthcare and education.
- It also impacts regional industry in terms of higher costs, reduced market and supply chain access, and challenges in attracting and retaining a skilled workforce.
- Addressing the tyranny of distance is about ensuring Australians have the same opportunities and access to services regardless of where they live in the country.
- Australians are impacted by poor connectivity through a lack of diverse transport options, which can lead to increased traffic congestion. Traffic congestion is estimated to cost the Australian economy nearly $27.5 billion[7] per year , and that cost is expected to grow to more than $37 billion in 2030 despite continued annual investment in transport infrastructure to the order of $33 billion per year[8] .
- As such, we are compelled to explore opportunities across all three transport domains of land, sea and air that can improve the connectivity of our communities.

[7] BITRE: https://www.bitre.gov.au/sites/default/files/is_074.pdf

[8] Infrastructure Australia



Addressing the tyranny of distance is about ensuring Australians have the same opportunities and access to services regardless of where they live in the country

Sustainability Commitments

Through the use of green energy sources, AAM offers a sustainable and zero-emission means transportation that can contribute towards our national commitment to attaining net zero emissions[9].

Service Demand

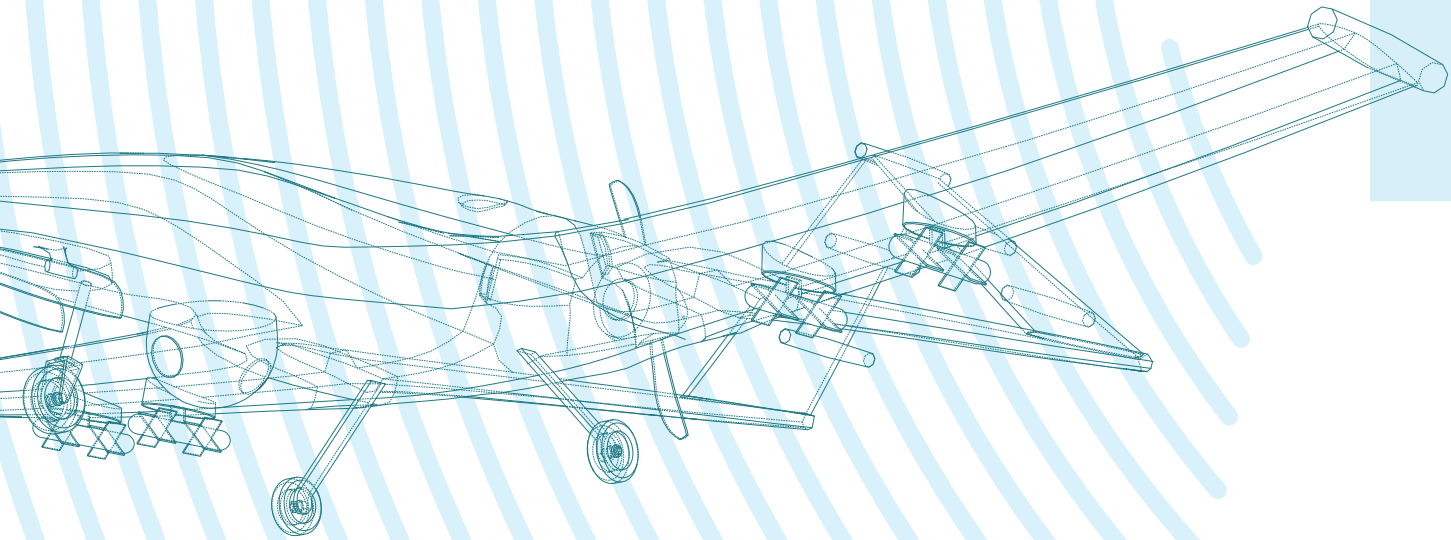
Aviation already plays an important and essential role in the provision of critical services to Australia's communities like firefighting, law enforcement, search and rescue, and air ambulance. However, due to high procurement and ongoing lifecycle costs, they are limited and highly utilised assets. AAM aircraft, at scale, are expected to be cheaper to procure and maintain than conventional aviation types, providing an opportunity for the expansion of critical services in complementary roles.

Safety Enhancement

Australia has developed a proactive and healthy culture for the continued enhancement of safety – our Workplace Health and Safety Legislation being a great example of this. We are morally and legally compelled to continually explore new ways to reduce the risk to our workers and communities through the adoption of new technologies, processes and best practices. This will be a driver for the uptake of AAM in Australia, which is expected to offer a safer mode of transport to some existing land and air alternatives.

Fleet Renewal

There are number of pressures driving general aviation fleet renewal in Australia. We have a relatively high average aircraft age of 36.6 and 20.6 years (fixed and rotary wing, respectively)[10]. Increasing maintenance and fuel costs, safety, community noise and a transition to more sustainable fuels are motivators for owners and operators to explore modern, safer and more cost-effective aircraft types.



There are numerous compelling drivers for the uptake of AAM in Australia

'Net zero emissions' refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere (Climate Council)

Australian Aircraft Activity 2020, Bureau of Infrastructure and Transport Research Economics (BITRE).
https://www.bitre.gov.au/sites/default/files/documents/australian-aircraft-activity-2020.pdf

3.2 Australia's Competitive Advantages

Australia is not alone in its pursuit to realise AAM, however we have some unique advantages:

Big But Not Too big

Australia has everything it needs to be a global first mover in AAM. At the same time, we are a relatively small and collegiate stakeholder group that once directed, can be fast and agile.

Capable Authority

We have a mature, capable and forward leaning aviation safety regulator - the Civil Aviation Safety Authority (CASA). CASA is internationally respected and has in place a regulatory framework for the efficient import and export of aviation products and services and other AAM operational regulatory requirements.

Uncongested Airspace

Compared to other nations, Australia's airspace is an under-utilised resource, particularly uncontrolled airspace away from major city centres.

Benign Operational Environment

Compared to other nations, some locations in Australia offer a relatively benign airspace operating environment that does not experience the extremes in temperature and weather more frequently experienced in some countries.

Airspace Navigation System

Australia has one of the most modern Air Traffic Management systems in the world. Foundational building blocks are already, or soon to be, in place. Work to develop digital services to support a data driven, connected, automated and integrated airspace environment is already underway.

Design and Manufacturing

Australia has a long history in the design, production and export of high-quality aircraft and aviation products. This capability is enabled by our investment in advanced manufacturing infrastructure and a highly skilled workforce.

R&D Capability

Australia has internationally recognised research intuitions, many top-ranked in the fields of engineering and aviation. This is combined with favourable tax incentives for research investment, flexible Intellectual Property (IP) conditions, and opportunities for co-funding through grants.

Aviation DNA

Aviation is in Australia's blood. We are home to the world's oldest airline and have a long history in aviation innovation. Aviation has played a critical role in shaping who we are today and who we will be into the future.

Engaged Private Sector

Our private sector industries are ready and keen to support the development of the industry. Some existing helicopter and fixed wing operators have already placed orders for AAM aircraft. The property industry has also shown interest in vertiport development.

Industry's Vision for AAM in Australia

Our goal is to enhance the connectivity of all Australians through the realisation of a new, safe, sustainable and accessible air transportation system – Advanced Air Mobility (AAM).

Safe

Delivers the highest standard of safety and exhibits a culture that stridently pursues the enhancement of safety.

Secure

Ensures the safety and privacy of service users.

Sustainable

Is net zero not only in its operational services but across the entire product lifecycle and industry value chain.

Accessible

Provides services that are inclusive and available to the entire community.

Integrated

A synergistic component of existing multi-modal transportation and infrastructure systems. They will complement and expand our existing transportation networks.

An
sust
delive
exce
co

Enhancing connectivity is more than the movement of people between places, it's about improving all Australians access to essential services, their connection to each other and our natural environment.

Our goal is to realise an AAM industry that is characterised as:

Innovative

Pursues continual improvement through innovation

Valued

Delivers benefits recognised and valued by the Australian community.

Compatible

Australian AAM environment will be compatible with global solutions.

Viable

industry that it is tainable, one that ers benefits that far eed the associated sts and impacts.

Diverse and Inclusive

A sector that values and pursues greater diversity and inclusivity as core to its mission.

Supportive

Enhances and makes the aviation industry more resilient, stimulating demand and creating new jobs in the sector and utilising many of our existing aviation assets.

Industry's mission is to foster the safe deployment and growth of an AAM sector – a new mode of transport – to the social, economic and environmental benefit of all Australians.

The AAM industry must meet and continually balance community and broader stakeholder expectations in relation to:

Intrusion

Minimising noise and visual intrusion of operations on the community

Privacy

Values and protects an individuals' right to control the collection, use, and disclosure of their personal information.

