

The 157th Transport Policy Colloquium – Washington Report XVIII

# **Latest trends of Advanced Air Mobility policy in the United States 2023 -Comprehensive approach for operations-**

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5. Conclusion: AAM launch in 2025 and beyond

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# 1. Introduction: What is Advanced Air Mobility?

## □ Japan

AAM is an "accessible and sustainable next-generation means of air transportation, made possible by aeronautical technologies such as electrification and automation, as well as vertical take-off and landing and other modes of operation."

(Source: Concept of Operations (ConOps) for Advanced Air Mobility)

- The term "Advanced Air Mobility" or AAM, used in the United States, was chosen for the ConOps to achieve harmonization with international discussions.
- AAM is aircraft under the Civil Aeronautics Act and does not necessarily provide a road-travelling function.

# 1. Introduction: What is Advanced Air Mobility?

## □ United States

*The terms “advanced air mobility” and “AAM” mean a transportation system that transports people and property by air between two points in the United States using aircraft with advanced technologies, including electric aircraft or electric vertical take-off and landing aircraft, in both controlled and uncontrolled airspace.*

(Source: Advanced Air Mobility Coordination and Leadership Act)

- The term “Urban Air Mobility” (UAM), a subset of AAM referring to AAM that operates in urban and surrounding areas, is also used.

# 1. Introduction: What is Advanced Air Mobility?

## □ Europe

*Innovative air mobility (IAM): the safe, secure and sustainable air mobility of passengers and cargo enabled by new-generation technologies integrated into a multimodal transportation system.*

(Source: Notice of Proposed Amendment (NPA) 2022-06 by the European Union Aviation Safety Agency: EASA)

- Similarly to the United States, the term “UAM\*” exists and is frequently used as a subset of IAM.

\*: On the EASA website, “Urban Air Mobility” is defined as “a new air transportation system for passengers and cargo in and around densely populated and built environments, made possible by vertical take-off and landing electric aircraft (eVTOL) equipped with new technologies such as enhanced battery technologies and electric propulsion. These aircraft will have a pilot on board or be remotely piloted.”

# 1. Introduction: What is Advanced Air Mobility?

## □ Summary

The term internationally used to refer to “flying cars” is “AAM” (or “UAM” for those operating in urban and surrounding areas). It is envisaged as a new air transportation system equipped with eVTOL, automation and other advanced technologies.



Source:  
METI website  
([https://www.meti.go.jp/policy/mono\\_info\\_service/mono/obot/181220uamroadmap.html](https://www.meti.go.jp/policy/mono_info_service/mono/obot/181220uamroadmap.html))

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## 2. Aircraft categories and development examples by country / manufacturer

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eVTOL aircraft, mainly anticipated as AAM design, can be categorized into the following three types according to the thrust mechanism used:

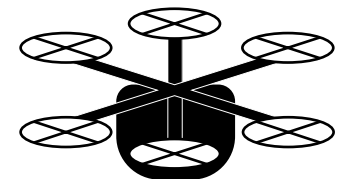
- ① Multi-rotor type
- ② Lift-and-cruise type
- ③ Vectored thrust type

### ① Multi-rotor type - Definition

#### □ Multi-rotor type

AAM that does not have fixed wings and uses a thrust mechanism consisting of three or more rotors for vertical take-off and landing (It cruises by way of having rotors revolving at different speeds to control aircraft attitude.)

- Pros: Simple structure, high energy efficiency at the time of vertical take-off, landing and hovering
- Cons: Not suitable for high-speed operation and long-distance operation due to the lack of fixed wings



### ① Multi-rotor type - Aircraft development examples

#### □ SkyDrive (Japan) SKYDRIVE(SD-05)

- Seating capacity: 3 (1 pilot and 2 passengers)
- Maximum takeoff weight: 1,400kg
- Flying range: Approx. 15km
- Maximum cruise speed: 100km/h
- Dimensions (length x width x height):  
Approx. 13m×13m×3m(including rotors)
- Number of rotors: 12
- Aiming to be debuted at the EXPO 2025 Osaka, Kansai



©SkyDrive

Source of photos and specifications: SkyDrive website  
<https://skydrive2020.com/archives/37772>

### ① Multi-rotor type - Aircraft development examples

#### □ Volocopter (Germany) VoloCity

- Seating capacity: 2 (1 pilot and 1 passenger)  
– Self-driving anticipated in the future)
- Maximum takeoff weight: 900kg
- Flying range: 35km
- Maximum cruise speed: 110km/h
- Height: 2.5m
- Rotor rim diameter (including rotor): 11.3m
- Number of rotors: 18
- Aiming to be debuted at the 2024 Paris Olympics and scheduled for flight demonstration at the EXPO 2025 Osaka, Kansai



©Volocopter

Source of photos and specifications: Volocopter website  
<https://mediahub-volocopter.pixxio.media/collection/32>  
<https://www.volocopter.com/en/solutions/volocity>

### ② Lift-and-cruise type - Definition

#### □ Lift-and-cruise type

AAM that has fixed wings and uses different thrust mechanisms for vertical takeoff/landing and cruising

- Pros: Suitable for high-speed operation and long-distance operation compared to the multi-rotor type as it features fixed wings
- Cons: Burdened with extra weight for thrust mechanisms



### ② Lift-and-cruise type – Aircraft development examples

#### □ Wisk Aero (USA) Cora

(Generation 5)

- Seating capacity: 2 (self-driving, 2 passengers)
- Flying range: 100km
- Cruise speed: 180km/h
- Maximum operating altitude: 10,000ft
- Using 12 propellers for VTOL and 1 propeller for cruising



©Wisk Aero

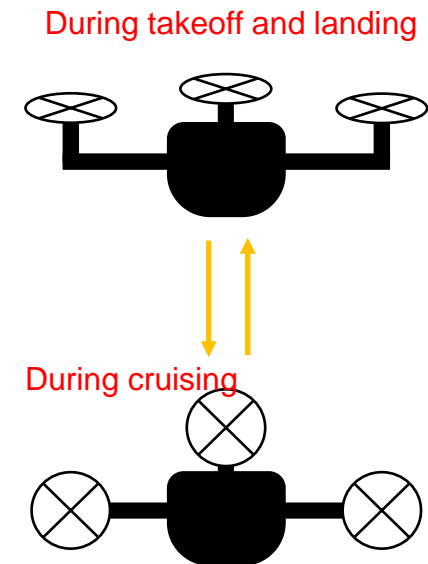
Source of photos and specifications: Wisk Aero and Vertical Flight Society websites  
<https://wisk.aero/generations/>  
<https://evtol.news/kitty-hawk-cora/>

### ③ Vectored thrust type - Definition

#### □ Vectored thrust type

AAM that has fixed wings and uses the same thrust mechanism for vertical takeoff/landing and cruising (by changing the orientation of the thrust mechanism)

- Pros: No extra weight for thrust mechanism and is more suitable for high-speed operation and long-distance operation than the lift-and-cruise type
- Cons: Slightly complicated structure and operation due to the need to change thrust orientation



### ③ Vectored thrust type – Aircraft development examples

#### □ Joby Aviation (USA) S4

- Seating capacity: 5 (1 pilot and 4 passengers)
- Maximum takeoff weight: 2,404kg
- Flying range: 161km
- Maximum cruise speed: 322km/h
- Six tilting propellers (4 propellers tilt the entire nacelle while the other 2 tilt the link mechanism)
- Aiming to be debuted at the EXPO 2025 Osaka, Kansai and commence commercial operation in New York by the end of 2025 (JFK Airport – Manhattan etc.)



©Joby Aviation

Source of photos and specifications: Joby Aviation and Vertical Flight Society websites  
<https://www.jobyaviation.com/news/joby-flies-quiet-electric-air-taxi-new-york-city/>  
<https://evtol.news/joby-aviation-s4-production-prototype>



### ③ Vectored thrust type – Aircraft development examples

#### □ Archer Aviation (USA) Midnight

- Seating capacity: 5 (1 pilot and 4 passengers – Self-driving anticipated in the future)
- Maximum takeoff weight: 3,175kg
- Maximum flying range: 160km (normally operating within 32~80km range)
- Maximum cruise speed: 241km/h
- Six tilting propellers (5 blades) and six fixed propellers (2 blades, dedicated to VTOL)
- Aiming to commence commercial operation in the United States in 2025



The above photo shows the AAM during its outdoor display.

