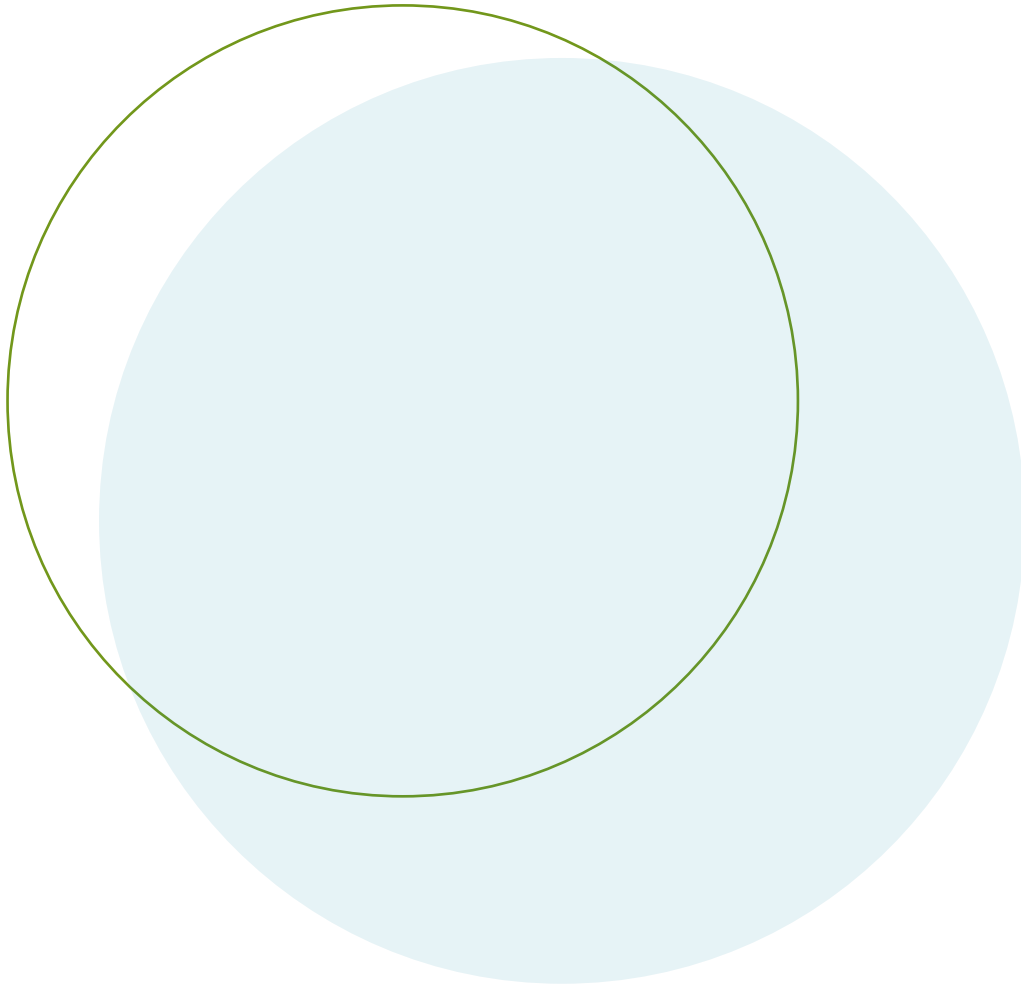




## **Preparing for a world with Advanced Air Mobility (AAM)**

# What is Advanced Air Mobility (AAM) ?



Advanced air mobility (AAM) is a new mode of transportation to move people and goods from one location to another. One of the primary goals of AAM is to provide the end user with a safe and efficient transportation option and to complement other modes of transportation, such as cars and trains. AAM also poses as a sustainable solution to help address urban congestion and provide access to remote areas of the world.

Some AAM aircraft will operate similarly to fixed-wing aircraft while others will have the ability to vertically takeoff and land, similarly to a helicopter. However, some of the key differences between traditional aircraft/helicopters and AAM is the proposed fuel sources and the noise that they produce. AAM aircraft are proposed to be powered either by electricity or hydrogen, whereas currently helicopters and fixed-wing aircraft are powered by petroleum-based products. Sound profiles between each manufacturer vary; however, initial results suggest that AAM may be quieter than traditional aircraft/helicopters. Some even say that an AAM aircraft will be 100 times quieter than a helicopter<sup>1</sup>.