Equity

Ensuring benefits and any impacts are balanced fairly across stakeholders and that the needs of all stakeholders are treated equally.

Leveraging our strengths, our strategy is to position Australia as a world leader in the development of a fit-for-purpose ecosystem that supports the early implementation and evolution of AAM.

Australia will offer the world's most favourable ecosystem for early operation and widespread adoption of AAM.

This strategy positions Australia to capitalise on the benefits of early adoption.

The AAM industry will deliver immense triple-bottom-line benefit (social, environmental and economic) to Australians.

Experience gained through early adoption and operation will become our competitive advantage, allowing us to quickly evolve regulations, business and operational models, products and use cases – enabling Australia to step beyond the products and progress of international efforts and be a significant global influence in the shaping of the emerging AAM sector.

Australia has the opportunity to be world leading in the realisation of regional air mobility.

The tyranny of distance is a compelling motivator for the adoption of AAM in Australia. The alignment of beneficial use cases with low complexity operating environments makes regional air mobility a strong use case for AAM in Australia. This use case will only become more compelling as AAM aircraft performance improves. While other nations focus on the urban environment, Australia has the opportunity to lead the world in the development of regional air mobility capability and the ecosystem to support it.

Australia will support a sovereign AAM design and manufacturing capability.

Australia will design and produce high-quality, high-value AAM inputs targeted to niche domestic and international markets.

Australia will design and produce high quality components that will form part of both the domestic and foreign AAM manufacturer supply chains and will have domestic final assembly, engineering, maintenance and training capability.

Australia will be an early exporter of Australian AAM services.

Australia will be part of a global AAM transportation services market. Australia will not only import but also export AAM products, skills and capability to international markets. Australia will be a leader in the development of commercial models utilising public and/or private land to build and operate vertiports.

Our first mover experience and established world class education and flight training sectors will offer high quality and internationally sought-after training in AAM operations, engineering, maintenance and support – building our knowledge export capability.

First mover advantage will provide a competitive edge for Australian businesses across the entire AAM value chain to pursue opportunities in international markets.

Australia will develop and sustain a skilled workforce spanning engineers, pilots, trainers, maintainers, to customer service providers.

The AAM industry will offer a new career pathway into the broader aviation sector. New employment opportunities in skilled vocations such as piloting (conventional and remote), engineering design and maintenance, ground handling, passenger services, flight operations, and business services.

AAM will attract a diverse workforce, and through a flexible training and licensing framework, provide a new entry-point for a long term career in the aviation sector.

Australia will support a healthy and commercially competitive domestic AAM transportation services market

Fair commercial competition is essential to service, quality, capacity, innovation, affordability and accessibility of services.

4.1 What are the risks?

There are risks associated with this strategy:

First Mover Risks

There are likely to be a small number of operators in Australia who will establish a precedent in the early development of the industry. There is a risk that these early movers will establish ecosystem settings that are not in the long-term interests of the broader industry. The safety, social and professional conduct of first movers can have a long-lasting impact on industry growth.

Perception of "pie in sky"

There is a risk of industry setting unrealistic expectations with stakeholders of a "Jetsons[11] future", including Government, investors, regulators and the public, which can have impacts in terms of damage to industry reputation, stakeholder trust, and in turn, prioritisation and investment.

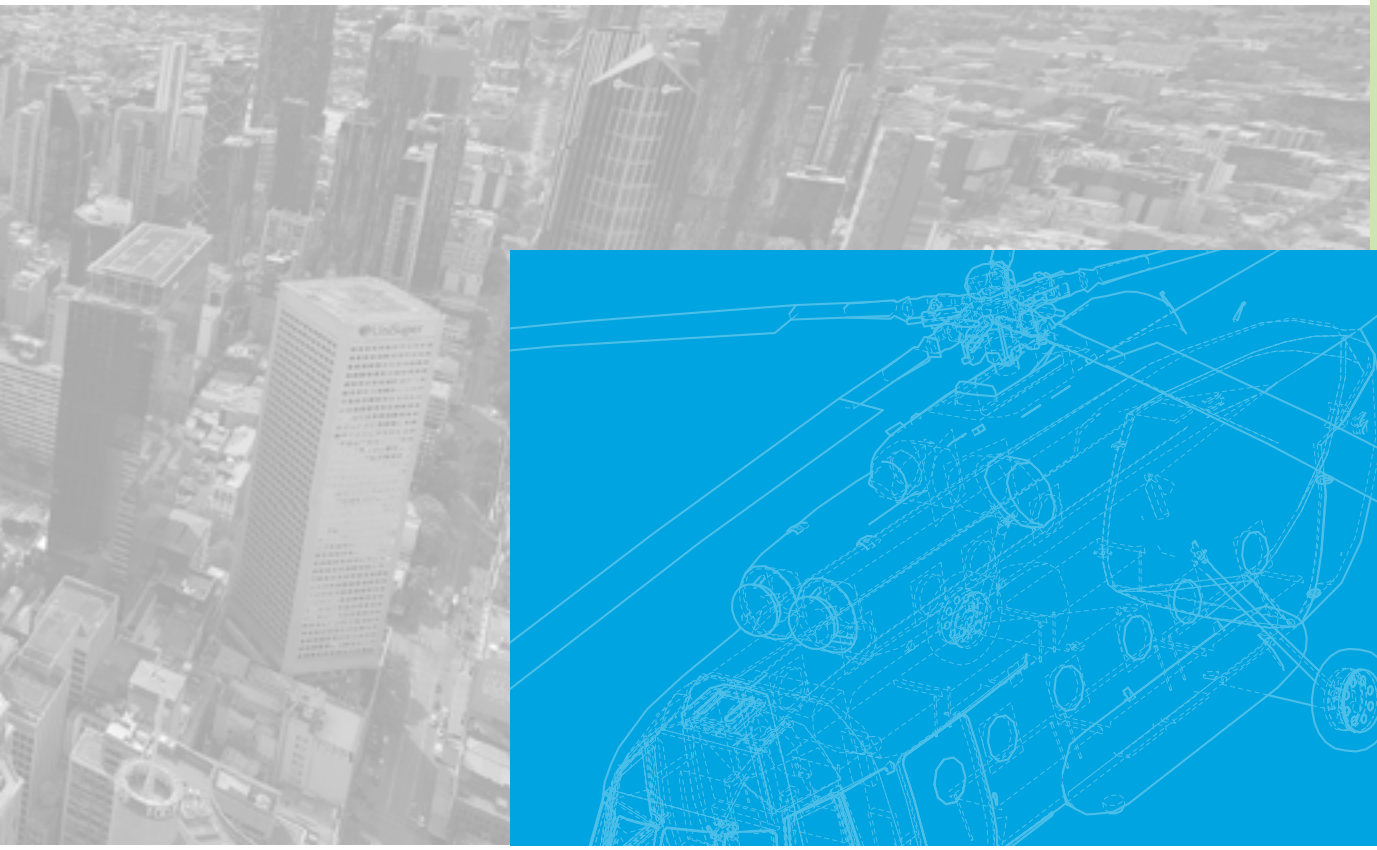
Dilution

While there are advantages to being small, there are also risks. There is a risk of diluting what limited investment and support is available due to competition and spreading too thinly, but also due to a lack of coordination across industry.

Too slow to put our hat in the ring

Australia is competing on an international stage. AAM manufacturer order lists are already growing, and Australia needs to get its name on the order books. Domestic AAM manufacturers will meet some of the demand, however, the rest will come from international manufacturers. The order backlog is already growing and Australia needs to get its name on the list or, despite our best efforts to provide an attractive and enabling ecosystem, we won't have the AAM aircraft to operate in it.

[11] The Jetsons was an American television series produced in the 1960s that depicted a futuristic society where families travelled in flying cars



Ability to attract investment required

Access to long term equity is essential. Early use cases and infrastructure will not necessarily be located in commercially viable locations, and investors will potentially carry risk for a long time before they see return on their investment. Further, our small market size relative to other global economies will make it difficult to attract outside investment. In a tightening capital market, this is not a good position to be in.

Fixation on the start line

Pragmatically, we need to focus on getting the foundations in place for industry to start. However, we need to keep an eye on long lead time challenges required for medium to long term industry growth and viability. Strategic investment is required for vertiport approvals, electricity grid upgrades, airspace and air traffic management system modernisation, and the regulatory changes necessary to enable autonomy and operations at scale.

Being overly cautious

Being proactive and forward leading on policy and regulation can have risks. In particular, promulgating unnecessary or over conservative regulation to tackle hypothesised issues or concerns that have yet to (or may never) be realised.