Source of specifications: Archer Aviation and Vertical Flight Society websites

<https://www.archer.com/midnight>

<https://evtol.news/archer/>

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### 3. Latest policy trends and initiatives on AAM in the United States



Supported by THE NIPPON FOUNDATION

# Policies and initiatives concerning AAM

		2020	2021	2022	2023	2024	
Laws	① AAM Coordination and Leadership Act			Enactment [October]	RFI implementation [May-August]	National strategy	
Roadmap / vision	② UAM ConOps	v1.0 released [June]			v2.0 released [May]		
	③ AAM Implementation Plan				v1.0 released [July]		
Individual technical standards and guidelines	④ Airworthiness criteria		Joby JAS4-1 airworthiness criteria released [November]	Archer M001 airworthiness criteria released [December]			
	⑤ Pilot certification and operation standards				NPRM announced [June]	Finalization	
	⑥ Vertiport guidelines			EB No.105 released [September]			
Public- and private-sector joint initiatives	⑦ AAAC	Activities as the predecessor DAC					
	⑧ AAM Summit			1 <sup>st</sup> meeting [February] 2 <sup>nd</sup> meeting [June] 3 <sup>rd</sup> meeting [October]	4 <sup>th</sup> meeting [April] 5 <sup>th</sup> meeting [August]	1 <sup>st</sup> meeting [August]	Scheduled 6 <sup>th</sup> meeting [February]

## ① Enactment of AAM-related laws

### □ Advanced Air Mobility Coordination and Leadership Act

- The law was enacted in October 2022 with the aim that the Federal Government foster leadership and interagency collaboration for the development of AAM, a field that holds the key to achieving sustainable transportation and economic growth in the United States.
- The law stipulates that the Secretary of Transportation establish an advanced air mobility interagency working group (AAM IWG) concerning AAM. The AAM IWG is to formulate a national strategy on AAM.
- The law sought participation of the Department of Transportation (DoT), the Federal Aviation Administration (FAA), the National Aeronautics and Space Administration (NASA), the Department of Commerce, the Department of Defense, the Department of Energy, the Department of homeland Security, the Department of Agriculture, the Department of Labor, the Federal Communications Commission and other relevant government bodies in AAM IWG. In reality, a total of 19 Federal Government organizations are participating, including the Department of State and the Department of Education.

Government bodies participating in AAM IWG	
Department of Transportation (including the Federal Aviation Administration)	Department of Veterans Affairs
	Department of Homeland Security
Department of State	National Aeronautics and Space Administration
Department of Defense	Office of Management and Budget
Department of Justice	Council of Economic Advisers
Department of the Interior	National Security Council
Department of Agriculture	Office of Science and Technology Policy
Department of Commerce	Office of the National Cyber Director
Department of Labor	Federal Communications Commission
Department of Energy	Department of Education

## ① Enactment of AAM-related laws

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- For handling specific AAM-related tasks, the AAM IWG has the following sub-groups:
  - Automation Strategy
  - Security Requirements
  - Air Traffic Federation
  - Infrastructure Development
  - Community Roles
- In May 2023, DoT issued RFI (Request for Information) to seek information widely for drafting the national strategy on AAM.

## ① Enactment of AAM-related laws

Information sought under the RFI (compiled based on the RFI)

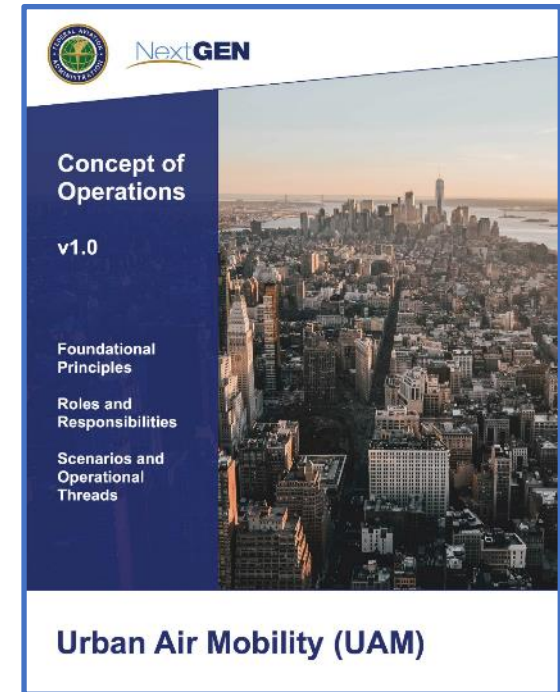
Grand vision toward establishing AAM	Matters that AAM IWG must review and examine under the AAM Coordination and Leadership Act	Topics that are determined as important by AAM IWG's sub groups
<ul style="list-style-type: none"> <li>• Initiatives to be included in the national strategy on AAM</li> <li>• Impediments to successfully establishing AAM</li> <li>• Short-term (2 – 3 years), mid-term (4 – 8 years) and long-term (8+ years) steps the Federal Government should take in maximizing the possibility of successful AAM development</li> </ul>	<ul style="list-style-type: none"> <li>• Steps that will mature AAM aircraft operations, concepts and regulatory frameworks beyond initial operations</li> <li>• Air traffic management and safety concepts that might be considered as part of evolving AAM to higher levels of traffic density</li> <li>And six other items</li> </ul>	<ul style="list-style-type: none"> <li>• Use cases</li> <li>• Safety enhancements</li> <li>• Research, development and testing environment</li> <li>• Role of state, local, tribal and territorial governments</li> <li>• Workforce development</li> <li>And 15 other items</li> </ul>

- RFI was implemented until August 2023, and the AAM IWG continues to work toward drawing up a national strategy on AAM by 2024.

## ② Building a roadmap on UAM operation

### □ UAM ConOps v1.0

- The FAA released UAM ConOps (Concept of Operations) v1.0 in June 2020 to present the future vision of UAM's operating environment.
- The document's overall structure
  1. Introduction (showing ConOps' scope of application and background)
  2. Overarching Principles and Assumptions
  3. Evolution of UAM Operations
  4. UAM Operational Concept
  5. Notional Architecture (showing main stakeholders of UAM operations and their roles)
  6. UAM Use Cases and Scenarios (showing actual examples of Sections 4 and 5)
  7. UAM Implementation

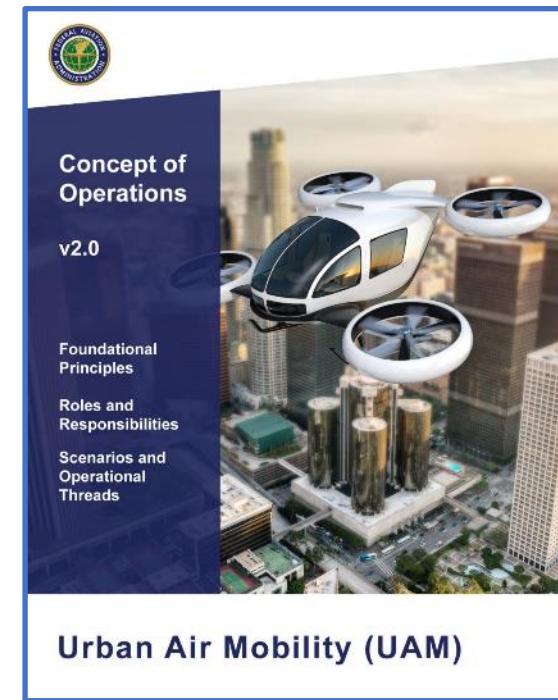


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## ② Building a roadmap on UAM operation

### □ UAM ConOps v2.0

- The updated UAM ConOps v2.0, reflecting the continued maturation of UAM and incorporating additional input from public- and private-sector stakeholders, was released in May 2023.
- The seven-section structure is largely unchanged, but there are some updates including detailed description of the development processes of UAM Corridors\* in Section 4.



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\*: A specific type of CA (Cooperative Area) within which cooperatively managed operations can occur. It is comprised of an airspace volume defining a three-dimensional route, possibly divided into multiple segments, with associated performance requirements. ATC (Air Traffic Control) ensures separation of aircraft that is not participating in UAM operations (e.g. General Aviation) from UAM Corridors.