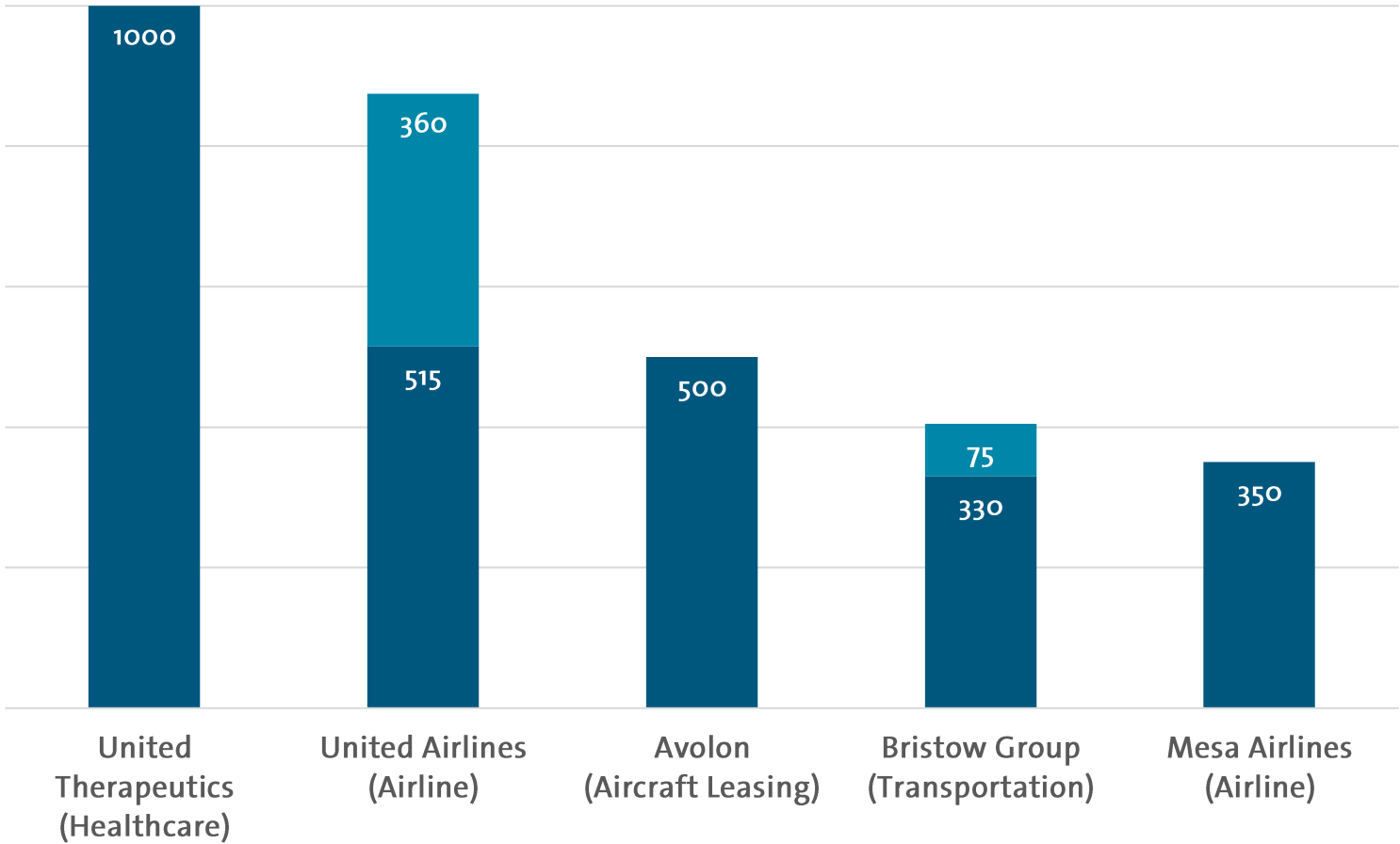
Initially, these AAM aircraft will be operated by pilots. Over time the piloting function will become automated, and flights will be performed solely based on computer systems inside the aircraft. At the time of this writing, AAM aircraft have yet to be certified by the FAA for commercial or private use. Most of the major AAM manufacturers in the United States are targeting to have their aircraft certified in the year 2024 or 2025, with most of them being very optimistic about achieving those target dates.