Backing the wrong horse

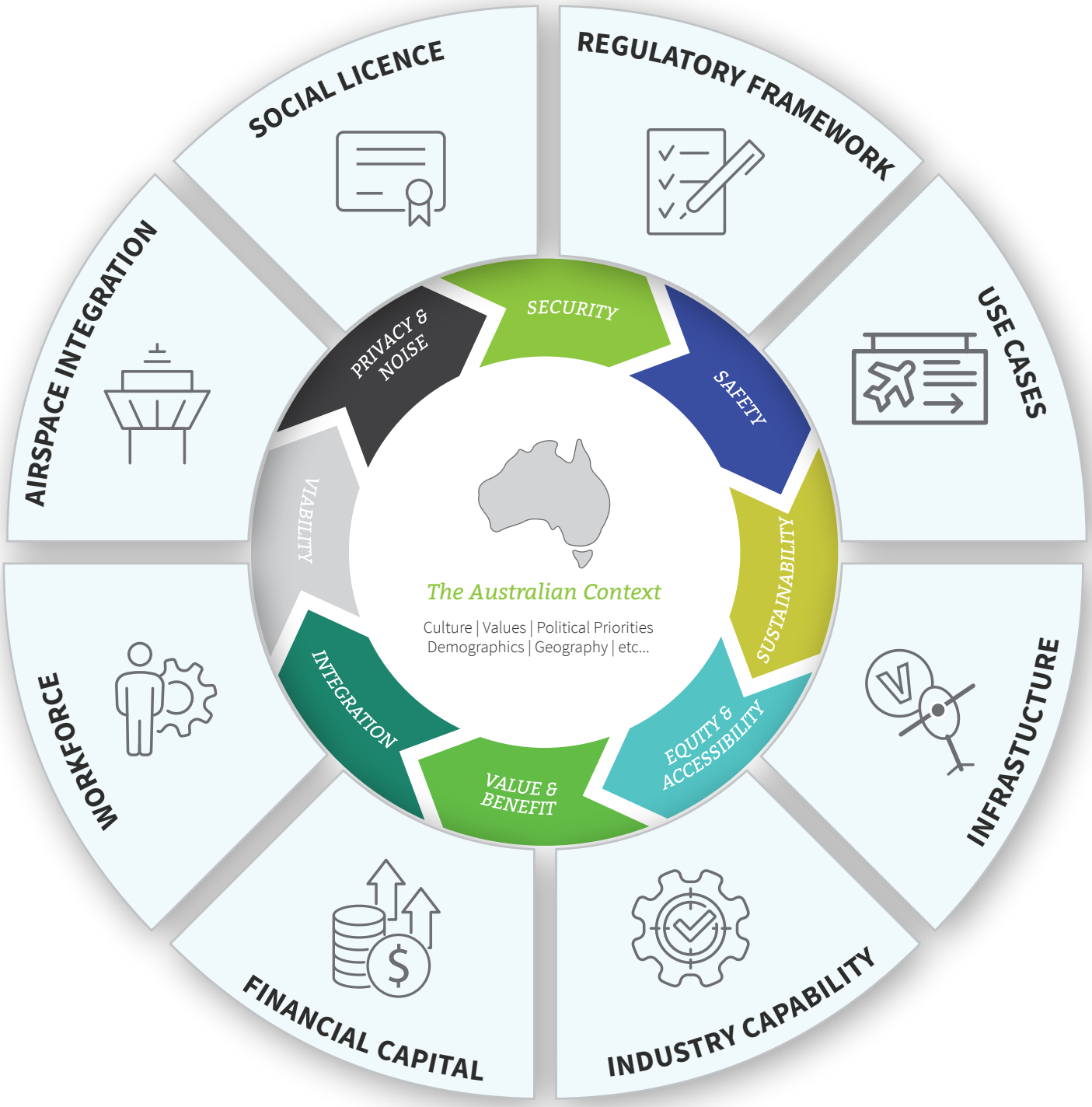
As global regulations and standards are yet to develop, and there is no consensus on the path they should take, there is a risk Australia pursues an approach that is not aligned with the global community.

Failing to establish scalable industry foundations

There is a risk that the complexity and change required to achieve necessary modernisation of airspace separation and management standards required for scaled operations could hold back the growth of a scaled and viable industry.

What does an enabling ecosystem look like?

The enabling foundational pillars of a prosperous AAM ecosystem are:



Regulatory Framework

A cohesive and comprehensive outcome-based legislative and regulatory framework that is effective, flexible, efficient and encourages safe and sustainable growth and innovation. Areas including, but not limited to:

- Safety
- Airspace
- Spectrum
- Noise
- Privacy
- Land use planning
- Liability
- Commercial and consumer
- Export and trade

Social License

A community that directly benefits from AAM, is actively engaged in the management of any associated impacts, and willingly accepts those impacts in return for its benefit.

Airspace Integration

An air navigation system, services, associated rules and procedures that provides equitable, efficient, and cost-effective access to airspace and supports the safe and seamless integration of AAM operations at scale.

- Airspace
- Air Traffic Management system
- Operating rules, separation standards, and procedures

Infrastructure

Cost effective and accessible enabling infrastructure, including:

- Vertiports
- Power / grid
- Hydrogen supply
- Communications and spectrum
- Connectivity with multi-modal transport systems

Workforce

A diverse, highly skilled and growing industry workforce. An industry that offers attractive, rewarding, secure, and internationally transferrable career pathways.

- Flexible and cost-effective training pathways and entry points
- Outcome-based training and licensing requirements
- Consistent qualification and licensing frameworks
- Transferable and recognised skills, qualifications

Industry Capability

The collective capability and capacity of the Australian industry (in terms of resources, infrastructure and networks) necessary to establish and maintain the necessary elements of the AAM ecosystem.

Use Cases

Healthy and growing end user demand in the form of a diverse, growing and viable market for AAM services.

Financial Capital

A funding market that provides diverse and affordable access to the financial capital that is needed for the long-term growth of the AAM sector. This includes insurance markets.

A healthy and prosperous ecosystem requires all eight pillars to be in place. While most are “all enabling”, some pillars will be more critical to the realisation of some use cases than others. The ecosystem pillars must be established in a consistent and coordinated manner. Some pillars, for example regulation and social license, will take longer to establish than others. Certainty on the roadmap for ecosystem development is the principal catalyst for industry investment.

How is it likely to evolve?

2027. This is the date we expect the first of type AAM aircraft to be ready for operation in Australia, and a lot needs to be done to be ready. With that said, if the right ecosystem conditions can be established earlier, then this date could be brought forward, limited primarily by certification timelines and AAM manufacturer production rates.

> *From 2027, we envision the AAM sector evolving as a series of overlapping waves. Different regions and use cases will progress at different rates of adoption.*

AAM will progressively grow through early use cases, the pace of which will be determined by the rate of advancement of each of the ecosystem pillars.

Likely Entry into Service

Use Case	Wave I
Private	
Aerial Work	
Public Services	
Defence	
Freight	
Tourism & Charter	
Experiential	
Training	
Urban Passenger Transport	
Regional Transport	

Increasing Scale, Compl

Wave II	Wave III	Key Enablers
		Infrastructure, Social Licence, Economic
		Technology Maturity, Regulatory, Economic
		Technology Maturity, Regulatory, Workforce
		Technology Readiness, Industry Capability, Regulatory
		Regulatory, Infrastructure
		Regulatory, Finance capital
		Regulatory, Finance capital, Infrastructure
		Regulatory, Finance capital, Infrastructure
		Social Licence, Airspace Integration, Infrastructure
		Technology maturity, Infrastructure

exity and Viability of AAM Operations

6.1 Wave I - Initial AAM Operations

> *Industry's primary objective over this first phase of operations is ensuring safe entry into service and laying strong foundations for sector growth.*

- Ensuring safe and timely entry into service
- Earning community and stakeholder trust
- Establishing foundations for prolonged industry growth
- Collecting the evidence needed to validate regulatory settings, operating and business models, and attract industry investment.

6.1.1 What could it look like?

The evolution of the Australian AAM sector begins with the introduction of a very small number of first-of-type AAM aircraft.

Technology

Battery technology will limit initial AAM aircraft to shortrange use cases. Development will occur across both crewed and self-flying (remotely supervised) systems. Initial AAM aircraft will support high levels of cockpit automation. While initial types will be predominantly conventionally piloted, a smaller number of certified self-flying (remotely supervised) AAM aircraft types will be available. Other fuel sources such as hydrogen, will become viable over the medium to longer term.