### 3. Latest policy trends and initiatives on AAM in the United States



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## ② Building a roadmap on UAM operation

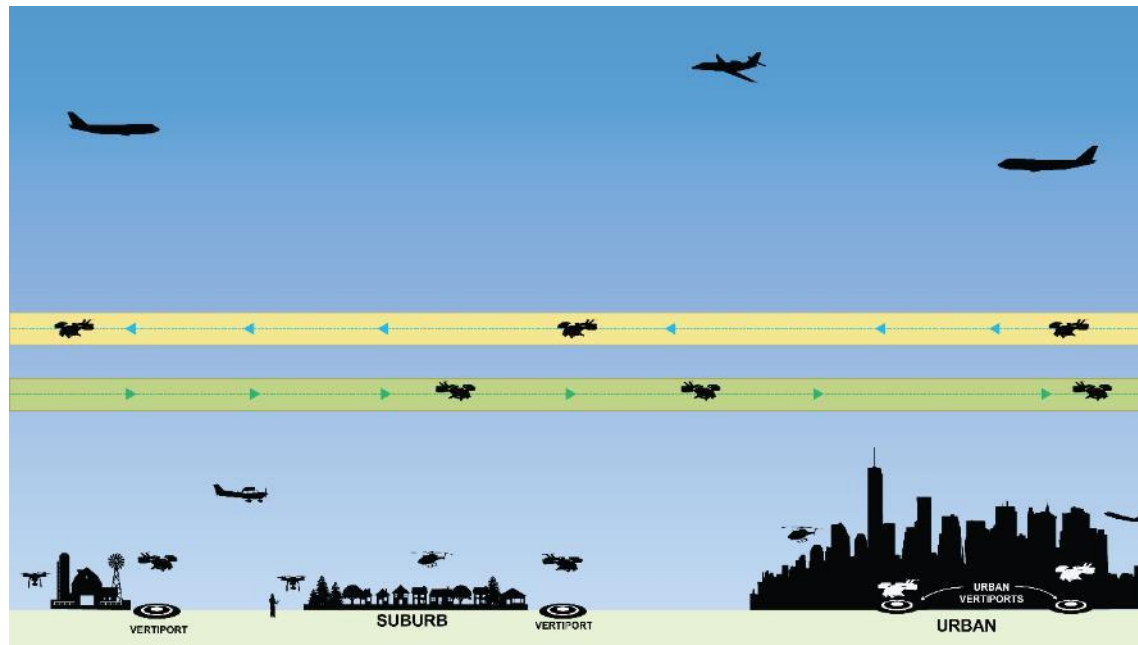
Evolution of UAM operations described in the UAM ConOps v2.0(compiled based on UAM ConOps v2.0)

Operational stage	Initial operations	Mid-term operations	Mature state operations
Operational tempo	Low	Low, but may have increased to a point that necessitates changes in the existing regulatory framework and procedures	High
Infrastructures and procedures	No UAM-unique structures or procedures exist. Operations will utilize existing ATS and routes but may create new routes as necessary.	UAM aircraft are flying within UAM Corridors. ATC ensures separation of non-participating aircraft from cooperative operations. Deconfliction in the UAM Corridors may be allocated to the UAM operator and/or driver.	UAM operations continue to occur within UAM Corridors. The UAM Corridors may form a network to optimize paths to support an increasing number of vertiports. The internal structure of the UAM Corridors is expected to increase in complexity, and the necessary performance parameters for UAM participation may increase. ATC ensures separation of non-participating aircraft from cooperative operations. Deconfliction may be allocated to the UAM operator or operator's automation.
UAM-driven regulatory changes	Initial UAM operations are conducted leveraging current rules, regulations and local agreements.	Changes to ATS regulations and new UAM regulations that enable operations within UAM Corridors	Extensive UAM-driven regulations will be necessary to enable cooperative operations within UAM Corridors.
UAM COPs <sup>*1</sup>	There are no COPs, but operational needs may be addressed in agreements such as LOA(Letters of Agreement).	COPs are defined by industry to meet industry standards or FAA guidelines when specified. COPs will require FAA approval.	The complexity of COPs and FAA involvement in establishing guidelines and approving COPs may evolve to match the specific topic addressed.
Aircraft automation level	Consistent with current, crewed helicopter technologies (e.g. autopilots)	Controlling the aircraft with emerging capabilities e.g. simplified aircraft operation	Automation improvements may lead to HOVTL*2 capabilities.
Operator location	Onboard	Primarily onboard aircraft but complemented by the introduction of Remote Pilot operations	Remote piloting is more widely available and as frequent as manned operations.

\*1:COPs stands for Cooperative Operating Practices, and refers to industry-defined, FAA-approved practices that address how operators cooperatively manage their operations within the Cooperative areas such as UAM Corridors. This is a term introduced in the UAM ConOps v2.0.

\*2:HOVTL stands for Human-over-the-Loop, and refers to the level of automation where human is engaged by the automation to take action.

## ② Building a roadmap on UAM operation

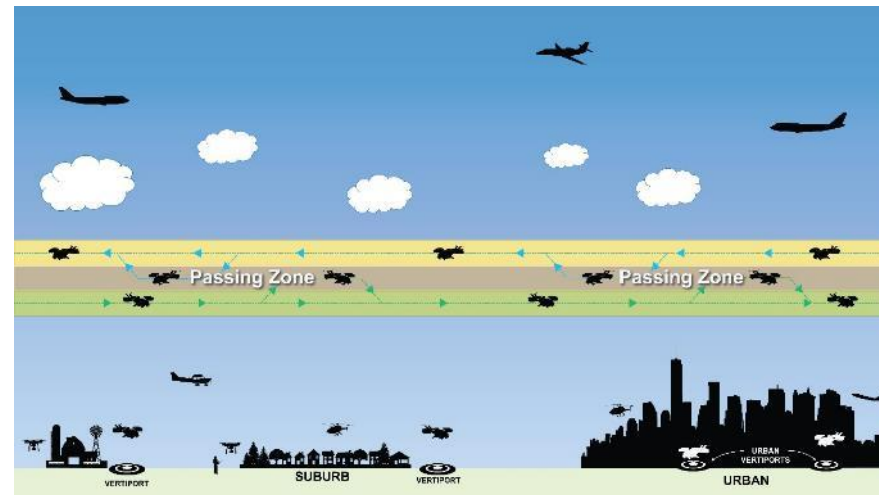


Early UAM Corridor concept  
(Source: UAM ConOps v2.0)

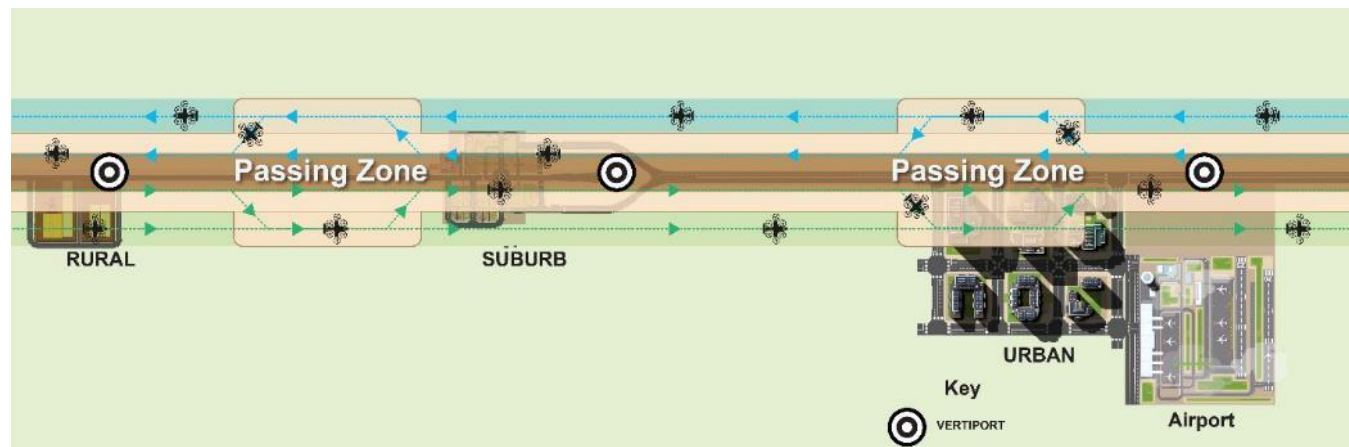
- Initial UAM Corridors are expected to be simple in design, as shown above, e.g. one-way corridors or single track in each direction.