The use and application of AAM can range from carrying cargo, to medivac flights and even moving people from one location to another. The capacity of each AAM aircraft varies from one manufacturer to another. For context, Joby Aviation and their S4 aircraft can carry one pilot and four riders, has a range of 150 miles, and can reach speeds up to 200 miles per hour<sup>2</sup>.

Sources:

- 1) <https://evtol.news/joby-s4>
- 2) <https://jobyaviation.com>

# What does the industry think about AAM?



\* Orders are as of January 2023

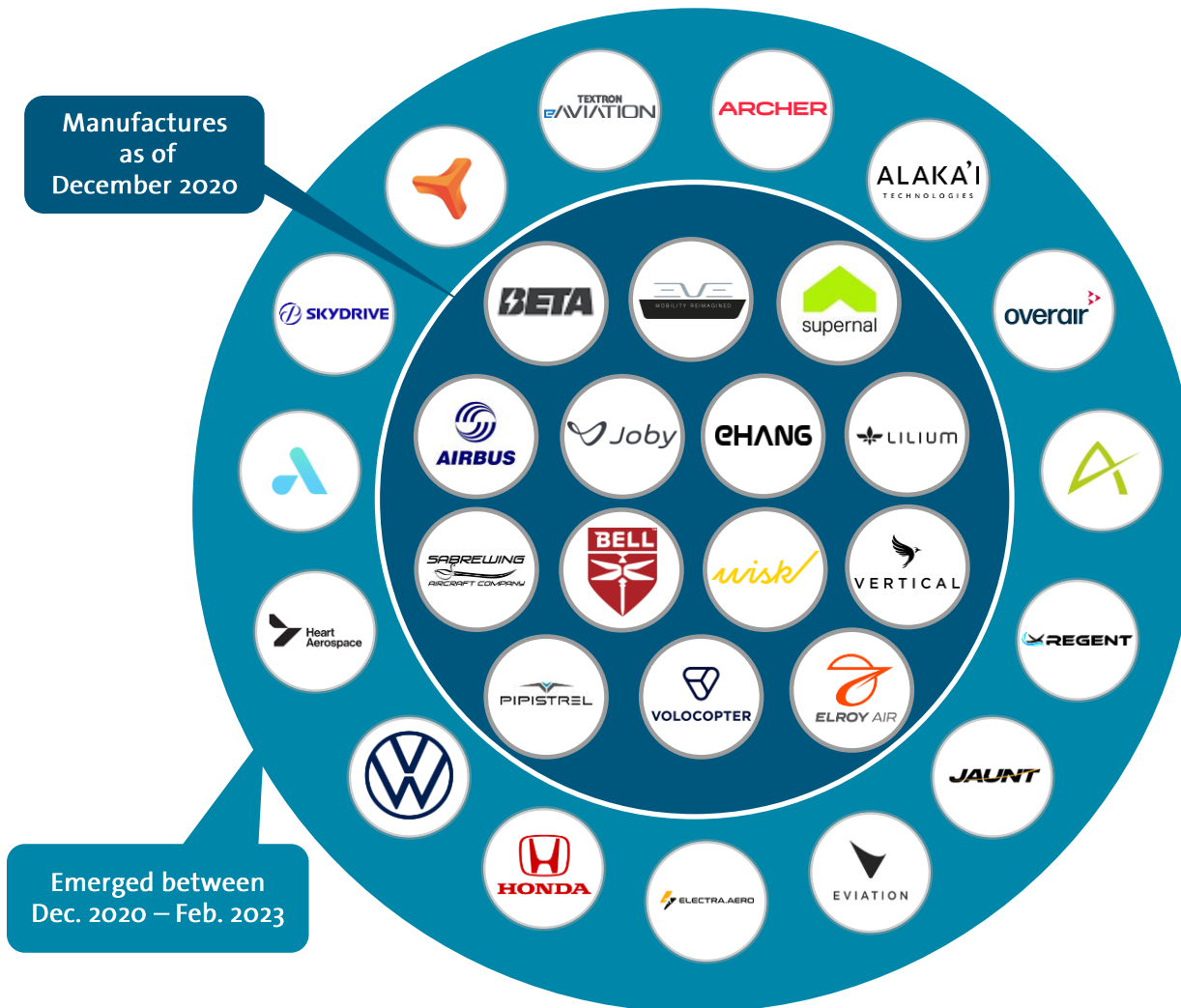
■ Number on Order ■ Options

AAM aircraft can provide great opportunities to the airlines, healthcare industry and for private entities. The perceived benefits are part of the reason why corporations have invested into AAM.