Regulatory

Bilateral aviation safety agreements and an Australian aviation safety regulatory framework that permits the timely acceptance/validation of foreign designed, manufactured and type certified AAM aircraft will be essential for operations to begin in Australia. Australian certificates of airworthiness will require inspection requirements for foreign manufactured but locally assembled AAM aircraft. Continuing airworthiness will be supported by existing Australian based licensed aeronautical maintenance engineers, and maintenance repair organisations (MROs) approved to maintain new AAM types in accordance with the instructions for continuing airworthiness issued by the manufacturer. New pilot training and licensing requirements will be needed, with the pool of qualified pilots being a critical resource.

Airspace Integration

Initial operations are expected to be conducted with no or minimal change or disruption to the existing airspace navigation system. AAM operations will be conducted under existing visual and instrument flight rules. They will operate under existing procedures and separation standards in non-segregated, controlled and uncontrolled airspace. They will need to integrate seamlessly within the existing air traffic management system and make use of existing communications, navigation and surveillance equipment. Over time, the utilisation of Flight Information Management System (FIMS) will be a significant enabler to digital airspace authorisation, scaling of operations, and enhancing the adoption of self-flying / remotely supervised AAM aircraft.

Infrastructure

Simple vertiports will need to be established, leveraging existing heliport landing areas and a small number of vertiports at new locations. The site selection criteria for newly established vertiports are expected to be conservative, driven by the need to minimise noise, intrusion, and disruption to the public, existing aviation operations, and by access to power infrastructure. Vertiports will be small, disconnected (not networked) and not support operations at scale. While early operations are expected to utilise existing communications systems, work needs to be undertaken to secure suitable spectrum for longer term industry growth.

Workforce and Industry Capability

Australia will have domestically designed, manufactured and eventually certified AAM types. However, challenges lie in the mass production and export of Australian designed and manufactured products. Specifically, achieving a cost-point that remains competitive against established aerospace manufacturing countries. This coupled with the small number of domestic manufacturers mean that the majority of initial AAM types (and equipment) will be foreign manufactured. It is expected that AAM will be operated and maintained by a combination of new and existing operators and maintenance organisations (once approved for new types). Initial operations will be limited by the availability of appropriately trained and licensed pilots and, to a lesser extent, maintenance personnel. Local training capability will take time to develop, with initial personnel trained internationally, by the manufacturer and/or operators. Initial AAM types are expected to vary widely in terms of automation, handling and cockpit controls, adding further complexity to the development of training and licensing requirements, and in turn, the transferability of the initial workforce between types. While new AAM aircraft types are expected to require significantly less maintenance than existing helicopters, a network of approved maintenance and repair organisations will need to be established.

Economic

Global demand coupled with low production rates all point to initial aircraft procurement costs being high. Certification and licensing costs will initially be high until requirements and processes are streamlined. Initial operating costs, while still expected to be lower than conventional helicopters, are expected to be high until economies of scale can be realised (e.g., supply chain development, adequate pool of licensed pilots and maintenance personnel). The cost of services is expected to reduce with industry scale. Access to capital is needed to fund procurement and/or leasing of initial fleets and to establish ground infrastructure (e.g., vertiport design and construction). Initial uncertainties (higher investment risk and long return on investment) will mean reduced access to, and higher cost of capital finance.

Social Licence

The bar to reach the social license to operate will differ between use cases. For passenger use cases, industry will need to earn its right to fly. It is likely to be less important for other use cases that deliver a direct social good (e.g., emergency transport). Factors such as noise minimisation, privacy and visual intrusion will be significant determinants on the location of vertiports, initial operating routes, and first use cases.

6.1.2 Wave I Use Cases

Initial use cases will be those that can be directly accommodated within the existing air navigation system, require minimal regulatory change, and pose no, or minimal, impact on existing airspace use and communities.

A quieter, cheaper and greener alternative

It is expected that viable first AAM use cases will be those that can supplement or directly replace existing shortrange helicopter operations on established routes. This is likely to include replacing helicopters on existing air tourism and private charter routes and utilising existing helicopter landing areas. Illustrative use cases:

- Theme park air tourism (Often referred to as “A to A” flights)
- Charters from Melbourne city to regional areas (e.g., Yarra Valley wineries)
- Sydney Harbour air tours
- Ad hoc flights from major airports to existing helicopter landing sites

Initial civil services

Niche services likely to be focussed on community-good applications, in low complex and low impact environments. Examples include offering high value passenger and freight transport to islands or from regional hubs. They are not expected to be economically viable, however, they will serve as “beach head operations”, designed to build Government and industry experience, collect evidence towards validating operational and business cases, and establish community value. Illustrative use cases:

- Mail and medical services to Moreton Bay islands
- Regular medical services to outlying rural towns (from a regional hub)

Low-volume scheduled commuter

Potentially high value but low volume scheduled services between a small network of fixed locations. Feasible early operations will be highly dependent on the geography, vertiport location relative to existing transport hubs (e.g., airports and train stations), and airspace design (e.g., where operations can be accommodated with minimal or no change). These will be established as a pre-cursor to the longer-term use case of scale scheduled operations. Illustrative use cases:

- Airport / transport hub connectors (e.g., Rose Bay seaplane terminal to Sydney Airport or Western Sydney Airport and Sunshine/Gold Coast Helipads to Brisbane Airport)
- Geelong-Docklands cross-bay commuter service
- Melbourne or Brisbane River helipad flights to airports

Defence

It is expected that defence will be early adopters and evaluators of AAM aircraft for a wide array of use cases. While initially limited to low-risk operations, it is expected that the scope of possible applications in Defence will grow, with the rate of growth primarily driven by the progress of Defence Aviation Safety Regulatory framework, ability of AAM aircraft to accommodate Defence specific requirements, and the availability of funding to support early demonstration and evaluation programs.

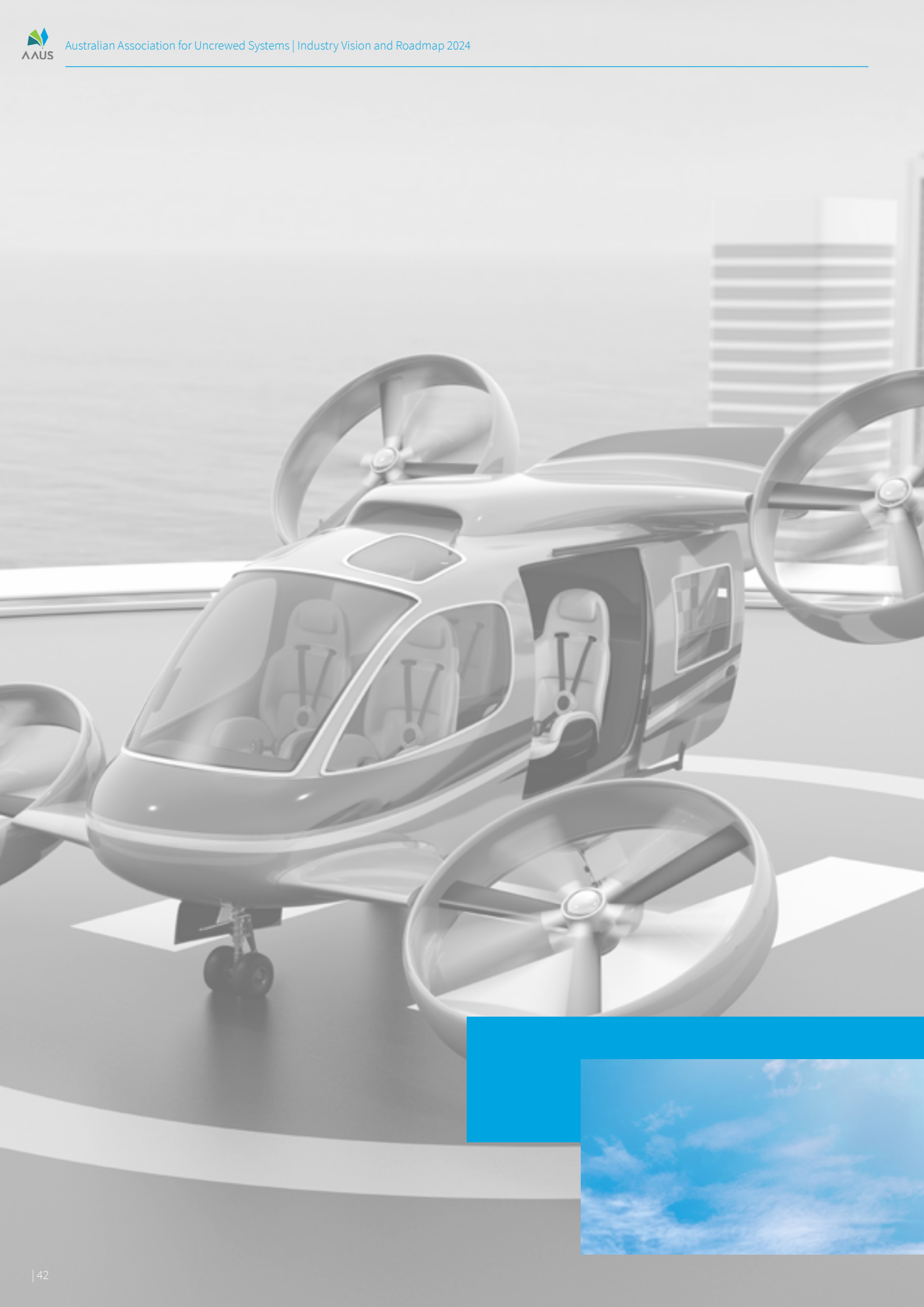
Regional Services

Low rate Regional Air Mobility (RAM) operations (passenger and freight) will be available. However, the service network and availability of the services is highly dependent on the advancement of propulsion technology (e.g. hydrogen). Illustrative use cases:

- Regional cargo and mail services (distribution hub-to-hub)
- Regional passenger connectors (e.g., outlying towns to a regional-centre airport)

6.1.3 Factors Governing Sector Growth

- Availability of AAM aircraft
- Access to infrastructure. This includes the number and location of vertiports, and the supporting power infrastructure. Initial vertiport locations are likely to seed the creation of clusters of industry capability.
- Advancement of new propulsion systems (i.e., hydrogen)
- Community and end user trust and sentiment. Early incidents or poor stakeholder experiences (including Government and investors).
- Access to long term capital for fleet and infrastructure investment
- Direction and progress of international certification programs
- International competition for investment, talent, aircraft, and market capture



6.2 Wave II – Transition and adaption to AAM operations

Building on the knowledge, trust, and foundations established during entry-into-service, the second phase shifts from one of "accommodation" to the safe and phased implementation of the necessary changes for viability and sustainable growth. The second wave can be characterised as one of adaption and transition. A period defined by a series of small changes to the existing ecosystem that permit an incremental expansion in the scope of viable and supported AAM operations.

Industry's primary objectives over this phase include:

- Building on, and maintaining earned stakeholder trust
- Safely enabling scale to accelerate viability
- Building end user demand and increasing accessibility
- Expanding the infrastructure network to enable a broader set of use cases, including high tempo urban operations
- Integration into existing transport and logistics networks
- Supporting the export of Australian AAM aircraft, and aviation products and services (including training)
- Removing impediments and incentivising international investment

> *To achieve our goal to be an early enabling environment and early benefactor, the goal would be to accelerate the first two evolutionary phases of this roadmap, as safely as possible.*

6.2.1 What could it look like?

Technology

Hybrid and hydrogen-fuelled types will become more readily available, with the additional performance (i.e., range) opening new use cases, particularly in regional areas. AAM aircraft will also become increasingly automated. The role of the on-board pilot for conventionally piloted AAM aircraft will subsequently change, as onboard automation plays a greater role in piloting tasks. In addition, remotely piloted AAM aircraft will be available, with remotely located crews concurrently supervising multiple self-flying AAM aircraft at a time. The increasing automation enables industry scaling.

Regulatory

Regulations will need to evolve to support the increasing automation and volume of AAM aircraft operations. Pilot training and licensing requirements will need to address the changing role of onboard and remotely-located AAM crews. Vertiport and airspace capacity will result in a shift to operations under Instrument Flight Rules (IFR) for scheduled / scale AAM operations. Ultimately, new operating rules for the safe and efficient operation of AAM aircraft will be required (e.g., often referred to as Digital or Automated Flight Rules). This will include regulations and standards for the certification and operation of automated flight services (e.g., Unified Traffic Management / Flight Information Management Systems / Provider of Services to UAM[13]), separation standards, and airspace design (e.g., AAM corridors) will be required. Requirements for the certification, maintenance and safe operation of hydrogen-based propulsion systems will be needed. Vertiport design standards will need to be updated to accommodate increasingly automated AAM operations. International regulations (i.e., ICAO) will lag the regulatory frameworks implemented by mature and forward leaning States.

Airspace Integration

New rules, procedures, and airspace constructs (e.g., corridors) will need to be established to enable safe and efficient high scale AAM operations. Scale operations in built-up areas will need to be supported by a digital and automated air traffic system. Outside high congestion areas, non-scheduled, aerial work, and other operations will continue to operate under existing rules, procedures, and airspace constructs.

Workforce and Industry Capability

The workforce will continue to grow with increasing demand and growing domestic training and licensing capacity. Australia will be well-positioned to offer training to international instructors, pilots, maintainers, and crew. Domestic design and production of AAM aircraft and products will increase, however, growth will be highly dependent on the ability of domestic manufactures to access global OEM supply chains. Final assembly plants will be needed to support the gradual increase in imported aircraft.

Economic

Until scale is realised, end user costs will begin to fall with the increasing availability of AAM aircraft, competition, infrastructure capacity, and workforce. Early operations will provide a greater certainty in the business and operating models needed to attract investment. However, scheduled commercial passenger transport use cases are not expected to be economically viable until scale operations can be realised. The business case is expected to close in several high value civil, defence, charter and tourism use cases – although "novelty" will become less of a driving factor for customers, with increasing emphasis placed on cost of services, performance and sustainability. Access to global manufacture supply chains will be important to realising export opportunities (i.e., AAM aircraft, aviation products and services).

Social Licence

Community engagement will remain critical to industry growth. Permanent frameworks for public consultation will be needed at all levels of Government. As activity grows, new techniques for mitigating intrusion (e.g., visual and noise) will be required. The arrival of self-piloting (remotely-supervised AAM aircraft types) will require extensive community engagement to engender the trust needed for service uptake.

Infrastructure

Networks of vertiports will begin to form in built up areas. They will be increasingly co-located with existing infrastructure (e.g., public transport terminals, freight and logistics hubs, airports, etc.). Vertiports will become more complex with some looking to integrate on top of existing buildings, support high-rate operations, and new infrastructure for hydrogen fuel types. Vertiports will be located at regional population centres, serving as short-to-medium range hubs for surrounding communities. Energy infrastructure and community acceptance will remain key limiting factors on the siting of new vertiports. The demand for "green electrons" will grow. Longer term as battery technology improves and hydrogen propulsion technologies become more common-place, recharging/refuelling infrastructure may not be required at all vertiport sites, especially some satellite sites. Thereby making it more economical to establish landing locations in remote sites.

[13] The extension of the current concept of Unified Traffic Management System (UTMS), of which the FIMS is a central component, to include AAM operations. Internationally, this is referred to as a Provider of Services to UAM (PSU).

6.2.2 Wave II Use Cases

Urban Public Transport

Scheduled urban public transport operations will begin. They are not expected to be cost-competitive with existing transport systems, but rather complement existing networks with new routes or a higher performance service (e.g., faster, service dependability, etc.). These initial "pilot" services are not expected to be commercially viable until scale is reached. Illustrative use cases include:

- Commuter – Brisbane to Caloundra connector, Gold Coast Hinterland or Maleny to CBD or Airport
- Sydney Airport to Bondi Junction shopping centre
- Western Sydney Airport to Northern Beaches or Hawksbury area
- Sorrento to Melbourne Central Business District

Complex Civil Services

Urban civil services that require high dependability and customisation (e.g., onboard equipment) will begin. Examples include potential applications in medical transportation, police, fire fighting, and search and rescue. Illustrative use cases include:

- Night time police patrols over urban areas where noise is a concern
- Hospital patient transfers

Regional Air Mobility

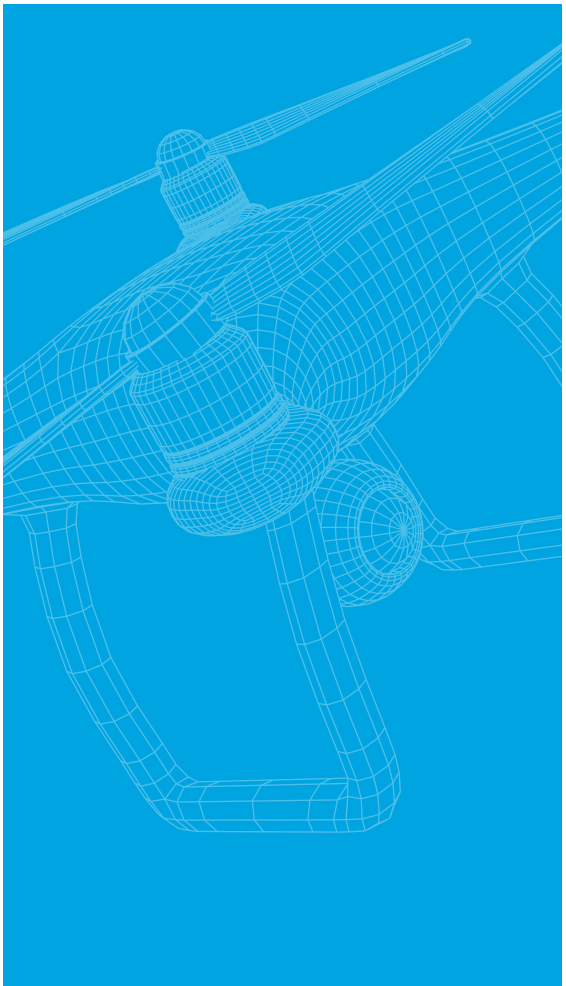
Improvements in the performance of AAM (e.g., through the introduction of hybrid and hydrogen propulsion systems, and improved battery technology) will open up a number of new use cases. This can include scheduled and charter regional passenger and freight transportation, and aeromedical services.