## ② Building a roadmap on UAM operation

- UAM operational demand may exceed a UAM Corridor's initial design capacity, at which it becomes necessary to increase capacity by way of introducing vertical and lateral "passing zones."

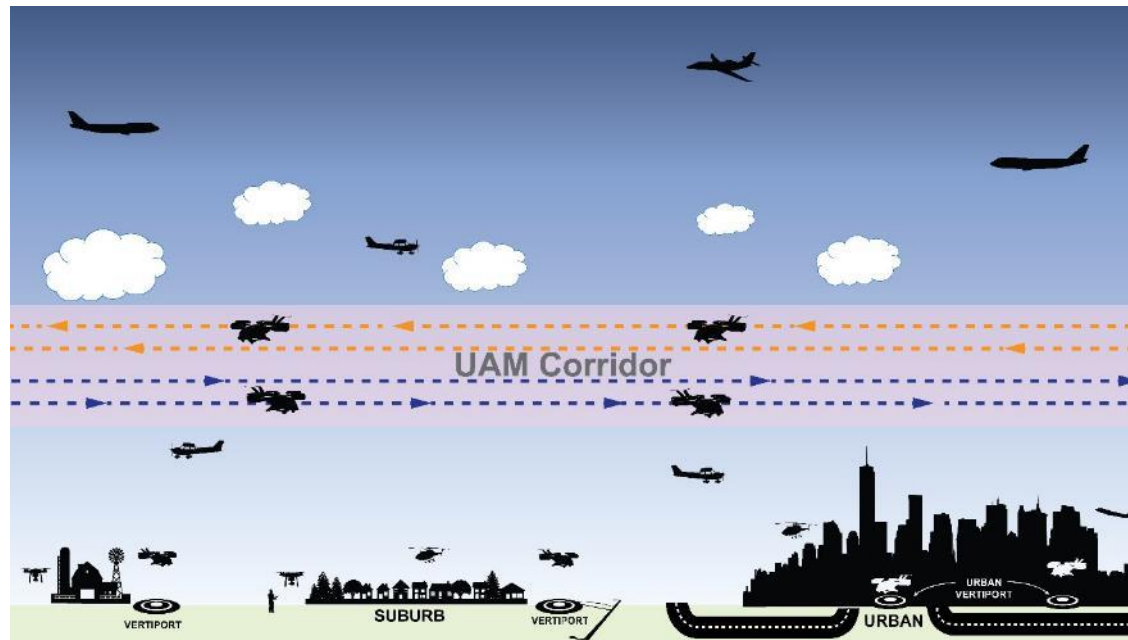


Use of a Vertical Common Passing Zone (Source: UAM ConOps v2.0)



Use of Lateral Passing Zones (Source: UAM ConOps v2.0)

## ② Building a roadmap on UAM operation



### UAM Corridor with multiple tracks

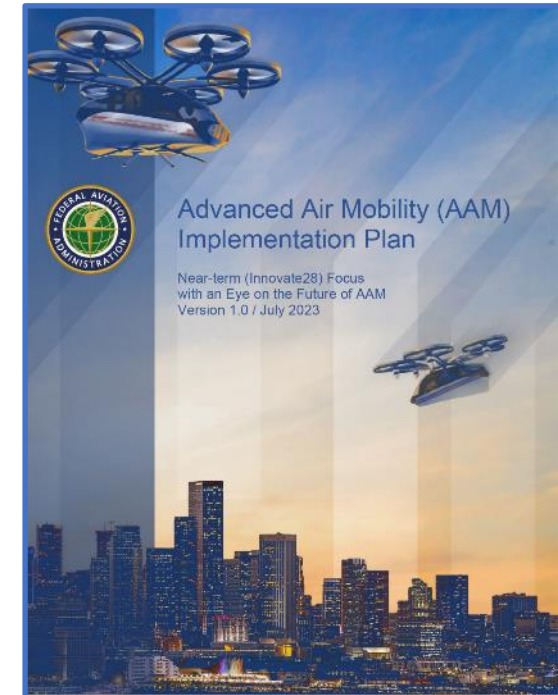
(Source: UAM ConOps v2.0)

- A UAM Corridor structure comprised of multiple tracks may emerge, requiring increased performance requirements (e.g. speed) that support an increased operational tempo.

## ③ Developing a vision for short-term achievement of AAM operations

### □ Advanced Air Mobility (AAM) Implementation Plan v1.0

- Released by FAA in July 2023
- While the UAM ConOps represents short- to long-term roadmap for UAM, the AAM Implementation Plan sets out a vision for short-term achievement of AAM operations (FAA's “Innovate 28” initiative for establishing AAM operations in the United States by 2028).
- Overall structure
  1. AAM
  2. Introduction to Innovate 28
  3. Implementation Plan overview
  4. Innovate 28 key site operations (describing general AAM operating environment in 2028 based on industry- and FAA-anticipations and predictions)
  5. Innovate 28 workstreams
  6. Innovate 28 integrated schedule
  7. AAM evolution framework



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## ③ Developing a vision for short-term achievement of AAM operations

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### ● Operations

- AAM aircraft is expected to operate from the surface to 4,000 feet above ground level on or in close proximity to airports in urban areas (equivalent to lower part of Class B\*1 airspace, Class C\*2 airspace and surrounding airspace in terms of ATC airspace classification)

\*1: Airspace from the surface to 10,000 feet MSL on and around airports with the highest traffic level

\*2: Airspace from the surface to 4,000 feet AGL on and around airports that have a control tower, radar approach control and a certain level of IFR operations or passenger transportation

- AAM must follow existing ATC rules (e.g. obtaining ATC clearance when entering Class B airspace and establishing two-way radio communications before entering Class C airspace) and fly along existing or modified VFR (visual flight rules) routes.

## ③ Developing a vision for short-term achievement of AAM operations

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### ● Infrastructures

- In initial AAM operations in 2025 – 2028, AAM aircraft is expected to use existing airports and heliports.
- When using an existing heliport, it may require the following modifications as it needs to comply with FAA's vertiport (heliport intended for use by VTOL aircraft) design guidelines (to be explained later)
  - ✓ Aircraft parking space separate from places for takeoff and landing
  - ✓ Extension to meet dimensions and other size requirements stipulated in the guidelines
  - ✓ Charging facilities
  - ✓ Weather observation facilities (if away from an airport)
  - ✓ Fire prevention services provided by enough personnel to address fires caused by electricity or hydrogen fuel

## ④ Setting airworthiness criteria

- ❑ Change of policy concerning airworthiness criteria of AAM (eVTOL) aircraft in type certification
  - FAA has already received multiple type certification applications for eVTOL aircraft still under development. The previous policy was to base eVTOL's airworthiness criteria (for those with fixed wings) on Part 23 of Federal Aviation Administration's CASR Airworthiness standards for small aeroplanes.
  - In 2022, the FAA expressed its stance of categorizing this type of AAM as powered-lift aircraft\* and setting its airworthiness criteria as "Special Class" based on Part 21.17(b) of FAA's Code of Federal Regulations, which is applied to aircraft that does not have specific regulatory airworthiness criteria defined.

\*: Powered-lift is a heavier-than-air aircraft capable of vertical take-off, vertical landing and low-speed flight, which depends principally on engine-driven lift devices or engine thrust for the lift during these flight regimes and on non-rotating aerofoil(s) for lift during horizontal flight.
  - The NPRM (Notice of Proposed Rulemaking, to be explained later) on powered-lift aircraft's pilot certification and operation standards, issued by the FAA in June 2023, has clear reference to the abovementioned FAA stance as the premise.



