



## ROADMAP

# RPAS and AAM Strategic Regulatory Roadmap

2024

January 2025



### Acknowledgement of Country

The Civil Aviation Safety Authority (CASA) respectfully acknowledges the Traditional Custodians of the lands on which our offices are located and their continuing connection to land, water and community, and pays respect to Elders past, present and emerging.

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# Document overview

The primary published form of the RPAS and AAM Strategic Regulatory Roadmap (the Roadmap) is on the [CASA website](#). The website publication is a living document that provides live Roadmap activity status and progress updates.

This document captures the late 2024 reviewed Roadmap at a point in time.

You should read it with the Roadmap [Review Progress and Outcomes document](#).

# 1. Introduction

This Roadmap sets out Australia's future approach to aviation safety regulations and oversight for remotely piloted aircraft systems (RPAS) and advanced air mobility (AAM). It provides a strategy and plan for these sectors, supported by acceptable levels of safety.

The Roadmap complements and prioritises day-to-day regulatory development efforts for these sectors. It includes continuous improvement activities aimed at improving the scope, efficiency, and effectiveness of regulations, standards, guidance and processes.

The Roadmap complements several government initiatives, including the:

- [Aviation White Paper → Towards 2050](#)
- Australian Future Airspace Framework (AFAF)
- Uncrewed aircraft systems (UAS) traffic management (UTM).

We are responsible for regulating aviation safety, which is the primary focus of the activities outlined in the Roadmap. When needed, we will work with other government agencies to support the regulation of other aspects of RPAS and AAM operations (see [Drivers, enablers and dependencies](#)).

The RPAS and AAM landscape is one of several important and interconnected emerging technology areas in aviation. We will continue to focus on safety across all these areas.

We aim to create clear and risk-based rules along with simple, flexible and efficient authorisation pathways for emerging technologies.

## 1.1 What are RPAS?

Remotely piloted aircraft systems (RPAS), also known as drones, differ from other aircraft in that they do not have a pilot or crew onboard.

RPAS typically refers to the aircraft itself, but it also includes all the components needed for its operation:

- ground control stations
- telemetry and communications
- sensors
- other hardware and software used to operate the aircraft.

There is no globally agreed definitional difference between RPAS and AAM. For this roadmap, RPAS refers to remotely piloted operations without people onboard and no plans for passenger transport in the near future.

RPAS operations are evolving to include more complex tasks that may carry higher risks because of size, speed or new operational concepts. This evolution could include future operations in controlled or high-altitude airspace. The Roadmap aims to clarify where activities are seeking to address higher risk or more complex RPAS operations. We expect these operations to increasingly cross-over with AAM needs and considerations.

## 1.2 What is AAM?

Advanced air mobility (AAM) is an emerging aviation ecosystem that uses new aviation services and innovative technologies to transport people and goods. This system operates in urban and regional environments, between regions, and eventually internationally. New aircraft designs include electric vertical take-off and landing (eVTOL) aircraft and other certified models.

There have been ongoing advancements in this sector due to progress in:

- hybrid and electric propulsion systems
- energy storage
- alternative fuels, for example, hydrogen
- lightweight materials
- digitalisation
- automation.

These innovations have enabled the creation of an array of new vehicle types.

For this Roadmap, 'AAM' refers to the broader ecosystem. 'AAM aircraft' refers to new and emerging aircraft that incorporate innovative technologies. We expect these aircraft to use varying levels of automation. Initially, AAM aircraft will be conventionally piloted, with a pilot on board. In time, some AAM aircraft operators may seek to be remotely piloted.

### 1.2.1 AAM vehicle types

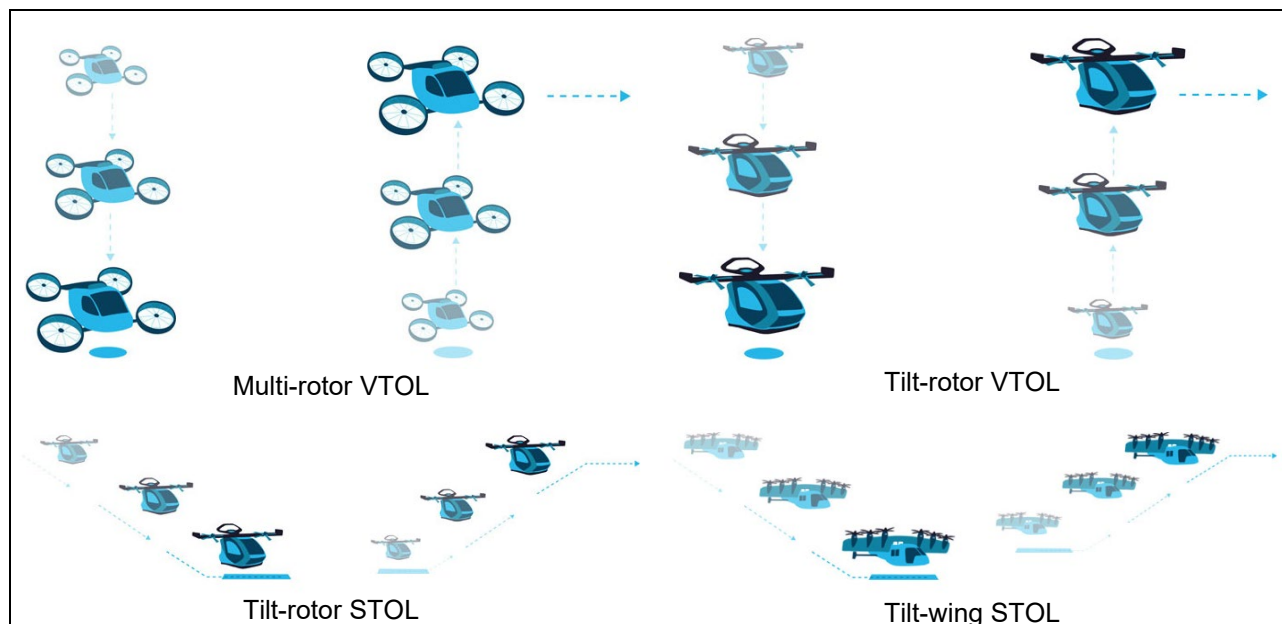
New AAM aircraft will use innovative technologies, including:

- multi-rotor
- tilt-wing
- tiltrotor
- lift and cruise
- vectored thrust
- powered lift.

These offer capabilities for electric conventional take-off and landing (eCTOL), short take-off and landing (STOL), and vertical take-off and landing (VTOL). Other aircraft under development may also qualify as AAM aircraft.

Here are some potential AAM aircraft:

**Figure 1 - Examples of AAM aircraft**



## 2. Developing the roadmap

The Roadmap was a commitment under the [National Emerging Aviation Technologies Policy Statement](#). The Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) released this policy in May 2021.

After this announcement, our [Aviation Safety Advisory Panel](#) formed a technical working group (TWG) with sub-groups and industry participation. This group collaborated to co-design the Roadmap. We developed the roadmap through this process to make sure that the outlined activities support industry goals while maintaining a safe aviation environment in Australia.

The TWG considered the requirements of the RPAS and AAM sectors over 4 time horizons.

We identified 9 primary use cases for RPAS and AAM, along with 6 Regulatory areas. We discussed the progression of each across these time horizons.

We transformed the work of the TWG into a draft roadmap, which was consulted on before its publication in 2022. We reviewed the 2022 version in 2024 (see Maintaining currency and relevance) in line with the Government's [Aviation White Paper → Towards 2050](#).

## 2.1 Use cases

Industry identified the following 9 use cases to inform the regulatory activities in this Roadmap. This is not an exhaustive list but covers a wide range of RPAS and AAM activities involving in Australia.

1. **Aerial application** – using RPAS to apply or disperse chemicals, seeds or other items including spreading fertilisers and disinfectants, and assisting with fire management.

Learn more about aerial application through our [short explainer video](#).

2. **Entertainment** – using RPAS for activities like light displays, racing, capturing still and video images for film and TV production. This also includes live sport and stadium operations or any other operation for entertainment purposes.
3. **Carrying cargo and packages** - RPAS and AAM aircraft transporting cargo, from small last-mile deliveries to large long-distance cargo transport. These operations have the potential to improve access to goods, economic efficiencies and reduce emissions.

Learn more about cargo carrying RPAS and AAM through our [short explainer video](#).

4. **Inspections and imaging** - using RPAS to capture imaging for information, research or data-gathering purposes. This may include photography, the use of LIDAR or other sensors and analysis.
5. **Passenger-carrying (urban and regional air mobility)** - AAM aircraft transporting people in urban areas, from urban to regional centres, and between regional centres. AAM use cases are expanding and include transport for private purposes, emergency or medical, and tourism.

Learn more about passenger-carrying AAM aircraft through our [short explainer video](#).

6. **Sport, recreation and education** - model aircraft operated for non-commercial purposes including for personal use, racing, and use by educational institutions.
7. **Surveillance and monitoring** - using RPAS to surveil, check and search environments. This may include shark spotting operations and search and rescue. This may also include high altitude operations like long endurance pseudo satellites.
8. **Training** - teaching and making sure operators can fly and maintain RPAS and AAM aircraft qualifications, proficiencies and competencies.
9. **Research and development** - all activities needed to develop or gain insight into an aircraft, operation, system or technology to do with RPAS or AAM.

Learn more about the research and development (R&D) activities taking place through our [short explainer video](#).

## 2.2 Themes

The TWG also identified 2 key themes across the regulatory activities.

### 2.2.1 Demystification of current regulations

Many of the use cases discussed with the TWG are possible under the current regulations. Yet, the requirements and pathways to carry out these activities can be unclear and confusing for some operators.

Industry have asked for more guidance to help understand how to carry out complex RPAS and AAM operations under current regulations.

### 2.2.2 Regulatory change

We are committed to fit for purpose regulatory policy. As technologies, operational practices, and safety considerations evolve, the focus is to ensure that we maintain an acceptable level of safety. At the same time, it aims to enable industry operations that often seek to employ novel technologies or concepts of operation.



