



eVTOL Aircraft: What they are & why they matter

New electric vertical takeoff and landing (eVTOL) aircraft are enabling aviation to be more closely integrated with our communities

A resource prepared by:

The Community Air Mobility Initiative (CAMI)

Supporting the responsible
integration of the third dimension at
the state and local level.

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What are eVTOL Aircraft?

eVTOL stands for "electric vertical takeoff and landing, meaning they don't need runways



eVTOL stands for “electric vertical takeoff and landing” and refers to a new kind of aircraft that uses electric motors to lift the aircraft so that it can take off and land straight up and down, much like helicopters. Some eVTOL aircraft are 100% electric and rely on battery power while others use an on-board generator or hydrogen fuel cell to recharge their batteries and/or generate forward thrust while en-route.



There are a variety of different eVTOL configurations: some are designed for short urban flights while others use wings to extend their range and serve a larger area. Most air taxi operations will use vehicles with between two and five passengers on board but there are also first responder and individual aircraft configurations that carry only one person.



There are over 200 eVTOL aircraft configurations that have been published. A handful of them have already completed full size flight testing, between them adding up to many thousands of flights over the last few years. Depending on FAA certification and other factors, limited commercial operations could begin with eVTOL aircraft before the middle of the decade.



A key enabling technology for eVTOL aircraft is advanced software, which is able to leverage developments in distributed electric motors and other new propulsion, batteries, and other energy storage and propulsion technology. Increasingly autonomous systems enhance safety by guarding against operator error, and remotely piloted aircraft may even allow the aircraft to fly with only passengers onboard. New certification and operational tools are being developed in parallel with the technology to ensure that these aircraft are safe.



eVTOL Benefits & Challenges

eVTOLs bring cost and environmental benefits but have new operational and infrastructure needs



As with most new technologies, eVTOL aircraft have a high level of potential benefits as well as significant challenges that must be addressed to reach that potential. Early planning and deliberate implementation of eVTOL aircraft in an urban air mobility (UAM) system within a metropolitan area will go a long way towards ensuring that the benefits offered by these aircraft are realized and the challenges addressed. The following is a partial list of eVTOL benefits and challenges:

Benefits

- Frequent, on-demand, low cost operations
- Low noise and sound annoyance levels which blend in with the ambient environment
- Low (zero) in situ emissions and the potential to use renewable energy
- Rapid vehicle deployment for first responder usage
- Hyper local access
- Low-capital vertiport build-out
- Increased range of access to the urban core
- Redundancy by design for safety and reliability
- Autonomy and automation which safeguard against human error
- Alternatives to current commute options and inter-modal connectivity

Challenges

- New legal and certification questions
- Social equity of noise and visual impacts
- Energy grid able to meet demand, and do so sustainably
- Integration with existing transit & traffic patterns
- Land use planning needed to avoid increased sprawl
- Accessibility as part of aircraft and vertiport designs
- Vertiport locations which balance public good and profits
- Education and utility demonstration during early stage operation
- “Right sizing” approach to noise impacts
- Consistency across localities and clarity over jurisdictions

eVTOL Aircraft and Communities

eVTOL aircraft will change how we interact with aviation and how we use our commuting time



So many visions of the future include aircraft that let us fly quickly, easily, and safely from wherever we are to wherever we want to go without having to slog through ground-based traffic. It may seem like that vision is still science fiction, but the reality is that there are a handful of highly credible eVTOL companies-with ample funding from the likes of global corporations like Boeing and Toyota-that are conducting advanced flight testing and moving towards certification and commercialization today. Within the decade it is highly likely that eVTOL aircraft will be meeting the daily transportation needs of a wide range of passengers.

In order to ensure that the potential of this future is fully realized for as many members of our communities as possible, it is imperative that local leaders start planning for eVTOL operations within their jurisdictions now. Unlike aviation today, with which we interact only on the other side of a fence or a security checkpoint after having left our daily transportation behind, eVTOL aircraft will enable aviation to be much more closely integrated with other modes of transportation and infrastructure. They also have the potential to enable commuters to travel over twice as far in the same time as current modern automobiles, even without accounting for traffic.

This more intimate integration of aviation into our daily lives means that secondary effects need to be considered: are passengers being funneled onto underutilized transit? Or overcrowding a system that is already at capacity? Is there adequate curbspace at the base of a new vertiport for drop-off and pick-up traffic or will it conflict with a major bus artery? Are underserved communities going to benefit from the economic opportunities associated with UAM? Or just bear the brunt of the inconvenience? Will the increased range of access to the urban core mean great economic opportunities for the region and moderated housing prices? Or will it just feed into urban sprawl?

These questions and more must be answered and policies implemented to ensure that eVTOL technology is a key piece of the future we all want to have. The Community Air Mobility Initiative (CAMI) provides resources for state and local decision makers in support of the responsible integration of UAM.

Please see www.communityairmobility.org for more information.