### 3. Latest policy trends and initiatives on AAM in the United States

## ④ Setting airworthiness criteria

### Example of airworthiness criteria in type certification - Archer Aviation Midnight (M001)

- In response to the aforementioned policy change, the FAA released special class airworthiness criteria in December 2022 (second such proposed criteria after those issued for Joby Aviation's JAS4-1 in November 2022).
- Combining required parts of the existing CFR Part 23 criteria for small airplanes (23.XXXX type), Part 33 criteria for engines (33.XXXX), Part 35 criteria for propellers (35.XXXX) with criteria specific to eVTOL aircraft (M001 type) (AM1.XXXX)



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## ④ Setting airworthiness criteria

### ● Consisting of the following nine sub-parts

- Sub Part A - General
- Sub Part B – Flight Performance
- Sub Part C – Structures
- Sub Part D – Design and Construction
- Sub Part E – Powerplant
- Sub Part F – Equipment
- Sub Part G – Flightcrew Interface and Other Information
- Sub Part H – Electric Engine Requirements
- Sub Part I – Propeller Requirements

## ④ Setting airworthiness criteria

- The M001 is expected to operate at an altitude similar to that of existing helicopters. However, since it is more quiet than conventional helicopters, birds may not be able to notice it in flight, heightening the risk of bird strikes.
- In response, AM1.2320(b) in Sub Part D stipulates a criterion concerning bird strikes, unique to M001.

*The aircraft must be capable of continued safe flight and landing after a bird strike with a 2.2-lb (1.0 kg) bird. In addition, the aircraft design must include bird deterrence devices to reduce the potential for bird strikes.*

- It is up to applicants what type of “bird deterrence devices” is used to demonstrate compliance with this criterion. The FAA cites an example of beaming light from the aircraft to help birds sense and avoid it.

## ⑤ Regulatory amendment on pilot certification and operation standards

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- ❑ NPRM concerning pilot certification and operation standards for powered-lift aircraft
  - Issued by the FAA in June 2023
  - With powered-lift aircraft to be operated as AAM in mind, the document proposes regulatory changes on pilot certification and operation standards.
  - The action proposes that permanent changes are made to each part of the Code of Federal Regulations (CFR) in some areas, and that a Special Federal Aviation Regulation (SFAR) is applied to determine which operating rules apply on a temporary basis to allow the FAA time to gather data and determine the most appropriate approach for permanent changes.
  - Since amendment suggestions under the SFAR encompass various parts of CFR, all suggested changes are compiled into the new Part 194, which is to have the expiration period of 10 years after amendment.

## ⑤ Regulatory amendment on pilot certification and operation standards

- Pilot certification and training requirements

- In 1997, the FAA established a powered-lift category rating\*1 for pilot certification in amending CFR Part 61 (pilot certification), but decided against introducing class rating\*1 and type rating\*1.

\*1: Pilot certification limits aircraft that the license holder can operate in the form of ratings, firstly by category ratings (e.g. aeroplane, helicopter, powered-lift aircraft (not adopted in Japan) etc.), secondly by class ratings (single-engine piston aeroplane, multi-engine turbine aeroplane etc.) and lastly by type ratings (e.g. B787, A350 etc).

- With commercial powered-lift aircraft of various designs being developed in recent years, the FAA has decided against setting class ratings and opted to seek type ratings, resulting in the suggestion of permanent amendment for Part 61.
- The FAA also proposes permanent amendments required for formality for Part 61, Part 135 (Commuter and on-demand operations and rules governing persons on board such aircraft) and Part 142 (Training centers) in order to incorporate powered-lift aircraft into the regulation.

Any additional requirements for powered-lift aircraft to supplement existing regulations (including regulations with specific provisions for powered-lift aircraft based on ICAO\*2 standards, etc) (e.g. permitting shorter flight distance as part of outdoor flight experience requirement, to be met when applying for private pilot certification limited to powered-lift aircraft), are suggested as rules on a temporary basis in Part 194.

\*2: International Civil Aviation Organization

## ⑤ Regulatory amendment on pilot certification and operation standards

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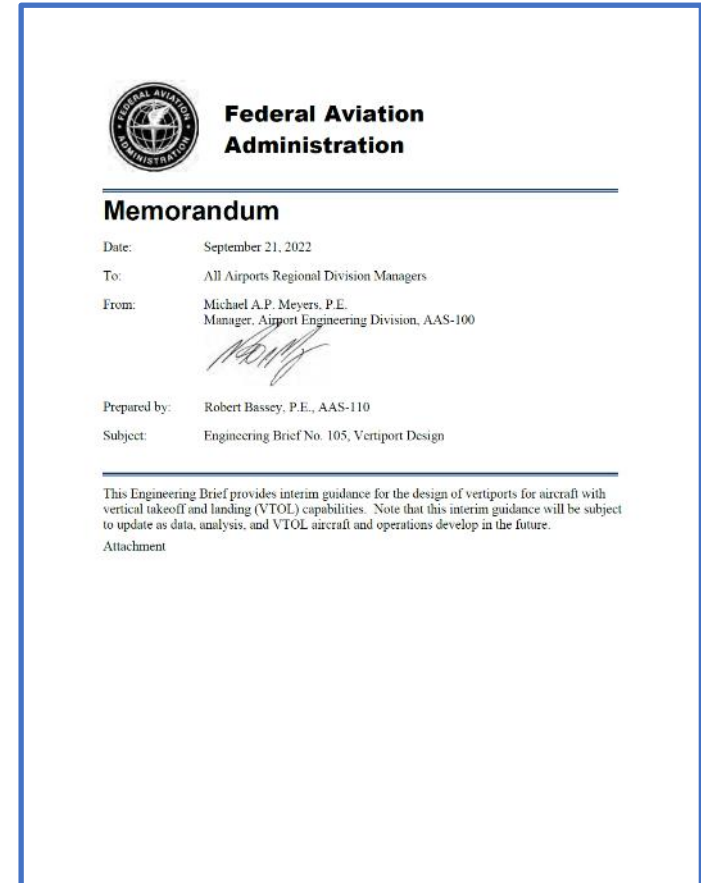
- Operation standards

- The FAA proposes permanent amendments required for formality in order to incorporate powered-lift aircraft into Part 91 (General Operating and Flight Rules). Any additional requirements for powered-lift aircraft to supplement existing regulations including those that do not specify aircraft type or those specific to aeroplanes and helicopters (e.g. applying requirements for aeroplanes to powered-lift aircraft that lands in a flight mode using fixed wings with regard to turning direction when landing at an airport in Class G airspace (uncontrolled airspace), thereby demanding a left turn; applying requirements for helicopters to powered-lift aircraft that lands in a flight mode using rotary wings, thereby demanding that it avoid the flow of fixed-wing aircraft), are suggested as rules on a temporary basis in Part 194.

## ⑥ Release of guidelines on vertiport

### □ Engineering Brief No.105, Vertiport Design

- Released by the FAA in September 2022
- Issued as transitional guidelines on vertiport design until a more comprehensive Advisory Circular (AC) is defined (due to be released in late 2024 – early 2025)



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## ⑥ Release of guidelines on vertiport

- Currently, data on VTOL aircraft's flight characteristics and operability is limited. These guidelines have been compiled based on the specifications of reference aircraft defined using the designs and performance data of nine VTOL models under development.
- The overall structure of the document:
  1. Introduction
  2. Vertiport Design and Geometry
  3. Marking, Lighting and Visual Aids
  4. Charging and Electric Infrastructure
  5. On-Airport Vertiports
  6. Site Safety Elements