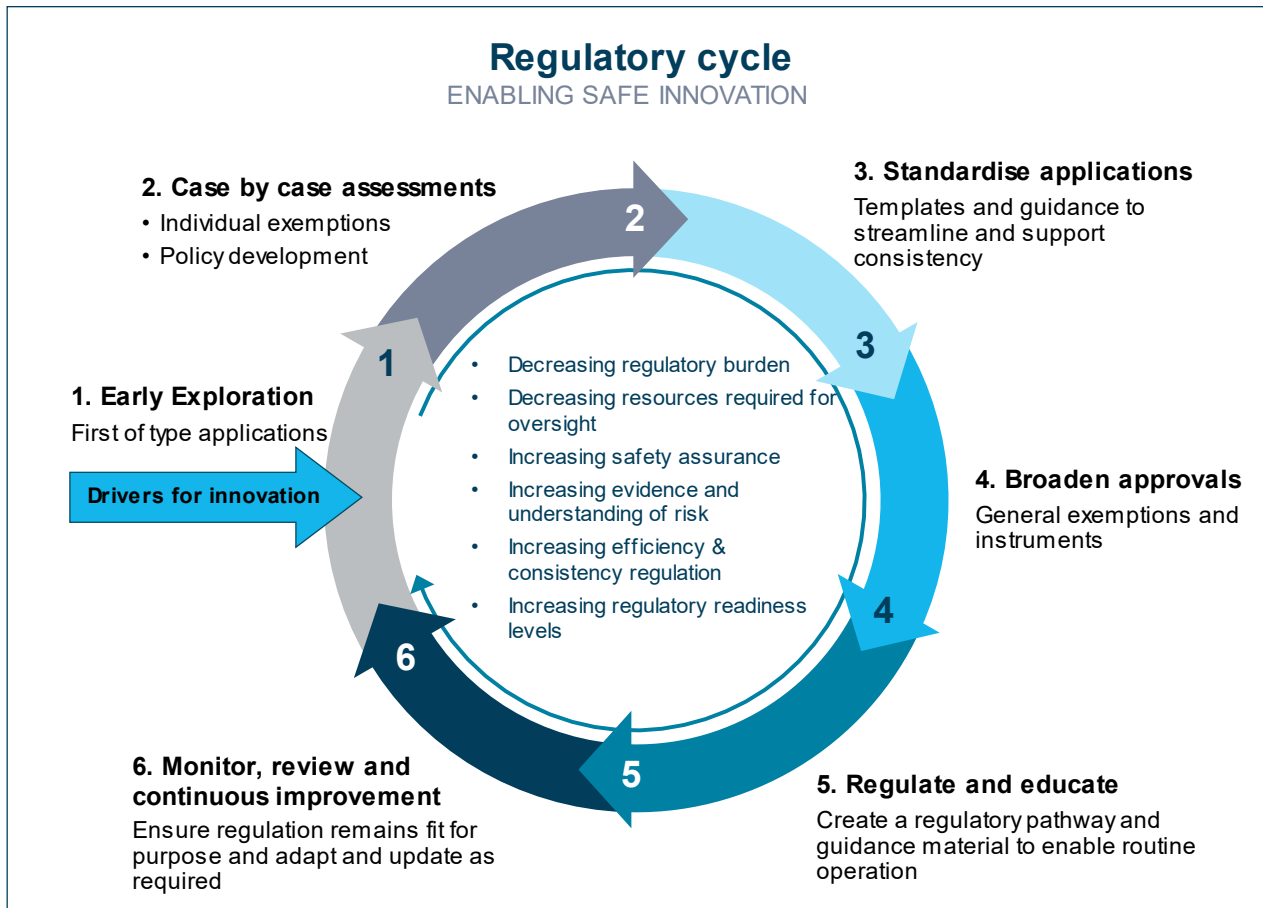
We will consider what impacts this may have across all Civil Aviation Safety Regulations (CASR). The International Civil Aviation Organization (ICAO) and leading aviation safety regulators will continue to guide us on necessary changes.

A regulatory maturity model approach that progresses cases from ‘novel to normal’ is often needed. Industry-led innovation and early adopters will drive first-of-type applications. CASA initiatives like post implementation reviews, data analysis, and safety risk profiling may also prompt regulatory change.

The conceptual model in Figure 2 below demonstrates how we form regulatory pathways. This approach allows data from first-of-type applications to inform policy development and processes leading to:

- more efficient regulatory services
- informed regulatory change.

**Figure 2 - The regulatory cycle**



We use the term ‘rules’ instead of ‘regulations’ because it covers a broader range of regulatory options. Section 4.1 outlines the types of documents we use to develop and implement policy. Policy shapes regulatory pathways, which may include transitional arrangements to support safe operations.

First of type applications will begin the regulatory innovation cycle. We will work with industry on emerging priorities, from new entrants to established operators introducing new operational concepts. Early applicants in the cycle must be open to co-development, iteration, and adaptation as policy takes shape.

## 2.3 Drivers, enablers and dependencies

AAM has the potential to improve:

- transport accessibility
- sustainability and mobility

- the environment, through the development of
  - aircraft and systems with lower carbon and particulate emissions
  - quieter aircraft
- quality of life, safety, and security of citizens.

The government's AAM strategy shows how the AAM ecosystem connects beyond just aircraft and technologies. This ecosystem will work to build the sector towards improved environmental and economic sustainability. It also supports local capabilities, manufacturing, the use of renewable energy, and economic growth, aligning with broader government goals. In short, AAM aims to improve logistics and lower costs for all Australians.

There are several government initiatives that support the growing RPAS and AAM sectors. Our main role is to create regulatory frameworks and processes that safely integrate emerging technologies into Australian aviation. We need to collaborate to achieve these benefits and work with other agencies to support related roadmap activities led by others. For example, the:

- DITRDCA is developing the overarching policy on UTM.
- Department of Home Affairs leads cybersecurity policy, and we work with them to understand and mitigate RPAS and AAM cybersecurity risks.
- Airservices Australia (Airservices) manage and operate the Flight Information Management System (FIMS). DITRDCA leads the development of UTM-wide policy, of which FIMS is a component, and we offer regulatory review services to support its development and implementation.

Figure 3 gives an overview of policies and initiatives related to this Roadmap that are led by others, and our involvement in each.

**Figure 3 - CASA's role in cross-government initiatives related to the roadmap**

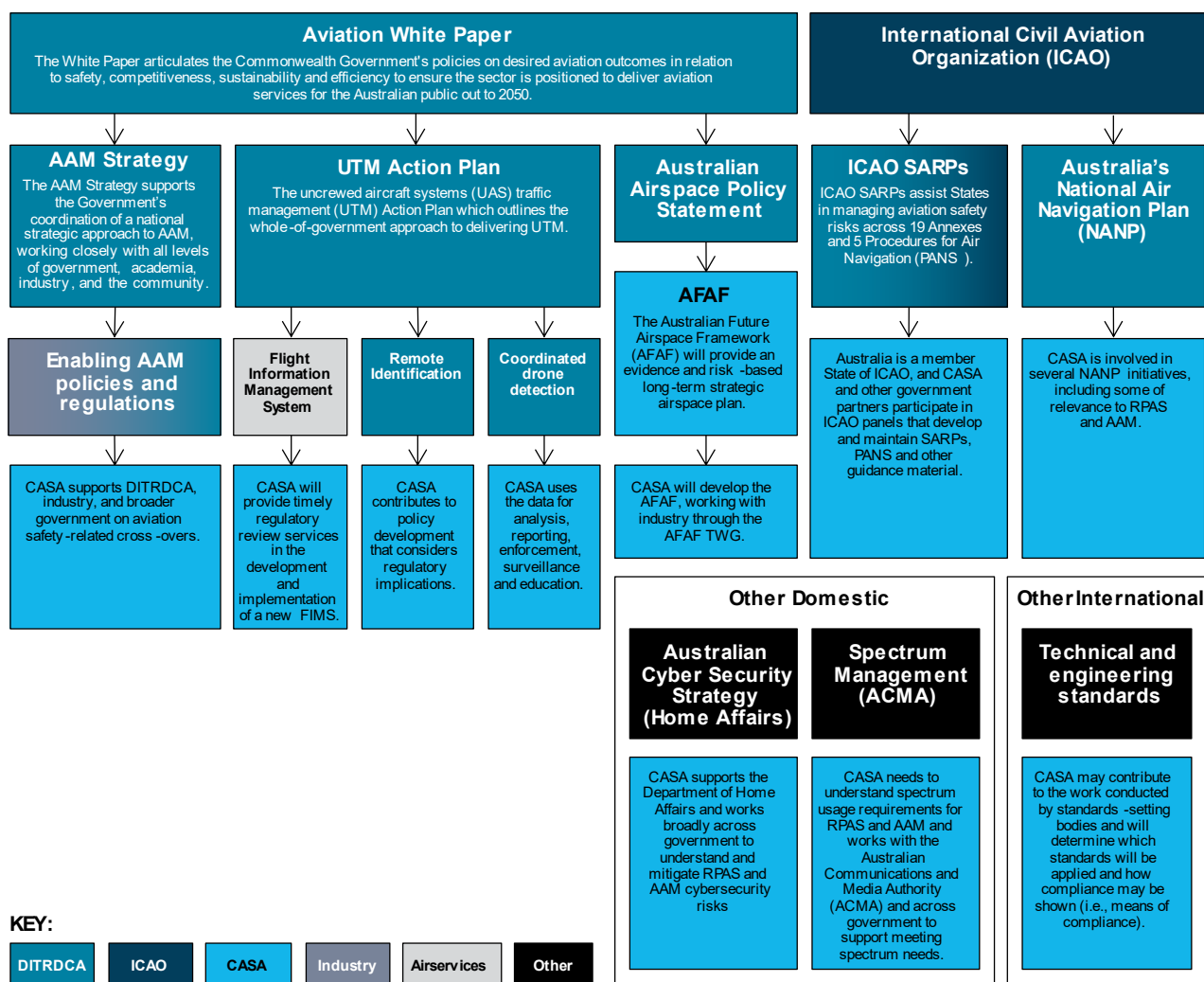


Figure 3 shows the interdependencies across the AAM and RPAS sectors. This extends to the Roadmap activities, which are not independent of other activities or larger national or international programs. In some cases, the critical path for an activity may be set outside the focus of the activity.

International dependencies may impact national cross-government initiatives and Roadmap activities. Internationally, we may:

- choose to progressively lead in developing solutions for emerging technologies
- need to align with international legal requirements or satisfy international commitments
- recognise and adapt to differences in the Australian operating, legal, political, economic or environmental context, while harmonising where practicable.

## 2.4 Maintaining currency and relevance

We expect the priorities of industry to change in response to new technologies and new operational use cases. For example, the timelines outlined in the Roadmap may not align with the pace of industry and technology development.

We may also need to respond to new challenges and priorities across other aviation sectors.

Therefore, regular reviews are essential to ensure it continues to meet industry needs. We will continue to collaborate with industry to update the roadmap in response to changing needs and priorities.

We will review the Roadmap with industry by no later than the end of the immediate term. For detailed progress and outcomes from the first review of the Roadmap conducted in 2024, see the Roadmap [Review Progress and Outcomes document](#).

## 2.5 Reporting

We will provide progress updates on activities and proposed Roadmap changes on the website. Previous updates, with searchable tags, will be available from our [Latest updates \(news\)](#) section of our website.

We'll continue to work with industry to develop flexible, regular consultation mechanisms. This may include sessions like those held in May and June 2024 for the first Roadmap review.