- Scheduled Melbourne to Ballarat connector service
- Patient transfer services
- Royal flying doctor services

Private operations

A much smaller, but in time growing, AAM use case will be private operations particularly in regional areas. The uptake will primarily be determined by initial purchase costs and cost, access and siting requirements for vertiports and energy infrastructure. This use case will grow in time with increasing AAM aircraft automation, and in turn, simplification of pilot training and licensing requirements. Illustrative use cases:

- Outlying farm to local regional centre
- City residence to weekender



6.2.3 Factors Governing Sector Growth

- Pace of regulatory and airspace / ATM change required to support safe and efficient scale operations
- Ability to expand scope of operations in line with community expectations.
- Vertiport and ground infrastructure (grid power) growth


FS-280

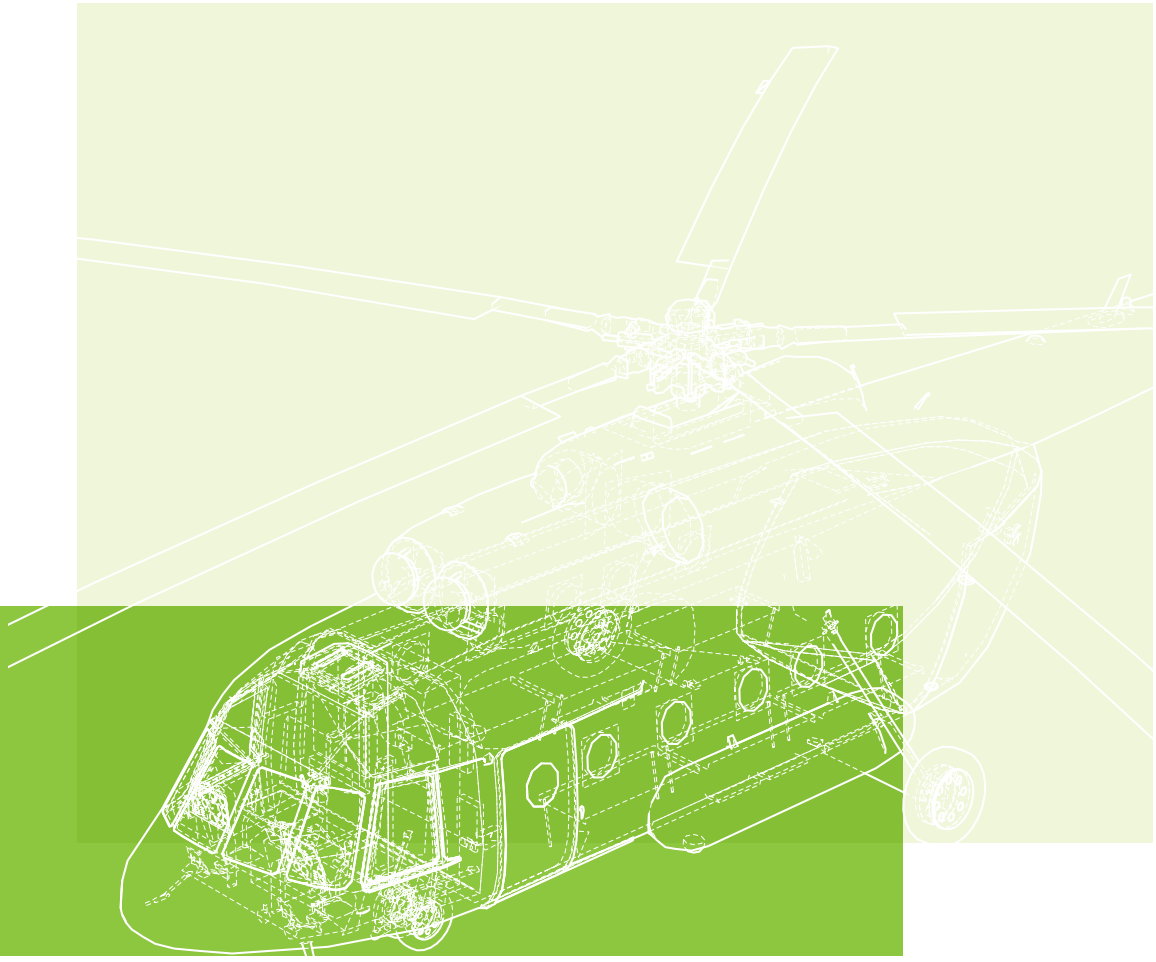
6.3 Wave III – Safe, Sustainable and Viable AAM Operations

The third wave can be characterised as one of revolution

With the necessary constructs in place, this phase is about scaling and driving aviation-wide innovation to realise greater value. It is also a phase where Australia begins to capitalise on its early leadership.

Industry's primary objectives over this phase include:

- Growing stakeholder value
- Maintaining community trust and an invested stakeholder in industry success
- Leading innovation in areas such as Airspace and Air Traffic Management modernisation to achieve safe efficiency and scale of operations
- Leveraging early leadership globally – through export of products, services, and expertise



6.3.1 What could it look like?

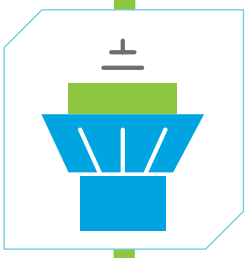
Accelerating growth in AAM operations and supporting industry.

Technology

The trend to higher autonomy will continue, reducing barriers to broader adoption (e.g., reduced pilot training and licensing requirements), driving down cost and creating the economy of scale needed for commercial viability. In time, the majority of commercial passenger and freight AAM operations will utilise remotely-supervised AAM aircraft. Continued advancements in battery chemistry and the increasing adoption of new energy sources (e.g., hydrogen) will lead to improvements in aircraft performance and AAM aircraft size.

Regulatory

The authority will need to continue to keep pace with both domestic and international industry-led innovation. International requirements (e.g., ICAO) will be in place and CASA will be well placed to take leadership in their development.



Airspace Integration

Fixed airspace structure (i.e., corridors) will continue to be needed for high volume AAM routes. However, there will be a greater proportion of AAM operations utilising trajectory-based operations under newly created digital flight rules. This is enabled through the expansion of services provided by automated airspace management systems. This brings benefits in terms of the geographical spreading of noise and visual impact and allowing operators to fly more efficient routes, and services to support safe separation from other airspace users, including drones, helicopters and RPAS. AAM will continue to be an early driver and benefactor from the continued evolution of Australia's Air Navigation System to one that is increasingly digitised, connected and automated.

Infrastructure

AAM vertiports will be part of an interconnected multi-modal transport and logistics network. Personal private use vertiports (with minimal infrastructure) will be common in locations away from built-up residential areas. In time, public but commercially operated vertiports with access to "parking" will be available at key destinations (e.g., central business districts, major shopping centres, transport hubs, and airports).

Workforce and Industry Capability

Australian-based manufacturers will scale moderately with access to international markets. Demand for training will continue to grow despite the shift to highly automated systems. Australian-based providers will continue to produce high quality graduates needed to meet growing domestic and international demand for remote pilots, operations, and maintenance personnel.

Economic

The cost and availability of AAM aircraft will fall with increased manufacturer competition and production rates. Scale and industry critical mass will drive operating costs down such that commercial business models close for a wide range of passenger and freight transportation use cases. End user costs will stabilise in line with service supply and demand.

Social Licence

The community will remain a key stakeholder in decision making concerning the siting of new vertiports or fixed routes (e.g., AAM corridors). Real time noise and visual intrusion management systems will be required to balance impacts with benefit. Services will become increasingly accessible with falling cost and the expansion of vertiport networks.

6.3.2 Wave III Use Cases

High-Capacity Urban Public Transport

A significant expansion in the coverage and capacity of scheduled passenger transport services across a growing network of urban and peri-urban vertiports.