Main specifications of the reference aircraft

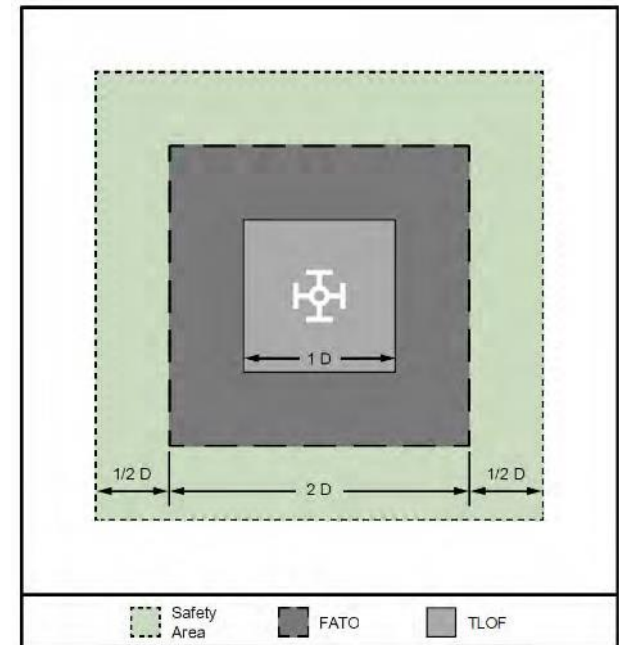
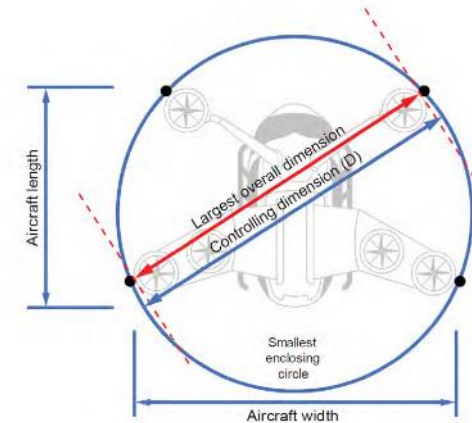
Item	Anticipated specifications
Propulsion	Electric battery-driven
Aircraft length	50ft (15.2m) or less
Aircraft width	50ft (15.2m) or less
Maximum takeoff weight	12,500lbs (5,670kg) or less
Pilot position	On board
Flight conditions	VFR



## ⑥ Release of guidelines on vertiport

- Vertiport Design and Geometry

- TLOF (Touchdown and liftoff area): The TLOF is a load-bearing, generally paved area centered in the FATO, on which the VTOL aircraft performs a touchdown or liftoff (transition from the surface to hovering).
  - ✓ Supports the weight of the design VTOL aircraft and any ground support vehicles, whichever is more demanding, and the dynamic loads at 150% of the maximum takeoff weight of the design VTOL aircraft
  - ✓ Centered within its own FATO
  - ✓ Minimum length and minimum width are 1D or more (for a circular TLOF, minimum diameter is 1D) etc.
- FATO (Final approach and takeoff area): The FATO is a defined area over which the VTOL aircraft completes the final phase of the approach to a hover or a landing and from which the aircraft initiates takeoff
  - ✓ Supports the weight of the design VTOL aircraft and any ground support vehicles, whichever is more demanding, and the dynamic loads at 150% of the maximum takeoff weight of the design VTOL aircraft
  - ✓ Centered within its own Safety Area
  - ✓ Minimum length and minimum width are 2D or more (for a circular FATO, minimum diameter is 2D) etc.
- Safety Area: The Safety Area is a defined area surrounding the FATO intended to reduce the risk of damage to VTOL aircraft unintentionally diverging from the FATO.
  - ✓ Minimum length and minimum width are  $\frac{1}{2}D$  from the edge of the FATO etc.



The D figure's definition and dimensions of TLOF/FATO/Safety Area (Source: FAA EB No.105)



## ⑥ Release of guidelines on vertiport

- Safety considerations
  - Fire fighting considerations
    - ✓ Past FAA research found that water and other foam fire extinguishing agents were more effective for suppressing lithium battery fires and preventing thermal runaway than gas or dry powder extinguishing agents.
    - ✓ The firefighting techniques for VTOL aircraft are still unknown and may differ from model to model.
    - ✓ Firefighting personnel at vertiports should be trained and equipped to manage the specific needs associated with electric aircraft such as lithium battery fires, toxic gas emissions and high voltage electrical arcing.
    - ✓ Firefighting equipment should be adjacent to, but outside, the TLOF and FATO area, and clearly marked for conspicuousness from anywhere within or outside the FATO.
    - ✓ The current NFPA 418 (standards for heliports), issued by the National Fire Protection Association, is based on conventional liquid fuel and its dangers and risks. This standard is currently under revision to account for electrical hazards and fire safety standards for vertiports, which is expected to be published on or before January 2024.

## ⑦ AAAC's activities

### □ Advanced Aviation Advisory Committee (AAAC)

- This is a committee that provides independent advice and recommendations to the DoT and FAA and addresses tasks given by the FAA in order to improve the efficiency and safety of UAS (Unmanned Aircraft System), AAM and other advanced aviation systems in an effort to incorporate such systems into U.S. airspace.
- The AAAC evolved from its predecessor Drone Advisory Committee (DAC), which played a similar role concerning UAS, and reconfigured into the current form encompassing AAM. The first Committee meeting was held in February 2022 (5 meetings held so far).
- The AAAC consists of 41 members including airport stakeholders, local government representatives, Air Traffic Control personnel, academic researchers, airline companies using conventional aircraft, UAS manufacturers / operators and AAM stakeholders.
- It has topic-specific task groups (including those formed during the DAC days), compiling recommendations individually.
- Information about previous meetings is made available to general public on their website.



Advanced Aviation Advisory Committee Virtual Public Meeting

Video showing AAAC's public meeting  
(source: FAA's YouTube Channel)

## ⑦ AAAC's activities

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- Example 1: Recommendation about the use of gender-neutral language (rather than gender-specific language)
  - In a DAC meeting held in June 2021, the Task Group 10 presented the following recommendations:
    1. The FAA should adopt gender-neutral language in the drone industry, in place of gender-binary language.
    2. (In the short term) Due to the advantage of maintaining the use of a “U” in acronyms, “unmanned” should be replaced with “uncrewed.” “Drone” is recommended as optimal for long-term use.
    3. Changes to adopt gender-neutral language should take on two priorities (i.e. All new documents and materials should use gender-neutral language, and rework of existing documents and materials should be prioritized by the number of individuals exposed to the material, as well as the effort required to update them).
    4. The FAA should expand beyond drones to aviation more broadly.

## ⑦ AAAC's activities

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- In response, the FAA made the following response:
  - ✓ In July 2021, the FAA issued a Draft Advisory Circular 150/5200-28G, Notice to Air Missions (NOTAMs) for Airport Operators (official version released in May 2022) to redefine “NOTAM” as “Notice to Air Missions” instead of the original “Notice to Airmen.”
  - ✓ The term “drone” will replace “unmanned aircraft system (UAS)” wherever possible and appropriate.
  - ✓ All rules and regulations will be subjected to systematic review and updating (but the process may be time-consuming as many of such terms are legally defined).
  - ✓ The FAA will examine received recommendations and hold an Inclusive Language Summit online as a forum for gathering comments and additional recommendations from the general public (convened in November 2021).



## ⑦ AAAC's activities

- Example 2: Recommendation about incorporating studies about drones and AAMs into K-12 (compulsory education period in the United States) curriculum

➤ Recommendations considered by the Task Group #12 were presented at the AAAC meeting held in February 2022.

Make content & resources readily accessible	1) Expanding access to existing resources 2) Building a network of educational volunteer mentors for educators 3) Building an online repository that can be accessed by educators to research and leverage for building curricula
Build connections for action and cultural transformation	4) Calling for public-private partnership for funding, mentorship etc. 5) Facilitating a change in attitudes to address gender bias in STEM fields (science, technology, engineering, mathematics) 6) Leveraging the resources of the FAA UAS Collegiate Training Initiative (CTI) 7) Forming an interagency working group with the Department of Education
Deliver aviation-specific curricula	8) Utilizing standards developed by National Institute of Standards and Technology to quantitatively evaluate various system capabilities and remote pilot proficiency 9) Creating a grade 8-12 aviation-specific STEM curricula modeled on CTE CyberNet (cyber security education program for secondary students in the United States) 10) Increasing support for extracurricular programs

- The FAA intends to present existing initiatives that address these recommendations, and consider them along with recommendations from the Women in Aviation Advisory Board and the Youth Access to American Jobs in Aviation Task Force to build a comprehensive plan to meet the challenges.

## ⑧ FAA AAM Summit

### □ FAA Advanced Air Mobility Summit

- Jointly organized by the FAA and the Association for Uncrewed Vehicle Systems International (AUVSI)
- In conjunction with the annual FAA Drone Symposium, the inaugural FAA AAM Summit was held in Baltimore, Maryland in August 2023.
- Featuring experts from the FAA, DoT, NASA, eVTOL manufacturers and overseas authorities (EU etc.) as panelists, the Summit held discussions on a wide range of subjects including UAM ConOps, vertiports, AAM operation launch, human resource development and international coordination.
- For example, the session about AAM operation launch discussed the outlook of NPRM concerning the aforementioned powered-lift pilot certification and operating criteria. The FAA said NPRM is due to be finalized by December 2024 – January 2025 with an associated Advisory Circular to be also drawn up.