From the airline perspective, they are very opportunistic. United Airlines and Mesa Airlines are in the top five for largest orders with options. Additionally, airlines such as Delta Air Lines, American Airlines, Azul, GOL, Japan Airlines, Virgin Atlantic and UPS have purchase orders in place to buy and/or lease AAM aircraft. There is no doubt that AAM plays a critical role in the future for the airline industry.

The largest single company that has placed an order for AAM aircraft is United Therapeutics. The graph demonstrates that not only will AAM be in the future for airlines, but it will also be a future consideration for the healthcare industry and other private entities.

# What does the short-term growth in AAM manufacturers mean for the market?



The landscape of AAM is constantly evolving and changing. At the start of December 2020, there were a total of 14 AAM manufacturers globally. Each one has a similar concept in nature; however, there were different business models for implementing AAM in the aviation market.

Little over two years later, there are nearly double the number of AAM manufacturers. Some of the new AAM outfitters are car manufacturers, aircraft manufacturers, and private/public startups with significant capital. During this time period, some manufacturers did close for various reasons.

This short-term growth in AAM manufacturers can have several effects in the market, including:

- **Increased competition** – With more manufacturers entering the market, there could be a higher drive for innovation, higher product quality, and competitive pricing.
- **Product diversification** – Each AAM manufacturer will have their own unique approach on their aircraft design and targeted application, leading to potentially a broader number of market uses.

Overall, this short period of growth suggests a strong interest in this emerging technology.

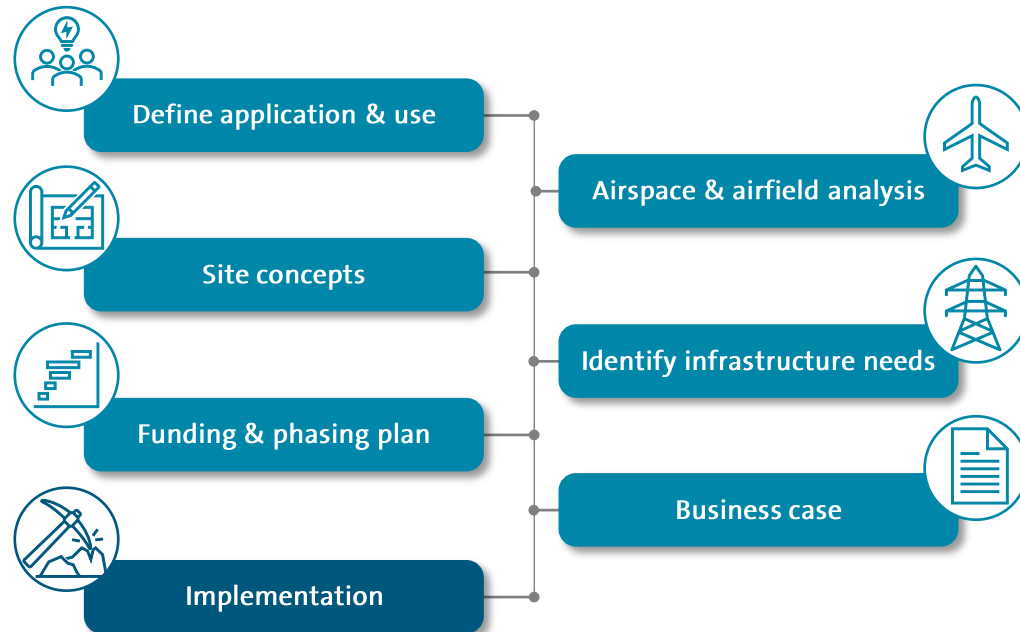
Sources:

1) <https://aamrealityindex.com/aam-reality-index>

# How do I begin preparing for AAM at my facility?

AAM is an emerging segment of the aviation industry and will truly change how people travel in the future. Integrating AAM operations seamlessly into the existing airport landscape is a complex task. When thinking about how to integrate AAM, it is best to do so by developing a detailed roadmap that incorporates the unique perspectives of users, stakeholders, regulatory representatives and community members.