# 3. Challenges and principles

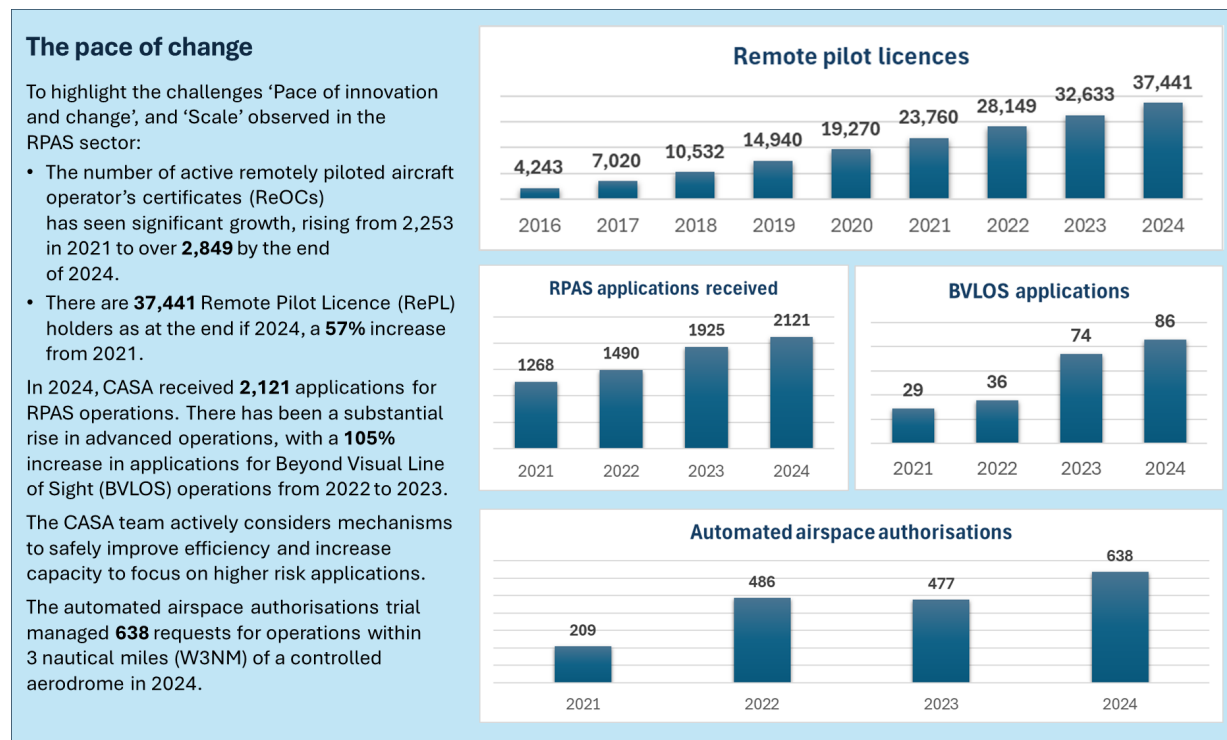
The RPAS and AAM sectors are rapidly evolving. The Roadmap outlines a long-term vision for safety regulation in these sectors, but their future needs are uncertain.

Challenges in safely regulating the RPAS and AAM sectors include:

- **Diversity** – aircraft have unique types, sizes, and varying degrees of complexity and performance
- **Pace of innovation and change** – quick evolution, with rapid advancements in technology and operational concepts
- **International alignment** – maintain alignment with global efforts due to diversity, rapid innovation and scale of the sectors
- **Scale** – there are more RPAS operating in Australia than the total number of existing airspace users combined, with further substantial growth expected
- **Disruptive** – these technologies differ from traditional approaches to aviation. We must adapt our regulatory and oversight processes to safely handle these technologies, integrating them into the broader ecosystem
- **Autonomy** – automation and human machine interactions pose regulatory challenges that need ongoing attention.

Figure 4 below illustrates some of these challenges. The rapid growth of the RPAS sector affects our regulatory services and impacts across roadmap regulatory areas.

**Figure 4 – RPAS sector challenges**



The pace of change shown in the figure above has challenged our regulatory service delivery times. This is a pain point for industry. In July 2024, we published service delivery standards for individual approvals [on our website](#) to improve transparency. We are also carrying out a benchmarking initiative to set service delivery timeframes for all regulatory services related to organisational approvals. This will give the aviation industry clear visibility of expected timeframes for receiving organisational approvals from CASA. Several Roadmap activities aim to improve, and where it is safe to do so, streamline approval and oversight processes including:

- policy
- guidance
- pathways.

See Section 5 Regulatory areas and activities.

[CASA's regulatory philosophy](#) sets out the principles underpinning the way we perform our functions, exercise our power and engage with the aviation community.

To address the challenges, the following principles guide the Roadmap activities:

- **Safety first** – the *Civil Aviation Act 1988* requires that safety must come first. We have designed the Roadmap to strive for acceptable levels of safety performance for all aviation operations.
- **Risk and outcome-based** – we will achieve greater flexibility through a legislative structure that is outcome-based. Regulations should not prescribe solutions. Regulation and oversight should be proportionate to the safety hazards and risks being managed.
- **Adaptive and scalable** – the legislative structure needs to be responsive to changing risk profiles and the needs of evolving sectors. It should account for the size of the sector and any constraints, for example, available regulatory resources.
- **Progressive and internationally aligned** – we will develop and implement the regulatory framework in phases, consistent with a long-term vision. It aims to align with, adopt or adapt international standards and regulations that benefit Australia. It should consider alignment with Australia's Defence Aviation Safety Regulations when appropriate.

<sup>1</sup> Image was updated in January 2025 to reflect full 2024 calendar year figures.

- **Balanced and socially responsible** – the framework should achieve the required safety outcomes and consider the cost and economic impact to industry. It should also account for broader community interests and expectations.

We also seek to make sure regulations are fit for purpose as per the Government's [Regulatory Policy, Practice and Performance Framework](#).

## 4. Roadmap structure

### 4.1 Policy development and consultation

The Roadmap activities often describe actions or outcomes related to regulatory needs, using terms like 'review', 'integrate', 'regulate', 'apply', or 'develop'. No matter the wording, these activities are part of a broader policy and regulatory process.

This process will usually include:

- defining and analysing the problem
- comparing to international best practices
- developing a policy position
- consulting internally and externally – we consult on all major regulatory changes
- revising and updating
- publishing the outcome
- reviewing and adjusting as operations, technology, or other factors change to ensure policies remain fit for purpose.

These steps may happen in a different order or at the same time. We may repeat steps based on feedback. Publications may take different forms, including temporary management instructions, changes to the Manual of Standards (MOS), Advisory Circulars, general exemptions, or instruments. Transitional arrangements help make sure regulations evolve as needed, as set out in the [Regulatory change](#) section.

Under the Legislation Act 2003, we must ensure that all legislative instruments go through appropriate consultation. We are also required to publicly [consult on MOS instruments](#) for at least 4 weeks, unless exceptions apply. We will also communicate major rule changes being considered via the Forward Regulatory Program.

The terms used in the Roadmap, such as 'review' or 'regulate,' reflect the progress expected over time. These terms do not pre-determine a policy decision or bypass the regulatory process. In fast-evolving sectors like RPAS and AAM, regular review, revision, and iteration are expected.

For more details, see '[How CASA changes the rules](#)' which explains our procedures, including [consultation with industry and the public](#).

### 4.2 Time horizons

Australia was one of the first countries to create laws for operating remotely piloted aircraft. Many operations that are expected to become widespread in the future are already happening here, though only on a limited scale.

While we have played a key role in supporting the growth of these sectors, we must keep up with the rapid changes by maintaining a flexible and responsive regulatory framework.

We need to efficiently scale our regulatory processes to handle the growing number of interactions with industry effectively.

Each 'time horizon' includes an assessment of how the RPAS and AAM sectors will evolve. Industry has also released an [AAM Industry Vision and Roadmap](#) including its assessment on the evolution of AAM in Australia.

#### 4.2.1 Immediate term – 2024 to 2026

Over the next 2 years, we expect the volume of RPAS flights to increase due to the rise in goods delivery services. Advances in technology will make RPAS more efficient, affordable, and capable of flying longer

distances. This is likely to boost the use of larger RPAS in the commercial sector. Meanwhile, we expect the use of RPAS and model aircraft for sport, recreation, and education to remain strong.

There will be greater demand for approvals of commercial operations beyond the standard operating conditions, and advanced operations we have not assessed before. The focus will likely shift toward implementing systems and services to support more complex operations in shared airspace.

This includes the use of RPAS to:

- play critical roles in firefighting, emergency services and public safety
- reduce costs in mining and agriculture
- conduct inspections on critical infrastructure, or in locations that are inaccessible or dangerous.

We expect a rise in demand for approvals related to:

- extended visual line of sight
- beyond visual line of sight (BVLOS)
- higher risk and larger RPAS
- increased automation, including one operator to multiple aircraft-type operations
- operations above 400 ft
- operations over and near people
- operations from or near aerodromes
- RPAS platform development and testing activities
- other new and advanced operations.

Some of these operations will present greater challenges around safety mitigations. We may see more use of micro-RPA for commercial activities. This increase will likely be driven by:

- advancements in technology
- lower aircraft costs
- fewer regulatory restrictions.

Ongoing review of the legislative framework will help address current and future challenges as operations mature.

Many companies worldwide are developing and designing aircraft types that can carry out AAM passenger and cargo operations, including in Australia. As AAM evolves, the sector will need clearer certification pathways and safety regulations, especially as operations are expected to start in Australia soon.

This will present new challenges as the regulatory approach for RPAS operations overlaps with traditional aircraft operations. The industry will first look to certify large remotely piloted aircraft.

We must consider what this means across:

- airspace design
- airspace services
- licensing
- operational approvals
- take-off and landing infrastructure
- maintenance
- flight rules
- aircraft and aircraft systems certification.

There will also be new or increased safety risks to consider in areas like cybersecurity and automation.

These emerging technologies and operations will challenge industry. They need to build social license for these new use cases among local communities and other stakeholders.

Industry will also need to meet the regulatory requirements at all levels of government including:

- national
- state
- territory
- local.

Immediate term priority outcomes:

- continue to review the efficiency and timeliness of application processing
- continue to streamline and clarify RPAS BVLOS pathways



- establish foundational regulatory policy for AAM consistent with peer national aviation authorities (NAAs)
- develop clear pathways to enable test-flights and development operations.

### 4.2.2 Near term – 2027 to 2029

In the following 3 years, we expect AAM operations to launch in Australia. This will introduce the first commercial applications, including passenger transport in urban areas. Approval processes for small to medium RPAS will become clearer and more aligned with national and international regulations. This will help pave the way for Australian-registered RPAS and AAM aircraft to start international operations during this period.

The industry will look to certify piloted AAM aircraft by type. It is likely that further planning and development will progress for vertiports and other supporting infrastructure.

The AAM sector will start showing its benefits through trials, education, and demonstrations. There is potential to:

- introduce new aerial services to remote and hard-to-reach communities
- improve and expand existing air transport options to enhance connectivity.

Emerging technologies and operations will continue to present challenges for industry. They will need to build social licence for new use cases with local communities and other aviation sector participants.

Industry will need to keep meeting the regulatory requirements at all levels of government including:

- national
- state
- territory
- local.

### 4.2.3 Medium term – 2030 to 2033

By 2030, most currently known use cases for remotely piloted aircraft systems (RPAS) are expected to be mature with expansive access to lower-level airspace and supporting regulations in place. Technologies enabling extended visual line of sight (EVLLOS) and beyond visual line of sight (BVLOS) operations in shared airspace, across both urban and rural environments, will be commonplace.

As operations mature, better data will be collected to improve safety assessments processes and systems.

Requirements for training will change as more complex operations introduce new technologies and increasing levels of automation. Competencies and skillsets will need to evolve from what has been learned before.

Research and development activities will continue with testing of even more complex operations and larger platforms, as well as higher levels of autonomy.

The commercial advanced air mobility (AAM) sector will continue to mature. It will expand to include multiple scheduled passenger transport applications supported by safe and efficient transport routes.

The first fully autonomous aircraft may be introduced on a limited scale.

### 4.2.4 Long term – beyond 2034

By the mid-2030s, we expect to see higher numbers of RPAS of different designs, purposes, and capabilities operating in the airspace. This technology will offer further efficiencies for labour-intensive operations.