- City mass transport networks

On-demand Air Taxi

Near-real-time public charter services. Described as ad hoc, on demand passenger and freight transportation services utilising a combination of public, public-commercial and private vertiports.

- “Yellow Cabs” of aviation servicing cities

On-demand Urban Freight

Similar to the Urban On-demand Air Taxi use case, flying equivalent high priority freight for courier companies. These will be focussed on hub-to-hub deliveries rather than last mile.

6.3.3 Factors Governing Sector Growth

- The transition to new airspace operational rules and related roll out and coverage of enabling services (i.e., FIMS) will be critical as airspace utilisation increases
- Compatibility and alignment of international requirements
- Regulator capability to keep pace with ongoing innovation and meet demand for regulatory services

Getting to the Start Line

There is work to be done to be ready by 2027. Government will play a critical role in Australia's readiness for AAM and in turn, our nation's ability to be a first-mover ecosystem for AAM. Working with industry, Government needs to:

Deliver the certainty needed to give industry confidence to invest and turn tentative orders into firm commitments

- Develop and communicate a commitment to AAM as a national strategic policy objective. A particular opportunity lies in the current work to develop an Aviation White Paper.
    - Work with industry to develop a joint vision and national roadmap for AAM.
    - Through this roadmap, identify priorities, responsibilities and actions for Government and industry.

Demonstrate a commitment to policy through action

- Reflect priorities in Government resourcing decisions, ensure any investments are aligned to the policy, vision and roadmap established with industry.
- Ensure AAM are a consideration in the scope of relevant National and State policy, strategic planning and investment initiatives. Examples include: Commonwealth, State and Territory transport and infrastructure planning and investment; Sustainability; Defence; National R&D priorities; Workforce, Jobs and Skills; National Airspace and ATM modernisation plans.
- Develop new guidelines specific for AAM vertiport permits. Being clear on the characteristics for suitable vertiport sites, and open to non-traditional sites, that still meet air safety requirements yet consider the distinct difference of this mode of transport compared to helicopters.

Be clear on the regulatory and permitting pathway for entry into service and development of vertiport infrastructure. Streamline the process for approvals, working in a timely manner with industry. This will provide industry certainty for investment and shorten the timeframe to generate economic returns, seed opportunities and investment until conditions for standalone viability can be realised.

- Work with Commonwealth, State and Territory departments and agencies to identify and evaluate potential use cases and critical "enabling requirements" for AAM in existing and new civil applications (e.g., firefighting, law enforcement, national parks, border protection, etc.). Work with industry to inform use case roadmaps, elicit requirements, and support trials and evaluation to inform tenders and long-range capital expenditure plans.
- Provide data and support to industry in evaluating business and operational models (e.g., public transport demand and capacity, infrastructure planning and investment timelines).
- Provide or encourage access to financial capital needed by industry in early phases. The Government can incentivise investment in the sector through linking it to sustainability offset programs, loans and subsidies to encourage investment in quieter, more cost-effective and sustainable technologies.
- Invest to accelerate the fielding of key technologies to enabling high value use cases and manufacturing opportunities like hydrogen propulsion.
- Work with industry to establish a focal point and in turn, critical mass of stakeholders. This could be achieved through seeding a use case or investment in initial infrastructure, and through creating a framework for Government-industry cooperation. The objectives of this "beachhead project" should be to inform policy and regulatory development, and collect the data and experience needed to mature business and operational models.

Work with industry to develop a strategic vision, operating concept, and roadmap for the modernisation of Australia's airspace and Air Traffic Management (ATM) system

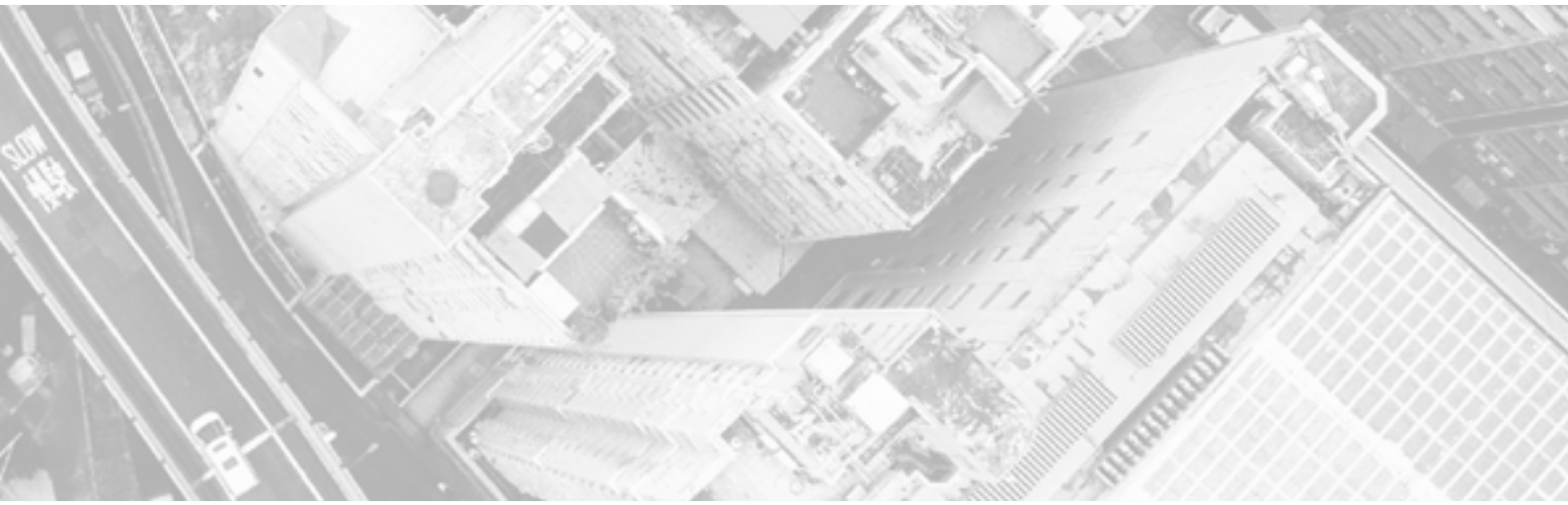
- Ensure airspace design and access that enables timely, safe and efficient integration of new technologies and operating concepts.
- Ensure ATM technology investment meets future airspace user needs and services.
- Ensure a regulatory environment is ready (rules and guidance for: airspace and route design, procedures, separation standards, operating rules, etc.) are in place and ready to meet new operating needs.

Ensure a National Approach

- A key risk lies in the promulgation of unnecessary, inconsistent or overly restrictive regulation across different areas of Government or between different levels of Government (Local, State to Federal). Commonwealth Government has an important role in facilitating an acceptable national framework and ensuring coordination but not necessarily ownership of the various policy and regulatory areas shaping the industry. The States and Local Government also play an important role, especially in vertiport planning and permitting. Ultimately there needs to be unambiguous mandates to Departments to facilitate this coordination and a nationally consistent approach. Mechanisms for greater Government accountability to agreed nationally coordinated positions is needed.

Ensure a regulatory framework that streamlines entry into service, establishes a strategic direction and lays the foundations for longer term industry needs.

- Develop the policy direction and identify the changes in regulations and standards required for the certification and operation of initial AAM operations.
- Work with industry to review the strategic regulatory roadmap and establish a process for continual industry input towards maintaining it. Initial priorities:
  - Policy and associated regulations for timely type certification (domestic) and the type acceptance/validation (foreign) AAM types.
  - Pilot training and licensing requirements for piloted AAM operations.
  - Operational requirements (e.g., organisation approvals).
- Work with the Department to review current aviation safety bilaterals, underlying implementation instructions, and CASA policy to ensure timely acceptance / validation of certified types and licenses. This includes international authority acceptance / validation of Australian certificates and licenses.
  - Timely and unimpeded import of foreign certified aircraft and aviation products.
  - Government must adopt a stronger political stance on trade settings that enable export opportunities. More balanced bilaterals are needed to ensure Australian industry remains on an even field with international industry.
- Continue to work with international authorities to learn from ongoing certification and licensing activities, and proactively inform and communicate any points of difference for streamlined local acceptance.
- Establish the initial policy, and through the roadmap, a timeline for implementation, for regulations relating to more complex AAM types and operations (e.g., scale operations, remotely supervised AAM, concurrent operations).
  - This exercise should identify the regulatory unknowns and work with industry and academia (e.g., through a Sandbox program) to collect the necessary evidence through a coordinated series of industry test and learn projects.
- CASA should continue to work with international authorities to keep abreast of, and inform, emerging regulatory requirements, promote global consistency and compatibility in regulations, and leverage global resources and expertise to accelerate its own regulatory activities.