### 3. Latest policy trends and initiatives on AAM in the United States



JTTRI  
Japan Transport and Tourism Research Institute



JITTI  
Japan International Transport and Tourism Institute, USA

Supported by 日本 THE NIPPON 財団 FOUNDATION

# Policies and initiatives concerning AAM

		2020	2021	2022	2023	2024				
Laws	①AAM Coordination and Leadership Act			Enactment [October]	RFI implementation [May-August]	National strategy				
	Roadmap / vision	v1.0 released [June]			v2.0 released [May]					
	③AAM Implementation Plan				v1.0 released [July]					
Individual technical standards and guidelines	④Airworthiness criteria		Joby JAS4-1, airworthiness criteria released [November]							
	⑤ Pilot certification and operation standards			Archer M001 airworthiness criteria released [December]						
	⑥Vertiport guidelines			EB No.105 released [September]						
Public- and private-sector joint initiatives	⑦AAAC	Activities as the predecessor DAC			1 <sup>st</sup> meeting [February]	2 <sup>nd</sup> meeting [June]	3 <sup>rd</sup> meeting [October]	4 <sup>th</sup> meeting [April]	5 <sup>th</sup> meeting [August]	Scheduled 6 <sup>th</sup> meeting [February]
	⑧AAM Summit				1 <sup>st</sup> meeting [August]					



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5. Conclusion: AAM launch in 2025 and beyond

# ① Discussions at the International Civil Aviation Organization (ICAO)

## □ Advanced Air Mobility Study Group (AAM SG)

- The 41<sup>st</sup> Session of the ICAO Assembly resolved to establish the Advanced Air Mobility Study Group (AAM SG) for developing a holistic vision and framework on AAM (following lobbying by the FAA).
- The first meeting of the AAM SG was held in Montreal, Canada in May 2023.
- The Study Group is expected to work on preparing related guidance documents and updating / drawing up SARPs (Standards and Recommended Practices).

## □ Advanced Air Mobility Symposium (AAM 2024)

- The first Advanced Air Mobility Symposium is scheduled to be held in Montreal, Canada, on September 9 – 12, 2024.
- The theme is “Advanced air mobility (AAM) global harmonization and interoperability: Challenges and opportunities.”
- The symposium is coincided with related events including AAM academic paper competition for students, AAM poster design competition and AAM photo competition.

## ② Policy trends in Europe

### □ EASA's various regulations

- Airworthiness standards

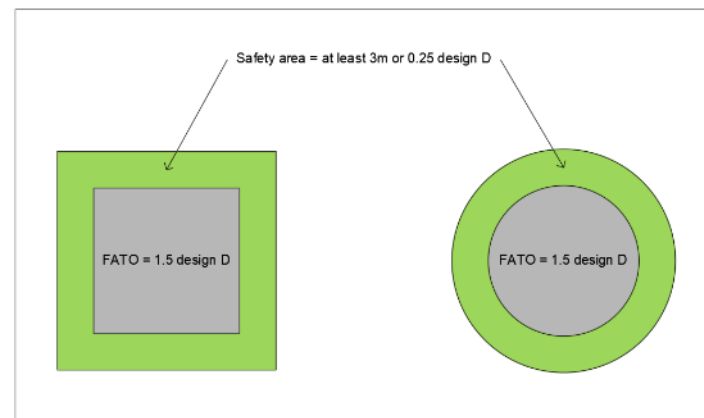
- In July 2019, the EASA released the SC-VTOL-01 standards (Special Condition) for small-category VTOL aircraft (seating configuration of 9 or less and maximum take-off mass of 3,175kg or less).
- In the future, the CS-VTOL Certification Specifications are due to be compiled (to be proposed in Q1 2025 and finalized in Q3).

- Operating standards and certification

- The EASA plans to draw up the new standard, Part-IAM (Innovative Air Mobility), to address the operation of manned UAM, and amend existing operating standards such as Part ARO and Part ORO.
- Amendments are anticipated to allow holders of commercial pilot certification for aeroplanes and helicopters to be issued with a type rating for VTOL aircraft, to cover the remote-pilot license and to create a new license for manned VTOL aircraft.

- Vertiports

- The EASA issued the Prototype Technical Design Specifications for Vertiports (PTS-VPT-DSN), which provides guidance on vertiport designs, in March 2022.



FATO/Safety Area dimensions (source: PTS-VPT-DSN)

TLOF	The minimum dimensions should be 0.83D or the dimensions for the required procedure prescribed in the regulations for aeroplanes, whichever is greater
FATO	The minimum dimensions should be 1.5 D or the dimensions prescribed in the regulations for aeroplanes, whichever is greater
Safety Area	Extending outward from the periphery of the FATO for a distance of at least 3 meters or 2.5 D, whichever is greater

## ② Policy trends in Europe

### □ Paris Olympics

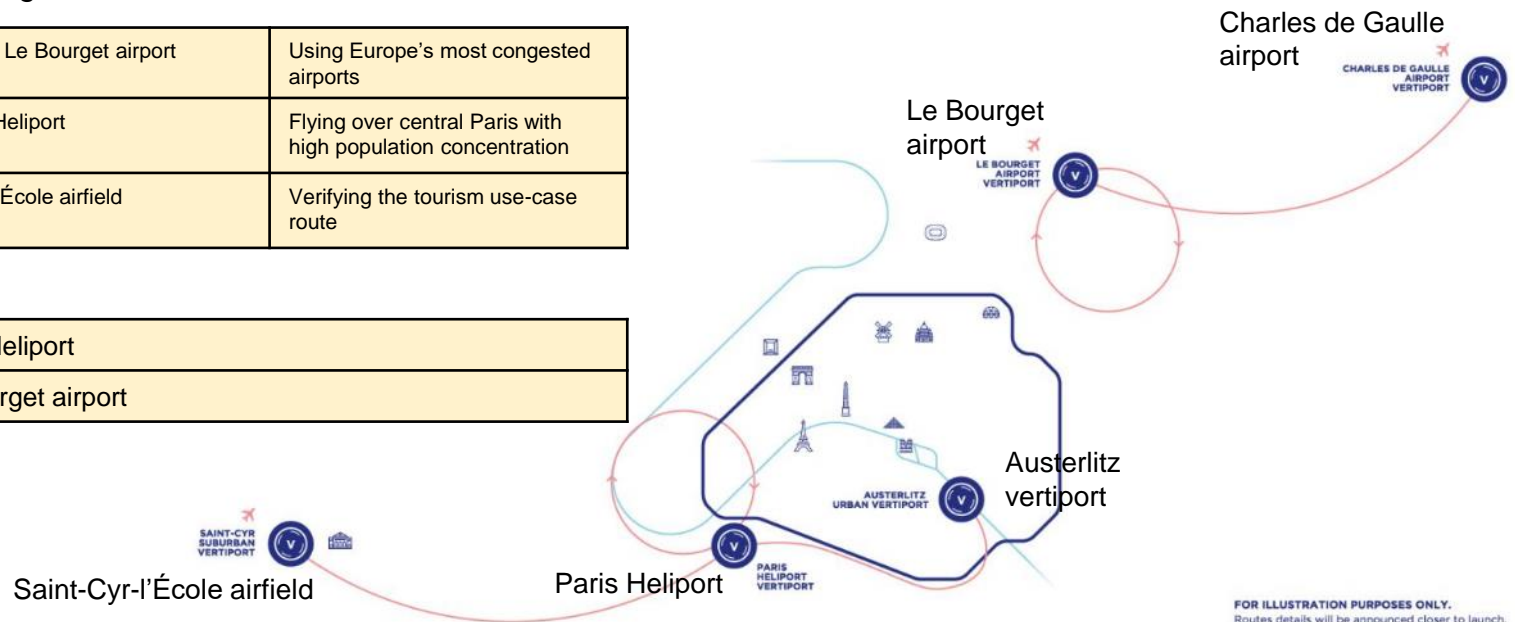
- During Paris Olympics in summer 2024, Vocolopter’s VoloCity is due to operate in Paris and its outskirts.
- The AAM is scheduled to operate in several routes connecting two locations and servicing local areas.