Advancements in technology will also increase the diversity of aircraft. This will blur the lines between RPAS, AAM and traditional aircraft. Hybrid designs will emerge as operators see the commercial benefits these new technologies offer.

As the AAM sector grows, we will see highly automated vehicles entering service on a small scale, gradually expanding over time.

Operations will provide high quality data. This data will support informed safety decisions as the RPAS and AAM sectors continue to expand and develop.

## 4.3 Regulatory areas

There are 6 regulatory areas considered in the ongoing development of Australia's future RPAS and AAM regulatory framework.

These areas will guide the activities in this Roadmap:

1. Safety and resilience
2. Aircraft and aircraft systems
3. Airspace and traffic management
4. Operations
5. Infrastructure
6. People.

## 4.4 Supporting activities

Along with the activities outlined in this Roadmap, there are 5 overarching supporting activities.

### 4.4.1 Digital services

We must review our administrative processes and approval times as the RPAS and AAM industries grow.

Digital services play an important role in the operational environment and the evolution of risk-based regulation.

Technology and digital tools will support faster processing times and reduce some of the regulatory oversight.

### 4.4.2 Research, development and testing

We need fit-for-purpose regulatory settings to support R&D, and flight-testing activities.

We will work with industry to understand the research, development, and testing needs of AAM and RPAS to allow industry to develop safely. We support these activities by understanding industry pain points and timely review of policy settings.

### 4.4.3 Regulatory sandboxes

Our regulatory sandbox framework allows us to work with industry to test and understand new products, services, or concepts.

It may help us identify, assess and manage new risks in a way that is:

- safe
- controlled
- time-limited.

This approach may inform future regulations for RPAS, AAM, or other emerging technologies.

Where we recognise value and utility in a regulatory sandbox approach, we will seek engagement from industry and select participants who can assist us to fill operational or regulatory knowledge gaps. We recognise the opportunity to build knowledge with multiple parties to support regulatory innovation. Sandboxes can help us collect the evidence needed to develop and adapt our regulatory approach so innovation can be achieved safely and efficiently.

### 4.4.4 Systems assurance

Future operations, systems, and services like UTM will increasingly rely on automation as we move toward autonomous systems. This shift may reduce human involvement and use technologies like artificial intelligence. To maintain safety and build trust in these new technologies, we need effective methods of system assurance. This work supports several Roadmap activities and affects initiatives across all regulatory areas.



### 4.4.5 Community

RPAS and AAM must operate in line with community expectations. Balancing this with the industry's desire to innovate and grow can be challenging without the right level of social licence. Social licence refers to the ongoing acceptance of a project or technology by the community and other important stakeholders.

We will work with industry and other government agencies to build community understanding. We will also promote engagement between operators and the communities where they operate. For more details, refer to 2.3 Drivers, enablers and dependencies.

## 5. Regulatory areas and activities

This section outlines the Roadmap activities by regulatory area. We have developed these activities in consultation with industry to align with:

- expected industry growth
- evolving concepts of operations.

The activities reflect a shared understanding between industry and CASA. This understanding is based on the anticipated timeframes in which policy and regulatory development should occur to support the RPAS and AAM sectors. There may be unforeseen delays, including from consultation, resourcing constraints or other work priorities. There may also be some regulatory activities that we are unable to forecast at the time of publication. As such, you should consider proposed milestones as indicative.

Including an activity does not pre-empt a pending policy position or decision. See 4.1 Policy development and consultation.

Like the regulatory framework across CASR Parts, Roadmap regulatory areas are interconnected. For example, developing airworthiness pathways will address both initial and continuing airworthiness needs. Continuing airworthiness may also include maintenance and operational personnel linking to 'operations' and 'people' activities. Subsequently, roadmap deliverables are likely to span multiple regulatory areas.

Some activities will have multiple deliverables to meet industry needs, operational maturity, or technological advances. We often describe these 'responsive' activities as either:

- ongoing
- commencing from
- enduring.

Each activity includes a relevant Roadmap principle to clarify its purpose. While 'safety first' is a core principle for each activity, it may not capture the broader reasons for including the activity in the Roadmap.

Importantly, milestones are not barriers for industry. Applicants can work with us toward safe operations ahead of activity milestones where there is value and priorities are aligned. Transitional arrangements may support these early-cycle applications (See Sections 2.2.2 and 4.1).

### 5.1 Safety and resilience

Safety and resilience encompass the standards, systems, guidance, and management of safety for RPAS and AAM operations. Safety and resilience also include data-recording, incident and accident reporting, enforcement methods, and security of RPAS and AAM operations related to safety. This includes:

- safety promotion
- safety innovation
- accident and incident reporting, analysis and investigation
- safety oversight, improvement and enforcement
- data collection
- methods to determine the assurance of software
- cybersecurity aviation safety regulatory considerations.

### 5.1.1 What we want to achieve

We will continue to work with existing security frameworks, while strengthening cooperative ties with other Australian government agencies.

We aim to take a scaled approach to safety management. This approach will allow innovation through:

- flexible, informed risk-based solutions
- ensuring high levels of safety and resilience for RPAS and AAM.
- clear guidance
- targeted safety promotion campaigns.

### 5.1.2 How we will do this

The safety and resilience regulatory area activities are as follows.

#### 5.1.2.1 Enduring activities

These activities are ongoing and will continue to be so.

#### **SR1: Continue to carry out safety education and promotion activities to embed a positive safety culture**

We will conduct ongoing safety education and promotion activities, informed by industry maturity and needs, for RPAS and AAM operators to foster a positive safety culture.

**Principle:** Safety first.

#### **SR2: Consider data collection and uses to improve safety results**

We analyse data from the National Drone Detection System to assess RPAS user behaviour for compliance and aviation safety. We use this data for enforcement related matters and informing mitigation strategies like targeted safety campaigns.

**Principle:** Safety first.

#### **SR3: Continue to work with industry associations to promote key safety lessons from available data**

We routinely work with industry associations collaborating over events, including industry webinars and presentations. We prioritise our education and safety awareness campaigns based on risk.

**Principle:** Safety first.

#### **SR4: Work with DITRDCA to provide transparent reporting on RPAS enforcement actions to promote corrective actions and lessons learned**

We will continue to work with DITRDCA on RPAS-related activities and initiatives to support whole of government efforts.

**Principle:** Balanced and socially responsible.

#### **SR5: Coordinate the approach to enforcement between relevant authorities**

Maintain relationships with enforcement agencies to coordinate appropriate enforcement actions on emerging technologies when needed.

**Principle:** Balanced and socially responsible.

#### **SR6: Work collaboratively across government to understand and establish spectrum requirements for RPAS and AAM**

Work with ACMA, DITRDCA and Airservices Australia to understand and establish spectrum requirements for RPAS and AAM.

**Principle:** Progressive and internationally aligned.

## 5.2 Aircraft and aircraft systems

We classify RPAS and AAM aircraft and systems based on whether they are certified by type. We determine these categories according to the level of assurance required for the aircraft and their intended operations.

Aircraft and aircraft systems include:

- airworthiness and certification of aircraft
- qualification and integration of systems and equipment
- design, production, and maintenance organisation approvals
- automation and autonomy
- Command, control, and communications.

### 5.2.1 What we want to achieve

We intend to develop clear pathways and regulations to certify RPAS and AAM aircraft and systems. There should be a harmonised framework consistent with major international bodies. This includes ICAO and regulators like the Federal Aviation Administration (FAA) and European Union Aviation Safety Agency (EASA). This framework will use [performance-based standards](#), including those published by standards development organisations.

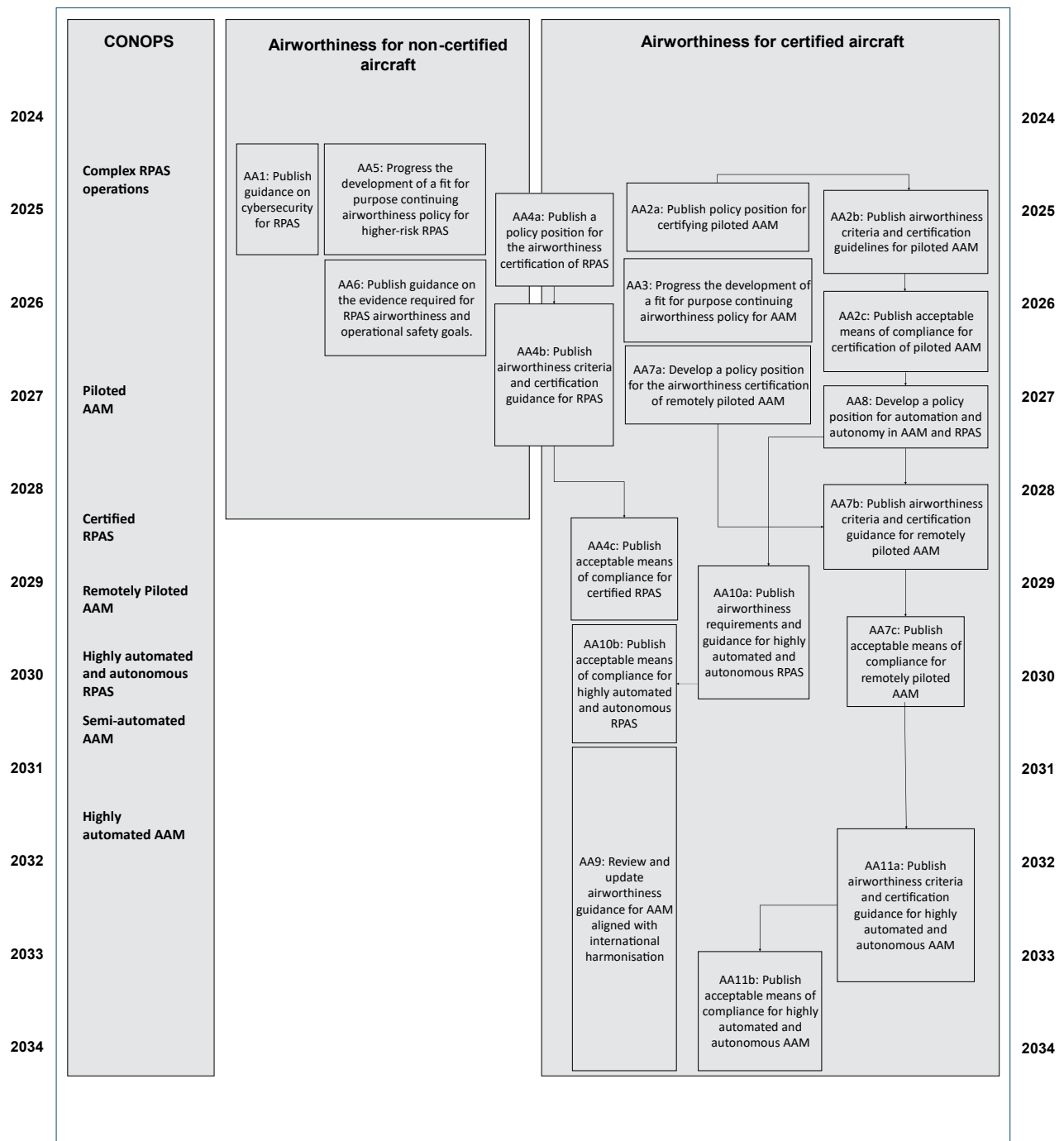
One framework is the Specific Operations Risk Assessment (SORA). This is the Joint Authorities for Rulemaking on Unmanned Systems (JARUS) method to safely create, evaluate and conduct uncrewed aircraft system operation.