Government must serve as the independent broker between industry and community

- Continue to serve as an informed and central point for community engagement and information at all levels of Government (Federal, State and Local Government).
- Support industry in identifying, understanding, and addressing broader community concerns. For example, providing advice and support for community and stakeholder engagement, support perception studies, use case value studies, communication / engagement etc.

Summary

Integral part of broader reform

This vision and roadmap must be part of broader aviation policy and reforms. The ecosystem evolutions required to support the AAM industry end state must also reflect the needs of other aviation sectors.

Living document

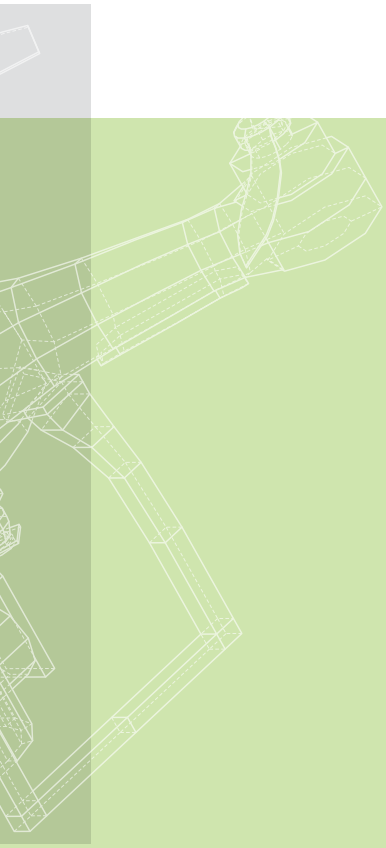
Uncertainty is an inescapable part of any strategic plan. We need to be flexible and responsive to new understanding and innovations that may warrant change to the journey we are on. As such, Government and industry must establish an agile mindset and be open to regular reviews.

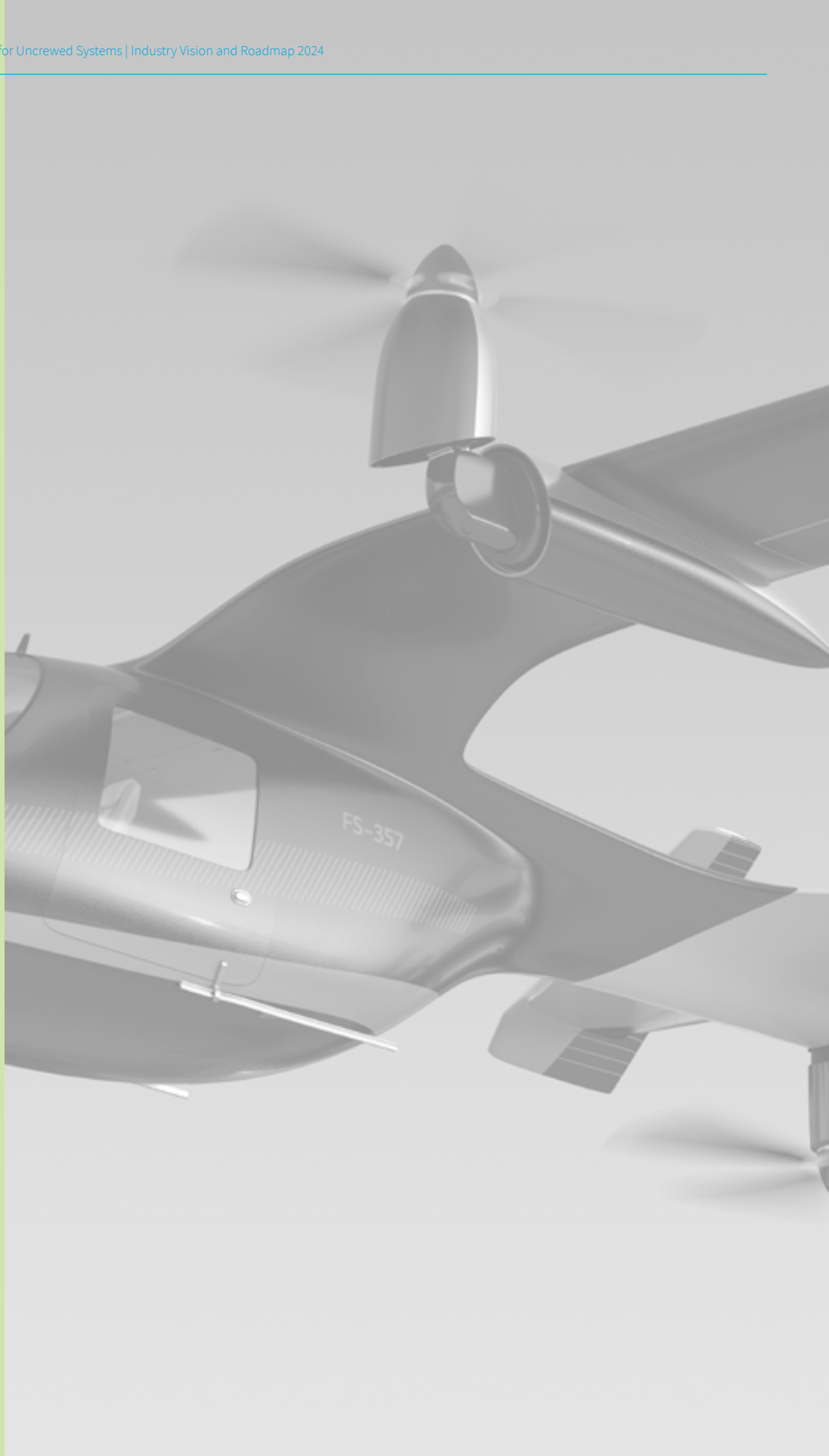
Cooperation

A safe, secure, sustainable, and prosperous AAM aviation sector will bring significant benefits to all Australians. We are all vested parties in its success. Realising this opportunity will require the concerted and coordinated action of both industry and Government.

Mutual and recognised benefit

Success is built on all stakeholders – industry, Government, and the Australian public – holding a shared appreciation of the benefit and magnitude of opportunity AAM presents.




FS-357

Appendix A - Glossary

Advanced Air Mobility (AAM)
An umbrella term for an air transportation system that moves people and cargo using revolutionary new aircraft. These aircraft are often referred to as air taxis or electric Vertical Take-off and Landing (eVTOL) aircraft.

Autonomy
The degree to which the AAM aircraft system is able to perform required piloting functions independent of a human pilot or operator.

Electric Vertical Take-off and Landing (eVTOL)
Electric or hybrid-electric powered aircraft capable of Vertical Take-off and Landing (VTOL) operations (see VTOL).

Regional Air Mobility (RAM)
A sub-category of AAM. A transportation system for the movement of people and freight using AAM aircraft capable of medium-to-long range operations. Civil Aviation Safety Authority (CASA) defines[14] RAM as:

- short to medium range and endurance designed for low altitude point-to-point passenger or cargo carrying tasks between regional areas.

Short Take-off and Landing (STOL) aircraft
A heavier-than-air-aircraft with very short runway requirements.

Urban Air Mobility (UAM)
A sub-category of AAM. A transportation system for the movement of people and freight using AAM aircraft in highly urban environments. Typically, over short distances and at scale within an urban environment. CASA[15] defines UAM as:

- Short to medium range and endurance designed for low altitude point-to-point passenger or cargo carrying tasks in, and between, urban areas.

Vertiport[16]
An area of land, water, or structure that is used or intended to be used for the landing, take-off, and movement of VTOL-capable aircraft. For the purposes of this document the term vertiport also includes vertihubs and vertistops:

- *Vertihub*
  A vertiport with infrastructure for maintenance, repair, fuelling, and parking spaces for storage of VTOL-capable aircraft.
- *Vertistop*
  A vertiport intended for take-off and landing of VTOL-capable aircraft to drop off or pick up passenger or cargo, but where there are no facilities for fuelling, defueling, scheduled maintenance, scheduled repairs, or storage of aircraft.

Vertical Take-off and Landing (VTOL) aircraft[17]
A heavier-than-air aircraft, other than aeroplane or helicopter, capable of performing vertical procedures by means of more than two lift/thrust units.

[14] The RPAS and AAM Strategic Regulatory Roadmap (2022)
https://www.casa.gov.au/sites/default/files/2022-06/the-rpas-and-aam-roadmap.pdf

[15] The RPAS and AAM Strategic Regulatory Roadmap (2022)
https://www.casa.gov.au/sites/default/files/2022-06/the-rpas-and-aam-roadmap.pdf

[16] From CASA Advisory Circular AC 139.V-01 v1.0, Guidelines for Vertiport Design, July 2023

[17] From CASA Advisory Circular AC 139.V-01 v1.0, Guidelines for Vertiport Design, July 2023

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