#### ➤ Flights connecting two locations

Charles de Gaulle airport – Le Bourget airport	Using Europe’s most congested airports
Austerlitz vertiport – Paris Heliport	Flying over central Paris with high population concentration
Paris Heliport – Saint-Cyr-l’École airfield	Verifying the tourism use-case route

#### ➤ Local flights

Local areas of Paris Heliport
Local areas of Le Bourget airport



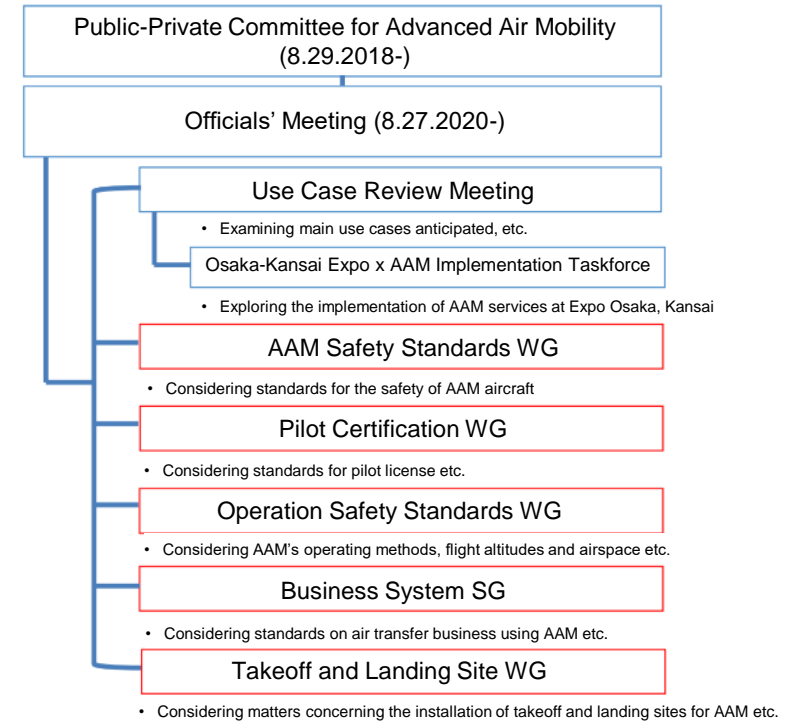
FOR ILLUSTRATION PURPOSES ONLY.  
Routes details will be announced closer to launch.

©Vocolopter

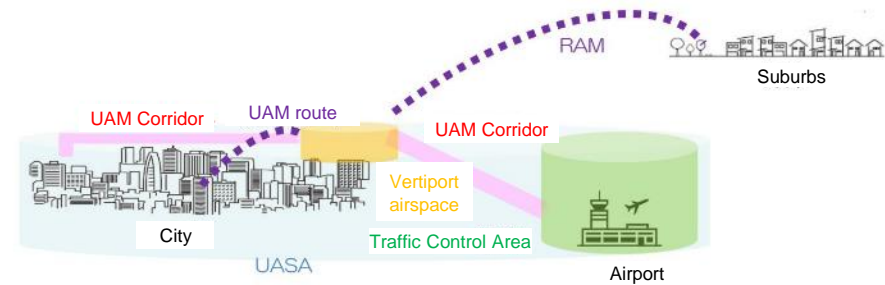
# ③ Policy trends in Japan

## Public-Private Committee for Advanced Air Mobility

- Had the first meeting in August 2018, attended by academics, industry stakeholders and government officials
- Drew up the Advanced Air Mobility Roadmap in December 2018 and updated it in March 2022
- Has the Use Case Review Meeting and various other working groups under the Officials' Meeting to discuss individual tasks
- Compiled the first edition of the AAM ConOps in March 2023



Source: Reference material used in the 9<sup>th</sup> meeting of the Public-Private AAM Committee



Source: AAM ConOps

# ③ Policy trends in Japan

## □ Expo 2025 Osaka, Kansai

- During the Expo 2025 Osaka, Kansai, the following companies plan to operate AAM (using models shown in brackets)
  - ANA Holdings / Joby Aviation (S4)
  - JAL (VoloCity)
  - Marubeni (VX4)
  - SkyDrive (SD-05)

Information added to a map compiled by the Geospatial Information Authority of Japan (GSI web)

- The following five locations are candidate sites for AAM takeoff and landing for two-point operations connecting to the Expo site.
  - Osaka Port area (central jetty)
  - East of Osaka Castle (Morinomiya)
  - Sakurajima area (South of USJ)
  - Kansai International Airport
  - Amagasaki area (Phoenix business site)



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## 5. Conclusion: AAM launch in 2025 and beyond

### □ Short-term viewpoints

- Ensuring successful AAM operation at the Expo 2025 Osaka, Kansai
  - From the perspective of social acceptance, the Expo is a major opportunity to raise public awareness about AAM in Japan. The operation should give sufficient safety considerations and appeal AAM's quiet and comfortable nature.
  - In the year before the Expo, eVTOL operation is planned at the Paris Olympics in a similar case. In 2022, Japanese and U.S. authorities signed the Declaration of Cooperation in Advanced Air Mobility, encompassing "exchange of information regarding policies, programs and projects, research results or publications" and "sharing of knowledge and best practices that will contribute to an advancement of AAM." Such overseas cases and know-how should be actively studied and applied.

Similar initiatives in the United States and other countries

- Operating know-how at 2024 Paris Olympics
- Exchange of information with U.S. authorities about advance projects and best practices

### □ Long-term viewpoints

- International harmonization of AAM standards
  - Authorities of relevant countries must work together in setting AAM standards for smooth aircraft development and operation by manufacturers and operators. It is important to become involved in ICAO's effort to define international rules and harmonization activities among individual regulatory authorities.
- Development of human resources involved in AAM
  - For the Japanese society whose population is aging, it is crucial to secure human resources capable of supporting new growth industries and facilitate greater empowerment of women.

- Examination by ICAO AAM SG
- Regulatory updates and guidance document preparation by EU and US authorities

- Department of Education's participation in AAM IWG
- AAAC's recommendations about HR development



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Thank you for listening

# Response to commentators' questions ①

Q: Would noise become an issue at and around AAM takeoff / landing sites with respect to AAM operation in urban areas? What is United States' awareness and regulatory status on noise generated by AAM?

A:

- Unlike current forms of aircraft, AAM is expected to become frequently operated in urban areas as a common means of transportation. AAM manufacturers are conscious about the issue of noise and quietness of operation from the perspective of social acceptance.
- The U.S. regulations have yet to present standards specific to the noise of AAM aircraft in a similar way to airworthiness standards. The AAM Implementation Plan and NPRM on powered-lift pilot certification and operating standards refer to the approach that the FAA is to examine, on a model-by-model basis, whether noise regulations for helicopters and tiltrotors in the existing 14 CFR Part 36 could be applied. If this is not appropriate, new application criteria could be drawn up for the applicable model.
- Noise environment at and around airports is defined in 14 CFR Part 150. Currently the FAA is planning to undertake a Noise Policy Review, gathering public opinions from May to September 2023. As a background factor of the review, the FAA has referred to changes in noise environment resulting from the operation of unconventional aircraft including AAM and drones, indicating the possibility that Part 150 may be updated to accommodate AAM operation.

# Response to commentators' questions ②

Q: There are media reports that U.S. military is showing interest in AAM. In terms of security, what applications and how much demand are they envisaging?

A:

- The U.S. Air Force is partnering with numerous AAM manufacturers for a project called Agility Prime, which taps into government resources to support private-sector development of eVTOL aircraft. A background factor of this project is that the United States sees Chinese companies' dominance of the compact drone market as a security issue and is focusing on supporting eVTOL development as a countermeasure.
- Specific applications of eVTOL aircraft, taking advantage of its low-noise performance and unmanned operation capability, appear to include sending and evacuating special forces, and conducting a search & rescue mission on enemy territories inaccessible with conventional aircraft. The U.S. Marine Corps may be considering to use eVTOL aircraft to transport supplies and reinforcements to small-scale units that are spread across enemy territories.
- As for demand, the U.S. Air Force has signed deals to acquire up to 9 eVTOL units from Joby (first one delivered in September 2023) and up to 6 Midnight units from Archer. These figures may increase further once the effectiveness of eVTOL aircraft is confirmed.