The first step in creating a roadmap is to understand the application and use of AAM at YOUR airport. What works for one airport, may not necessarily work for your unique facility. The application of AAM has a wide range of uses such as urban air transportation, emergency response, tourism, law enforcement, cargo transportation and even could be used by individuals as a means of personal air transportation. Understanding the market conditions specific to your airport will help to influence where AAM operations can occur and how they should be conducted. Part of determining if a site is suitable for AAM operations is understanding adjacency needs and the proximity the operator needs to be to other facilities.



There are numerous options or sites that could be considered for AAM. Terminal-based operations can provide a high-level of service for the traveling public, but security and operations may limit the site's capabilities. Landside facilities, like parking lots, are attractive; however, these sites may limit the opportunities to collect revenue. Developing an independent site such as a vertiport or repurposing an existing facility could provide independence; however, it could require significant capital investment.

Since there are numerous site options to consider, it's important to understand the use and application of AAM when selecting a site. Just because a site seems reasonable today, does not mean it will not create challenges in the future for not only the AAM operator but the overall airport environment.

To help narrow down potential site options, a detailed airspace and airfield analysis should be conducted. Ultimately, AAM operations should have minimal impact on other airfield functions such as the capacity of the runway system or the functionality of instrument approach procedures. An evaluation of the airspace system should consider the following;

- **Operational requirements** – Just like determining a critical aircraft for an airport, understanding the operational requirements for the most demanding AAM aircraft will help influence the operational needs of the airspace system.
- **Identify airspace constraints** - Potential hazards, obstructions and obstacles should be identified to understand limitations in the airspace system. The intended use of AAM will help influence the extents of the airspace analysis.
- **AAM integration concepts** – An identification and evaluation of various methods for accommodating AAM in the airspace should be prepared. Evaluated concepts can include both providing independent solutions such as dedicated corridors and dependent solutions where AAM operations are mixed with fixed-wing aircraft.

Once an AAM integration concept is defined there may be a need to develop procedures and protocols for AAM operations. This could include communication protocols, traffic management, emergency response, and contingency plans.

In concurrence with the airspace analysis is the evaluation of the airfield. Prior to preparing detailed concepts, multiple considerations should be identified and examined to determine if a site is feasible for AAM operations. When evaluating the airfield and the overall airport environmental for suitable sites, consider the following factors:



One of the proposed fuel sources for AAM is electricity. A lot of airports do not have the extra capacity to charge these new aircraft. Preparing a utility master plan or refreshing a prior study can help to identify the needed capacity to support AAM operations. Additionally, as airports continue to work towards becoming environmentally sustainable and achieving a net zero status, there is an opportunity to explore renewable resources such as solar panels and Microgrids to help add additional capacity to the electrical system to support future aircraft chargers.

Another consideration for integrating AAM operations at an airport is the business case. Developing a business case for AAM will help to answer questions such as who should build the facility, who should operate the facility, and who should maintain the facility? In preparing a business case for AAM there are several factors that should be considered.

- **Validating market demand** – An analysis of market demand is crucial to understanding the potential for AAM services at an airport. This should include an assessment of the size and growth potential of the market, customer needs and preferences, and competition from other transportation modes.
- **Financial feasibility** – An analysis of the costs and potential revenues associated with offering AAM services should be performed. This could include an assessment of the cost of infrastructure, maintenance, and other operating expenses, as well as an analysis of potential revenue streams such as charging or refueling services, landing fees, hangar rental, and maintenance services.
- **Risk assessment** - An analysis should be conducted of the relevant regulations and requirements, as well as an assessment of the potential risks and liabilities associated with AAM operations.
- **Ownership structure** – An analysis should be prepared that considers the financial and operational implications of having the facility built, managed, and maintained by the airport or by a third-party entity.

Finally, as the roadmap is being prepared, its important to communicate with your stakeholders early and often to ultimately gain acceptance.



---

Integrating AAM is a complex task. It requires airports to begin planning early, coordinating with stakeholders often, and preparing a detailed roadmap that incrementally phases improvements to fulfil market needs.