In developing these pathways, we propose the following principles:

- We will seek to align with like-minded countries for this work and will accept international standards where appropriate in preference to developing unique Australian standards.
- Certification of AAM aircraft would be in line with international regulatory frameworks using appropriate airworthiness standards and acceptable means of compliance.
- Higher risk RPAS that need to be certified by type will have policy set in line with international regulatory frameworks. We will use appropriate airworthiness standards and means of compliance in the certification process. These will ensure a safety level comparable to traditional aircraft when operating in any airspace.
- Lower risk RPAS that we do not need to certify will be operationally approved in line with recognised methods and processes.

## 5.2.2 How we will do this

Figure 5 - Aircraft and aircraft systems activities



### 5.2.2.1 Immediate term

#### AA1: Publish guidance on cybersecurity for RPAS

Create guidance material for assessing cybersecurity in low and medium-risk RPAS operations.

**Principle:** Balanced and socially responsible.

**Milestone:** Q2, 2025.

### **AA2a: Publish policy position for certifying piloted AAM**

Work with international regulatory authorities to harmonise guidance on the certification of piloted AAM, airworthiness criteria and means of compliance.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q3, 2025.

### **AA2b: Publish airworthiness criteria and certification guidelines for piloted AAM**

Work with international regulatory authorities to harmonise guidance on the certification of piloted AAM, airworthiness criteria and means of compliance.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q3, 2025.

### **AA2c: Publish acceptable means of compliance for certification of piloted AAM**

Identify published standards from standards organisations that applicants may use to show compliance with applicable airworthiness requirements. This will need us to work with international regulatory authorities to harmonise as piloted AAM needs mature.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q4, 2026.

### **AA3: Progress the development of a fit for purpose continuing airworthiness policy for AAM**

Progress the development of a fit-for-purpose continuing airworthiness policy and regulatory pathways. Adopt a proportional approach to AAM maintenance, maintenance personnel licensing, and continuing airworthiness management policies.

**Principle:** Risk and outcome-based.

**Milestone:** Q3, 2026.

### **AA4a: Publish a policy position for the airworthiness certification of RPAS**

Review and develop airworthiness regulatory pathways for higher-risk RPAS, to support expected platforms and their safe and efficient operations.

**Principle:** Adaptive and scalable.

**Milestone:** Q4, 2025.

### **AA5: Progress the development of a fit for purpose continuing airworthiness policy for higher-risk RPAS**

Review and update maintenance and continuing airworthiness policies for RPAS so they are appropriate as platforms increase in size and complexity. This includes consideration of maintenance personnel authorisations and continuing airworthiness management policies.

**Principle:** Risk and outcome-based.

**Milestone:** Q3, 2025.

## **AA6: Publish guidance on the evidence required for RPAS airworthiness and operational safety goals**

Work with original equipment manufacturers (OEMs) and operators to develop procedures and guidance for medium risk RPAS airworthiness. Improve existing regulatory pathways to allow a risk-based approach to RPAS operations.

**Principle:** Risk and outcome-based.

**Milestone:** Q2, 2026.

## **AA7a: Develop a policy position for the airworthiness certification of remotely piloted AAM**

Work with international regulatory authorities to develop a harmonised policy for the remote piloted operation of AAM aircraft.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q1, 2027.

### **5.2.2.2 Near term**

## **AA8: Develop a policy position for automation and autonomy in AAM and RPAS**

Work with international regulatory authorities to develop a policy for highly automated and autonomous systems in AAM and RPAS.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q1, 2027.

## **AA7b: Publish airworthiness criteria and certification guidance for remotely piloted AAM**

Work with international regulatory authorities to harmonise guidance on airworthiness criteria.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q4, 2028.

## **AA4b: Publish airworthiness criteria and certification guidance for RPAS**

Work with international regulatory authorities to harmonise guidance on airworthiness criteria for certified RPAS.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q2, 2027.

## **AA4c: Publish acceptable means of compliance for certified RPAS**

Identify published standards from standards organisations that applicants may use to show compliance with applicable airworthiness requirements. This will need us to work with international regulatory authorities to harmonise as certified RPAS needs mature.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q3, 2029.

### 5.2.2.3 Medium term

#### **AA7c: Publish acceptable means of compliance for remotely piloted AAM**

Identify published standards from standards organisations that applicants may use to show compliance with applicable airworthiness requirements. This will need us to work with international regulatory authorities to harmonise as remotely piloted AAM needs mature.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q2, 2030.

#### **AA9: Review and update airworthiness guidance for AAM aligned with international harmonisation**

Monitor and review airworthiness guidance after AAM operations begin to ensure they are fit-for-purpose and maintain international harmonisation.

**Principle:** Progressive and internationally aligned.

**Milestone:** Ongoing from Q1, 2030.

#### **AA10a: Publish airworthiness requirements and guidance for highly automated and autonomous RPAS**

Work with international regulators to harmonise guidance on airworthiness criteria for highly automated and autonomous systems in RPAS.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q1, 2030.

#### **AA10b: Publish acceptable means of compliance for highly automated and autonomous RPAS**

Identify published standards from standards organisations that applicants may use to show compliance with applicable airworthiness requirements. This will need us to work with international regulatory authorities to harmonise as the needs for highly automated and autonomous systems in RPAS mature.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q4, 2030.

### 5.2.2.4 Long term

#### **AA11a: Publish airworthiness criteria and certification guidance for highly automated and autonomous AAM**

Work with international regulatory authorities to harmonise guidance on airworthiness criteria for highly automated and autonomous systems in AAM.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q1, 2033.

#### **AA11b: Publish acceptable means of compliance for highly automated and autonomous AAM**

Identify published standards from standards organisations that applicants may use to show compliance with applicable airworthiness requirements. This will need us to work with international regulatory authorities to harmonise as the needs for highly automated and autonomous systems in AAM mature.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q1, 2034.

## 5.3 Airspace and traffic management

Airspace and traffic management covers the policies, frameworks, standards, regulations, and processes needed to support new airspace users. It must support an airspace and traffic management environment that is safe, efficient, provides fair access and operates across all airspace users. This includes:

- airspace structure
- rules of the air
- separation and conflict management
- Uncrewed aircraft systems (UAS) traffic management (UTM) services
- equipage and information exchange.

We regulate Australian administered airspace through our [Office of Airspace Regulation](#), which works with stakeholders including Airservices and Defence. [Airservices](#) and Defence are responsible for Australia's airspace management. Airservices also manages Australia's:

- aeronautical information
- aviation communications
- navigation aids and technology
- flight path changes
- Aviation Rescue Fire Fighting Services.

### 5.3.1 What we want to achieve

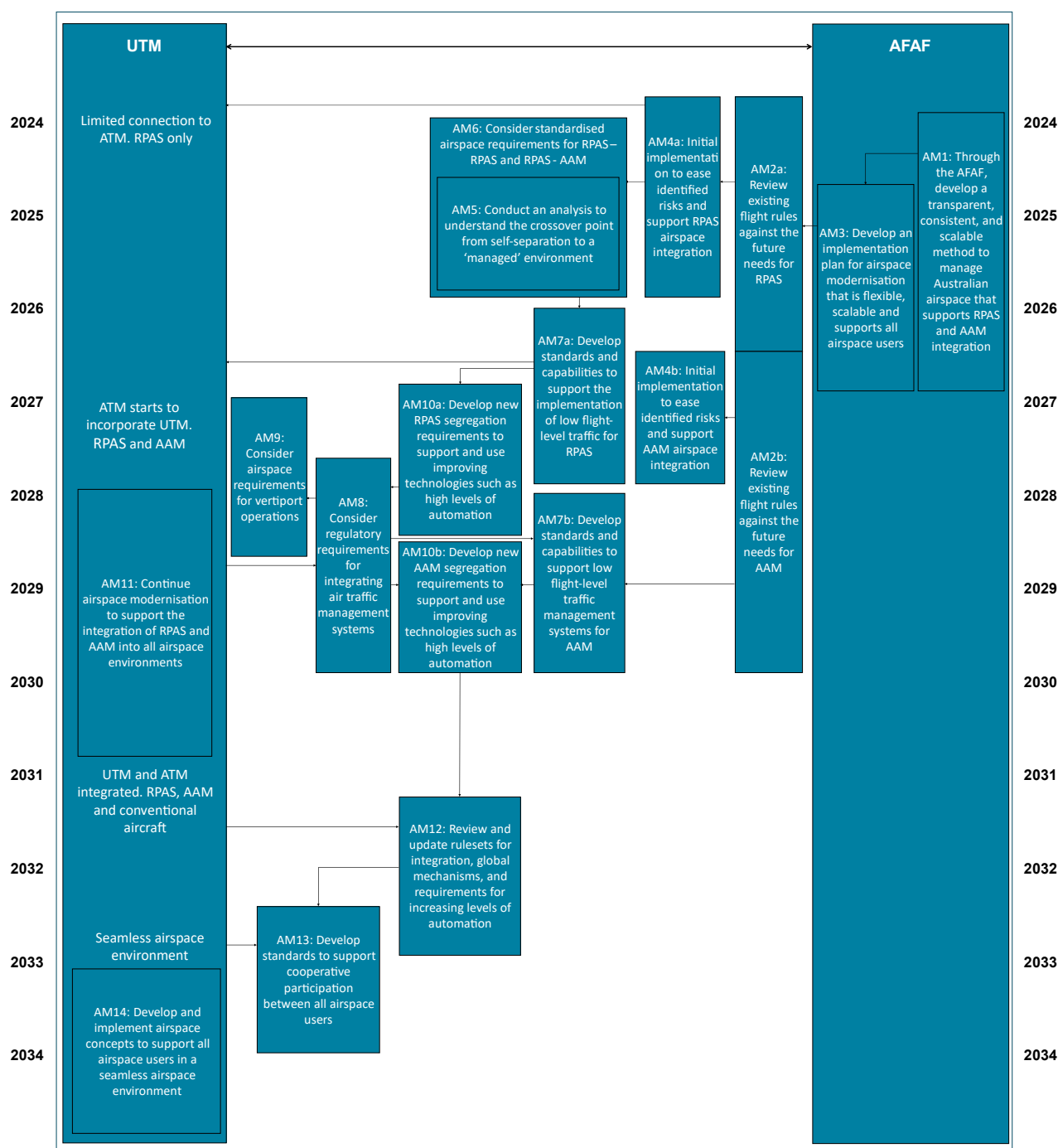
We aim to create a harmonised national airspace. We will base this on an evidence and risk-based approach where safety is the primary consideration. It will use robust collision risk modelling to minimise restrictions on user access to airspace, balancing other stakeholder needs. This could include efficiency, equitability, the environment, or national security. This approach will maintain an acceptable level of safety performance, regardless of the type of aircraft or pilot. UTM is one enabler of this harmonised national airspace approach.

The activities in this Roadmap must be informed by other [Aviation White Paper → Towards 2050](#) initiatives. This includes Australian Future Airspace Framework (AFAF), the UTM Action Plan and the Airservices' FIMS. Activities related to Australian airspace are also in the [Australian Airspace Policy Statement \(2021\)](#).



## 5.3.2 How we will do this

Figure 6 - Airspace and traffic management activities



### 5.3.2.1 Immediate term

#### AM1: Through the AFAF, develop a transparent, consistent, and scalable method to manage Australian airspace that supports RPAS and AAM integration

Develop an overarching framework to align and integrate all airspace users, including RPAS, AAM and high-altitude operations. The AFAF is a component of Australia's long-term airspace reforms.

**Principle:** Adaptive and scalable.

**Milestone:** Q4, 2026. Decide and publish AFAF sub-activities, clarify sequencing and dependencies over time.

## **AM2a: Review existing flight rules against the future needs for RPAS**

Research how international flight rules for RPAS and AAM have been implemented and investigate how existing flight rules apply to RPAS and AAM in Australia. Review Australian flight rules considering the evolving needs of RPAS, anticipating the need to align with operational maturity and technology advancements over time. Identify future changes required including conspicuity and equipage considerations.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q2, 2026.

## **AM3: Develop an implementation plan for airspace modernisation that is flexible, scalable and supports all airspace users**

Develop an implementation plan under the AFAF, supported by a long-term strategic airspace plan that will support all airspace users. This will be reliant on both higher-level policy and operational technology.

**Principle:** Adaptive and scalable.

**Milestone:** Q4, 2026.

## **AM4a: Initial implementation to ease identified risks and support RPAS airspace integration**

Begin implementation towards RPAS airspace integration to mitigate identified risks, facilitate progress, and help gain broader acceptance from all airspace users. This includes maturing systems building from [trials for automated airspace authorisations](#) for ReOC holders within 5.5 km of selected controlled airports.

**Principle:** Adaptive and scalable.

**Milestone:** Q4, 2025.

## **AM5: Conduct an analysis to understand the crossover point from self-separation to a 'managed' environment**

Conduct analysis to decide the need for, demand drivers, and oversight requirements for RPAS integration.

**Principle:** Risk and outcome-based.

**Milestone:** Q4, 2025.

## **AM6: Consider standardised airspace requirements for RPAS – RPAS and RPAS - AAM**

Conduct analysis to decide the need for, demand drivers, and oversight requirements for RPAS integration.

**Principle:** Safety first.

**Milestone:** Q4, 2025.

### **5.3.2.2 Near term**

## **AM2b: Review flight rules against the future needs for AAM**

Research how international flight rules for RPAS and AAM have been implemented and investigate how existing flight rules apply to RPAS and AAM in Australia. Review Australian flight rules considering the evolving needs of AAM, anticipating the need to align with operational maturity and technology advancements over time. Identify future changes required including conspicuity and equipage considerations.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q2, 2029.

#### **AM4b: Initial implementation to ease identified risks and support AAM airspace integration**

Commence implementation to mitigate identified risks and facilitate AAM airspace integration to assist broader acceptance by all airspace users

**Principle:** Adaptive and scalable.

**Milestone:** Q4, 2027.

#### **AM7a: Develop standards and capabilities to support the implementation of low flight-level traffic for RPAS**

Develop standards and capabilities to support the implementation of low flight-level traffic management systems for RPAS. This includes exploring existing standards, international developments and Australian airspace needs while aligning with government safety initiatives.

**Principle:** Safety first.

**Milestone:** Q4, 2027.

#### **AM7b: Develop standards and capabilities to support low flight-level traffic management systems for AAM**

Develop standards and capabilities to support low flight-level traffic management systems for AAM. This includes exploring existing standards, international developments and Australian airspace needs while aligning with government safety initiatives.

**Principle:** Safety first.

**Milestone:** Q4, 2029.

#### **AM8: Consider regulatory requirements for integrating air traffic management systems**

Consider the regulatory needs for integrating air traffic management systems (for instance, ATM and UTM) following the Civil Military Air Traffic Management System implementation and government policy direction on UTM.

**Principle:** Balanced and socially responsible.

**Milestone:** Q4, 2029.

#### **AM9: Consider airspace requirements for vertiport operations**

Consider airspace requirements to address demand and capacity needs for air traffic into and out of vertiports.

**Principle:** Adaptive and scalable.

**Milestone:** Q2, 2028.

#### **AM10a: Develop new RPAS segregation requirements to support and use improving technologies such as high levels of automation**

Develop RPAS segregation requirements that leverage increasing levels of automation and emerging technologies in airspace management. These new requirements aim to enhance aviation safety and increase efficiency.

**Principle:** Safety first.

**Milestone:** Q2, 2028.

### **AM10b: Develop new AAM segregation requirements to support and use improving technologies such as high levels of automation**

Develop AAM segregation requirements that leverage increasing levels of automation and emerging technologies in airspace management. These new requirements aim to enhance aviation safety and increase efficiency.

**Principle:** Safety first.

**Milestone:** Q4, 2029.

#### **5.3.2.3 Medium term**

### **AM11: Continue airspace modernisation to support the integration of RPAS and AAM into all airspace environments**

Progress airspace modernisation towards the integration of RPAS and AAM into all airspace environments, ensuring a safe, efficient and cohesive operational environment.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q4, 2030.

### **AM12: Review and update rulesets for integration, global mechanisms, and requirements for increasing levels of automation**

Review and update rulesets for integration, ensuring they account for the adoption of new technologies worldwide.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q4, 2032.

### **AM13: Develop standards to support cooperative participation between all airspace users**

Develop standards to support cooperative participation among all airspace users. This aims to mature provisions for increasing levels of automation and integrating emerging technologies in airspace management.

**Principle:** Adaptive and scalable.

**Milestone:** Q4, 2033.

#### **5.3.2.4 Long term**

### **AM14: Develop and implement airspace concepts to support all airspace users in a seamless airspace environment**

Develop and implement airspace concepts to support all users in a seamless future airspace environment, improving coordination and efficiency. This activity works towards the master plan for Australian airspace.

**Principle:** Balanced and socially responsible.

**Milestone:** Q4, 2034.

## 5.4 Operations

Operations include the requirements, conditions, and approvals needed to safely conduct RPAS and AAM activities. We categorise operations based on different risk levels. This includes:

- standard operating conditions for RPAS
- operational approvals and authorisations for RPAS (for example, oversight mechanisms for area approvals)
- operating conditions for AAM
- operational approvals and authorisations for AAM
- regulatory interfaces (for example licensing, maintenance, equipage requirements, certification, registration marks, security).

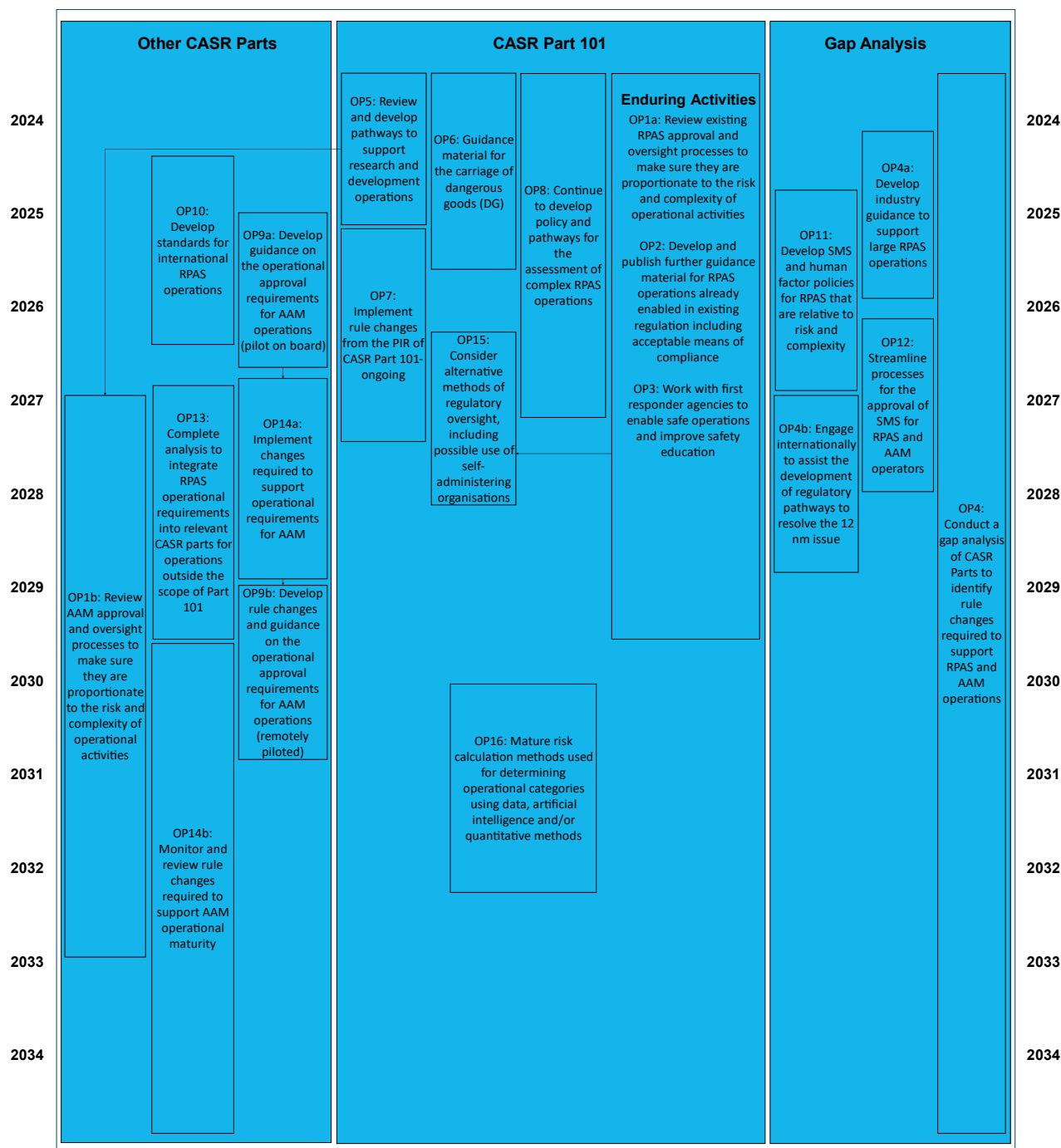
### 5.4.1 What we want to achieve

We aim to maintain an effective, [outcome-based](#) regulatory framework for safe operational requirements and approvals. This framework aims to be scalable and accessible to all entrants. It will be subject to appropriate regulatory oversight that matches the level of risk an operation may pose.

We will continue to normalise operations previously considered to be novel to sit within standard rules. This includes the development of general exemptions and instruments in line with the regulatory maturity model (see Regulatory change).

## 5.4.2 How we will do this

Figure 7 – Operations activities



### 5.4.2.1 Enduring activities

#### OP1a: Review existing RPAS approval and oversight processes to make sure they are proportionate to the risk and complexity of operational activities

Review processes and supporting documentation in line with current priorities and resourcing. We will consider quality assurance and continuous improvement practices. Where possible, streamline applications while ensuring safety. This could include considering digitisation or similar technologies to enhance efficiency and timeliness.

**Principle:** Risk and outcome-based.

## **OP2: Develop and publish further guidance material for RPAS operations already enabled in existing rules including acceptable means of compliance**

We regularly review RPAS policy to apply a risk-based approach that enables safe operations and improves efficiency. This work will be ongoing and will adapt to industry needs.

**Principle:** Safety first.

## **OP3: Work with first responder agencies to enable safe operations and improve safety education**

We maintain liaison with first responder agencies to enhance education on the safe operation of RPAS and regularly review policies and procedures that support operations.

**Principle:** Balanced and socially responsible.

## **OP4: Conduct a gap analysis of CASR Parts to identify rule changes required to support RPAS and AAM operations**

Conduct gap analysis of CASR Parts and supporting policies as needed. Detailed industry concepts of operation will help to identify changes required for regulatory readiness for RPAS and AAM operations. The outcome of this work could include the identification of new activities, such as OP4a and OP4b.

**Principle:** Progressive and internationally aligned.

### **5.4.2.2 Immediate term**

## **OP5: Review and develop pathways to support research and development operations**

Review requirements for research and development; and develop and publish guidance. This activity aims to support industry needs, while ensuring best practices and safety standards throughout systems, operations development and testing processes.

**Principle:** Risk and outcome-based.

**Milestone:** Discussion paper Q1, 2025.

## **OP6: Guidance material for the carriage of dangerous goods (DG)**

Develop and publish guidance material for the safe carriage of dangerous goods to assist operators to adhere to the rules.

**Principle:** Balanced and socially responsible.

**Milestone:** Q4, 2025. Publish guidance material for the carriage of dangerous goods on RPAS.

## **OP7: Implement rule changes from the PIR of CASR Part 101**

Continue to implement the actions that resulted from the 2021 post-implementation review and public consultation in 2022.

**Principle:** Adaptive and scalable.

**Milestone:** This work is ongoing.

## **OP4a: Develop industry guidance to support large RPAS operations**

Review policy and publish industry guidance outlining operational pathways to support the safe operation of large RPAS.

**Principle:** Risk and outcome-based.

**Milestone:** Q4, 2025. Publish guidance for large RPAS operational pathways.

## **OP8: Continue to develop policy and pathways for the assessment of complex RPAS operations**

Continue to develop policies and pathways for RPAS operations that are relative to the risk and complexity of the operations. This could include further clarification and streamlining of BVLOS pathways, and consideration of high altitude and increasingly automated RPAS. It may include identifying streamlined pathways to enable lower risk RPAS operations.

**Principle:** Risk and outcome-based.

**Milestone:** This work is ongoing.

## **OP9a: Develop guidance on the operational approval requirements for AAM operations (pilot on board)**

Develop guidance and pathways for operational approval for pilot on board AAM operations with a focus on aviation safety through efficient processes.

**Principle:** Risk and outcome-based.

**Milestone:** Q3, 2026.

## **OP10: Develop standards for international RPAS operations**

Develop standards for international RPAS operations that align to ICAO standards and recommended practices. This will ensure harmonisation internationally for RPAS operations.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q2, 2026.

## **OP11: Develop SMS and human factor policies for RPAS that are relative to risk and complexity**

Develop safety management system (SMS) and human factors policies relative to the risks and complexity of RPAS operations.

**Principle:** Risk and outcome-based.

**Milestone:** Q4, 2026.

### **5.4.2.3 Near term**

## **OP12: Streamline processes for the approval of SMS for RPAS and AAM operators**

Review and, if needed, develop and streamline SMS assessment and approval processes to improve efficiency and make sure requirements are relative to risk.

**Principle:** Risk and outcome-based.

**Milestone:** Q4, 2028.

## **OP1b: Review AAM approval and oversight processes to make sure they are proportionate to the risk and complexity of operational activities**

Review AAM processes, procedures and supporting documentation using quality assurance and continuous improvement practices to streamline applications whilst ensuring assessments of applications deliver safe operations.

**Principle:** Risk and outcome-based.

**Milestone:** This work will commence once AAM operations are underway and will be ongoing.



### **OP13: Complete analysis to integrate RPAS operational requirements into relevant CASR parts for operations outside the scope of Part 101**

Analyse the need to integrate RPAS operational requirements across the CASR framework to safely cater for the increasing complexity of RPAS aircraft and future operations.

**Principle:** Risk and outcome-based.

**Milestone:** Q2, 2029.

### **OP14a: Implement changes required to support operational requirements for AAM**

Implement the necessary changes required to support the introduction of AAM operations to ensure that evolving standards and practices effectively enhance aviation safety.

**Principle:** Risk and outcome-based.

**Milestone:** Q4, 2028.

### **OP15: Consider alternative methods of regulatory oversight, including possible use of self-administering organisations**

Review appropriateness of regulatory oversight as operational activity profiles develop and mature over time. This could include third-party authorisations or the establishment of self-administering organisations.

**Principle:** Risk and outcome-based.

**Milestone:** Q4, 2027.

### **OP4b: Engage internationally to assist the development of regulatory pathways to resolve the 12 nm issue**

Continue working with ICAO and like-minded regulators at legal and operational levels to help develop regulatory solutions for the 12 nm issue.

**Principle:** Progressive and internationally aligned.

**Milestone:** Commenced, with expected resolution by Q4, 2028.

#### **5.4.2.4 Medium term**

### **OP9b: Develop rule changes and guidance on the operational approval requirements for AAM operations (remotely piloted)**

Develop guidance, pathways for operational approval, and subsequent rule adjustments for remotely piloted AAM operations with a focus on aviation safety through efficient processes.

**Principle:** Safety first.

**Milestone:** Q2, 2030.

### **OP14b: Monitor and review rule changes required to support AAM operational maturity**

Monitor, review and implement the necessary changes to rules, guidance and procedures needed to support the increasing maturity of AAM operations. This is a follow-on activity from OP15a.

**Principle:** Risk and outcome-based.

**Milestone:** From Q1, 2029.

## **OP16: Mature risk calculation methods used for determining operational categories using data, artificial intelligence and/or quantitative methods**

Enhance risk calculation methods for determining operational categories by using data, artificial intelligence, and quantitative approaches. This process should improve the accuracy and reliability of risk assessments, supporting informed decision-making and promoting safer operational practices.

**Principle:** Risk and outcome-based.

**Milestone:** Q1, 2032.

## **5.5 Infrastructure**

Infrastructure is the supporting facilities, systems and processes needed for the safe operation of RPAS and AAM aircraft. This includes:

- aerodromes including airports, vertiports, and interoperable heliports
- development of a regulatory framework to support infrastructure approvals outside of existing airports and helipads
- flight test ranges and areas
- Safety-related Surveillance Technologies (ground and space-based)
- RPAS detection systems
- spectrum and data sharing.

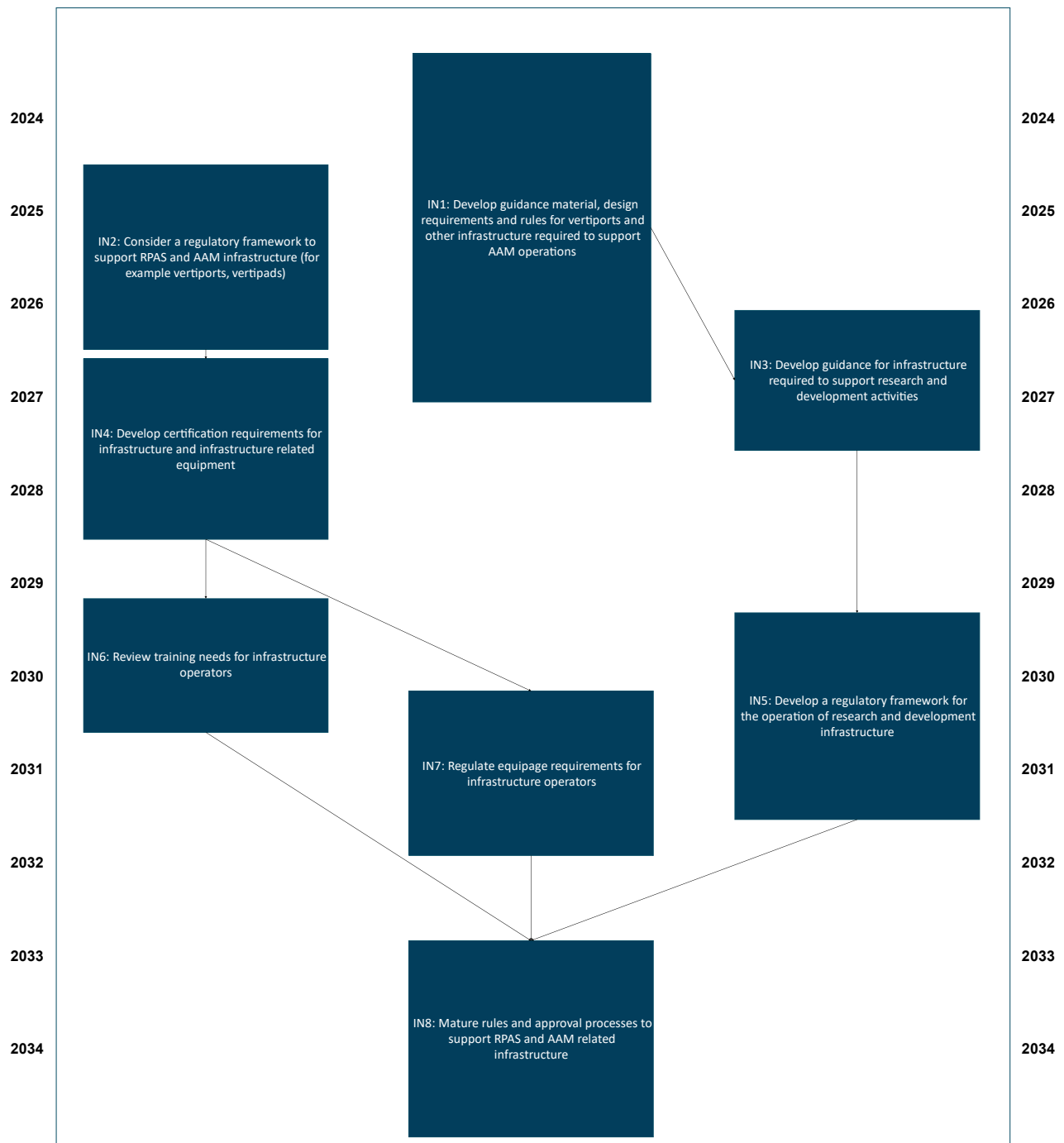
### **5.5.1 What we want to achieve**

We aim to create clear and risk-based standards along with simple, flexible and efficient authorisation pathways for operators of ground-and spaced-based infrastructure.

The activities identified in the Roadmap will be informed by other [Aviation White Paper → Towards 2050](#) initiatives. These include the AAM Strategy, and AAM Infrastructure Planning Guidance.

## 5.5.2 How we will do this

Figure 8 – Infrastructure activities



### 5.5.2.1 Immediate term

#### IN1: Develop guidance material, design requirements and rules for vertiports and other infrastructure required to support AAM operations

Develop guidance material, design requirements, and rules for vertiports and other infrastructure needed to support AAM operations. This initiative will ensure that facilities are safe, efficient, and able to meet AAM needs, helping integration into urban and regional environments.

**Principle:** Balanced and socially responsible.

**Milestone:** Q4, 2026. Develop operations and detailed design standards guidance.

## **IN2: Consider a regulatory framework to support RPAS and AAM infrastructure (for example vertiports, vertipads)**

Establish a regulatory framework to support the infrastructure needs for RPAS and AAM operations, including vertiports and vertipads. This framework will outline the rules and standards to ensure safety, efficiency, and integration of AAM infrastructure into regional and urban environments.

**Principle:** Risk and outcome-based.

**Milestone:** Q2, 2026.

### **5.5.2.2 Near term**

## **IN3: Develop guidance for infrastructure required to support research and development activities**

Develop guidance in relation to the infrastructure needed to support automated flight and airspace flow between vertiports. The activity is also dependent on OEM requirements and operator concepts of operation.

**Principle:** Balanced and socially responsible.

**Milestone:** Q2, 2027.

## **IN4: Develop certification requirements for infrastructure and infrastructure related equipment**

Develop certification requirements for infrastructure and related equipment as demand increases to ensure safety, reliability, and compliance with regulatory standards. These requirements will give a clear framework for evaluating and approving aviation safety aspects of infrastructure necessary for safe RPAS and AAM operations.

**Principle:** Adaptive and scalable.

**Milestone:** Q2, 2028.

### **5.5.2.3 Medium term**

## **IN5: Develop a regulatory framework for the operation of research and development infrastructure**

Develop a regulatory framework for research and development infrastructure. Set standards and guidelines to ensure safety, compliance, and effective management. Support industry innovation while maintaining safety.

**Principle:** Risk and outcome-based.

**Milestone:** Q2, 2031.

## **IN6: Review training needs for infrastructure operators**

Where required, regulate operator training and set competency goals for infrastructure operators to ensure they meet safety standards.

**Principle:** Risk and outcome-based.

**Milestone:** Q2, 2030.

## **IN7: Regulate equipage requirements for infrastructure operators**

Decide the corresponding requirements for infrastructure equipage as airspace management and technology evolves to ensure the safe operations of RPAS and AAM.

**Principle:** Adaptive and scalable.

**Milestone:** Q3, 2031.

#### 5.5.2.4 Long term

### IN8: Mature rules and approval processes to support RPAS and AAM related infrastructure

Continue to monitor, review, and update rules for RPAS and AAM infrastructure as operations evolve and complexity increases.

**Principle:** Risk and outcome-based.

**Milestone:** This work will be ongoing.

## 5.6 People

This regulatory area addresses the training, licensing and ongoing competency for everyone involved in RPAS and AAM operations. This includes:

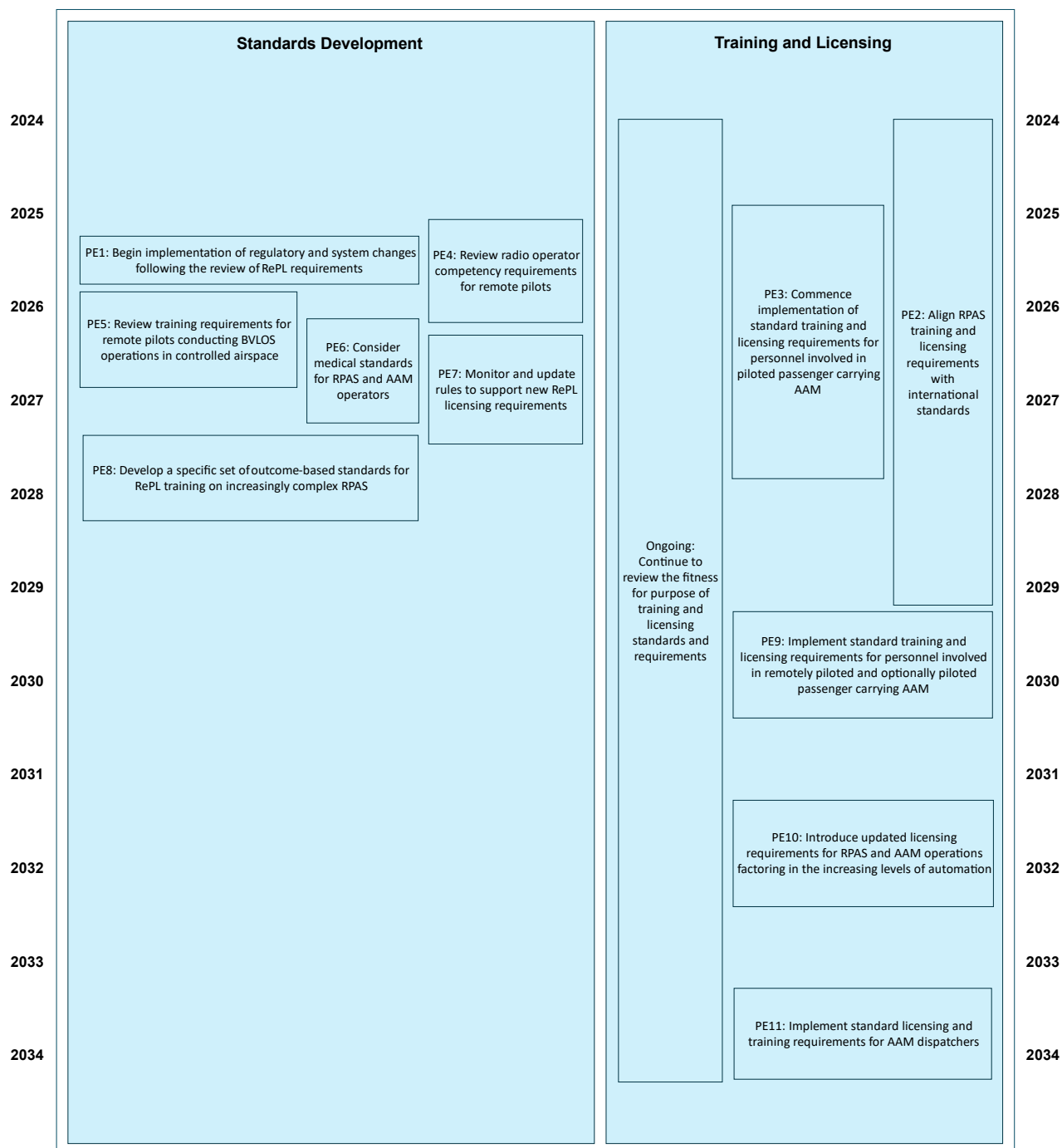
- remote pilot accreditation
- remote pilot training and licensing
- AAM pilot training and licensing
- AAM aircraft supervisor training and licensing
- non-certified and certified RPAS maintenance staff training and licensing
- cabin crew
- training organisations
- instructor/examiner training and licensing
- encouraging diversity and inclusion in the talent pool.

### 5.6.1 What we want to achieve

We aim to improve the regulatory requirements for training, licensing and ongoing competency for all roles in commercial and non-commercial RPAS and AAM operations. Guided by ICAO and other aviation safety regulators, this may include licencing and training pathways that help transition people between traditional aviation roles and RPAS and AAM operations.

## 5.6.2 How we will do this

Figure 9 – People activities



### 5.6.2.1 Immediate term

#### PE1: Begin implementation of regulatory and system changes following the review of RePL requirements

Begin implementing regulatory and system changes based on RePL requirements review. Future-proof the licensing system to accommodate industry growth and evolving concepts of operation. This could include streamlined pathways for medium RPAS licensing.

**Principle:** Adaptive and scalable.

**Milestone:** From Q2, 2025.

## **PE2: Align RPAS training and licensing requirements with international standards**

Work to align and improve the efficiency of RPAS licensing requirements to harmonise with international (including ICAO) standards.

**Principle:** Progressive and internationally aligned.

**Milestone:** This work has begun and is ongoing.

## **PE3: Commence implementation of standard training and licensing requirements for personnel involved in piloted passenger carrying AAM**

Monitor international developments towards implementing harmonised requirements for AAM. This work needs to consider how aviation professionals transition their current licensing to new vehicles and technologies.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q4, 2025.

## **PE4: Review radio operator competency requirements for remote pilots**

Identify the gap between remote pilot training and competencies and what is required to safely coordinate with crewed aviation.

**Principle:** Safety first.

**Milestone:** Q1, 2026.

## **PE5: Review training requirements for remote pilots conducting BVLOS operations in controlled airspace**

Build on the BVLOS OCTA exam developed in 2023 to meet remote pilot training needs. Use operational maturity to inform the timing.

**Principle:** Safety first.

**Milestone:** Q4, 2026.

### **5.6.2.2 Near term**

## **PE6: Consider medical standards for RPAS and AAM operators**

This activity and activation of work within ICAO will contribute to the development of medical standards for RPAS and AAM operators.

**Principle:** Progressive and internationally aligned.

**Milestone:** Q1, 2027.

## **PE7: Monitor and update rules to support new RePL licensing requirements**

Review and update rules as needed so they are fit for purpose as operational needs evolve. Clarifying requirements to enhance and mature the rules.

**Principle:** Adaptive and scalable.

**Milestone:** Q2, 2027.

## **PE8: Develop a specific set of outcome-based standards for RePL training on increasingly complex RPAS**

Advance the current RePL training standards to support the safe operation of increasingly complex RPAS.

**Principle:** Risk and outcome-based.

**Milestone:** Q1, 2028.

### 5.6.2.3 Medium term

#### **PE9: Implement standard training and licensing requirements for personnel involved in remotely piloted and optionally piloted passenger carrying AAM**

Implement standardised training and licensing for personnel in remotely piloted and optionally piloted AAM aircraft. Ensure personnel have the skills and knowledge for safe and efficient operations.

**Principle:** Risk and outcome-based.

**Milestone:** Q2, 2030.

#### **PE10: Introduce updated licensing requirements for RPAS and AAM operations factoring in the increasing levels of automation**

Implement licensing requirements for personnel and systems involved in increasingly automated operations. Ensure personnel have the skills and knowledge for safe and efficient operations.

**Principle:** Risk and outcome-based.

**Milestone:** Q2, 2032.

### 5.6.2.4 Long term

#### **PE11: Implement standard licensing and training requirements for AAM dispatchers**

Implement licensing requirements for personnel who dispatch AAM aircraft to ensure they have the necessary skills and knowledge for safe and efficient operations.

**Principle:** Risk and outcome-based.

**Milestone:** Q1, 2034.



# Appendix A – The RPAS and AAM Strategic Regulatory Roadmap acronym list

**Table 1. Roadmap acronyms**

Acronym	Expansion
AAM	Advanced Air Mobility
ACMA	Australian Communications and Media Authority
AFAF	Australian Future Airspace Framework
AGL	Above Ground Level
AI	Artificial intelligence
AME	Aircraft Maintenance Engineer
AOC	Air Operator's Certificate (AOC)
ATC	Air Traffic Control (in general)
ATSB	Australian Transport Safety Bureau
BVLOS	Beyond visual line of sight
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations (1998)
DASA	Defence Aviation Safety Authority
DITRDCA	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
EASA	European Aviation Safety Agency
eVTOL	Electric vertical take-off and landing
FAA	Federal Aviation Administration
FIMS	Flight information management system
FPV	First person view
ICAO	International Civil Aviation Organization
JARUS	Joint Authorities for Rulemaking on Unmanned Systems
NAA	National aviation authority
RAM	Regional air mobility
ReOC	Remotely piloted operator's certificate
RePL	Remote pilot licence
RPAS	Remotely Piloted Aircraft Systems. See the Flying drones/remotely piloted aircraft in Australia webpage for information.
SMS	Safety management system
SORA	Specific operations risk assessment
STOL	Short Take-off and Landing
TWG	Technical working group

Acronym	Expansion
UTM	Uncrewed Aircraft Systems (UAS) Traffic Management
VTOL	Vertical take-off and landing