



# PREPARING MIAMI-DADE FOR ELECTRIC URBAN AIR MOBILITY

Phase 2: Stakeholder Feedback on the  
Miami-Dade Air Mobility Blueprint

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# ACRONYMS

<b>eVTOL</b>	Electric Vertical Take-off and Landing Vehicle
<b>MDC</b>	Miami-Dade County
<b>TOD</b>	Transit-Oriented Corridor
<b>UAM</b>	Urban Air Mobility

# GLOSSARY

<b>eVTOL</b>	An electric, zero-emission aircraft that takes off vertically. Typically, these aircraft will carry 4-6 passengers on short hops across the city.
<b>UAM</b>	The use of aircraft to travel across a large urban area. Historically, UAM has generally used helicopters but eVTOLs will introduce a zero-emission, quiet, and accessible mode for urban flights.
<b>Vertiport</b>	A vertiport is the infrastructure intended for eVTOL aircraft to take off and land. It can have a single or multiple Final Approach and Take-Off Areas (i.e., landing pads). Vertiports will also provide services, including weighing passengers and bags to ensure the weights are within limits.

As large cities grow larger, urban travel is likely to become more complicated, time consuming, and stressful. Governments and communities around the world are searching for innovative ideas that can simplify urban mobility in a sustainable way.

One technology on the horizon is electric vertical take-off and landing aircraft (eVTOLs). By 2030, eVTOLs will offer quick, quieter zero-emission flights that will connect people and deliver cargo across cities. These aircraft will take off vertically and require only a small ground infrastructure for landing while their distributed electric propulsion will be significantly quieter than other vertical aircraft today. The shift toward electric aircraft will lower the operating cost of urban flights. Consequently, the price of urban air mobility (UAM) flights will become accessible to more people.

In early 2022, Eve Air Mobility, Skyports, L3Harris, and Community Air Mobility Initiative (CAMI) published the Miami-Dade Air Mobility Blueprint. The Blueprint focused on an airport shuttle use case between Miami International Airport and the Miami Beach Convention Center, and mapped the passenger and eVTOL journey as well as the infrastructure, services and touchpoints that passengers and eVTOLs will need for safe and efficient flights at launch and as demand grows.

It also highlighted the potential community benefits, including investment in new infrastructure for vertiports (facilities where eVTOLs will land and take off), electrification systems, workforce development, a new sustainable mode of mobility, and improved urban connectivity. Realizing these benefits requires planning to start today, following a process that aligns with communities' needs and an eye toward ensuring equity, sustainability, and accessibility.





## Why did we speak to Miami-Dade stakeholders?

Communities are powerful; they can welcome, hinder, or prevent new ideas and technologies from taking root. Communities must also receive tangible, meaningful, and long-term benefits when new forms of mobility are introduced. As such, they must have a voice in defining the types of benefits electric UAM should deliver and expressing the concerns that must be addressed. After releasing the Blueprint, Eve, Skyports, and CAMI interviewed government and business stakeholders across Miami-Dade County (MDC) with the goal of:

1. Hearing questions and concerns about UAM;
2. Identifying hurdles and opportunities for government, business and community acceptance;
3. Gathering feedback on the Blueprint to inform next steps for developing the Miami-Dade County UAM infrastructural ecosystem.

## What did we learn?

Through these conversations, we discovered three main themes:

**1** UAM Must Integrate with Ground Transportation Systems and Other Airspace Users

**2** Community Engagement is Critical to Ensuring Benefits and Improving Equity

**3** Stakeholders Want to Learn More About Infrastructure Financing and Planning

# 1 UAM MUST INTEGRATE WITH GROUND TRANSPORTATION SYSTEMS AND OTHER AIRSPACE USERS



MDC government and business stakeholders emphasized that UAM using eVTOL cannot exist in a silo. This new form of mobility must serve the community equitably, be accessible to all, and integrate with existing mobility options such as trains, buses and micromobility (e.g., bikes and scooters) to ensure a seamless and flexible journey from door to door. Equity, access and integration must be key principles when planning the UAM infrastructural and operational ecosystem. Therefore, industry and government must:

**Ensure that UAM operations and ground infrastructure are integrated with ground mobility options such as trains, buses, and micromobility.**

Integrating UAM operations with existing ground transportation systems, such as buses and trains, will ensure that UAM becomes a part of a seamless journey that enables passengers to access first- and last-mile mobility options with minimal effort. Integration will also offer residents more mobility choices and thereby provide more flexibility in when and how commuters choose to move across the county. As the county grows, UAM could offer MDC residents access to a form of transportation that offers flexible routing.

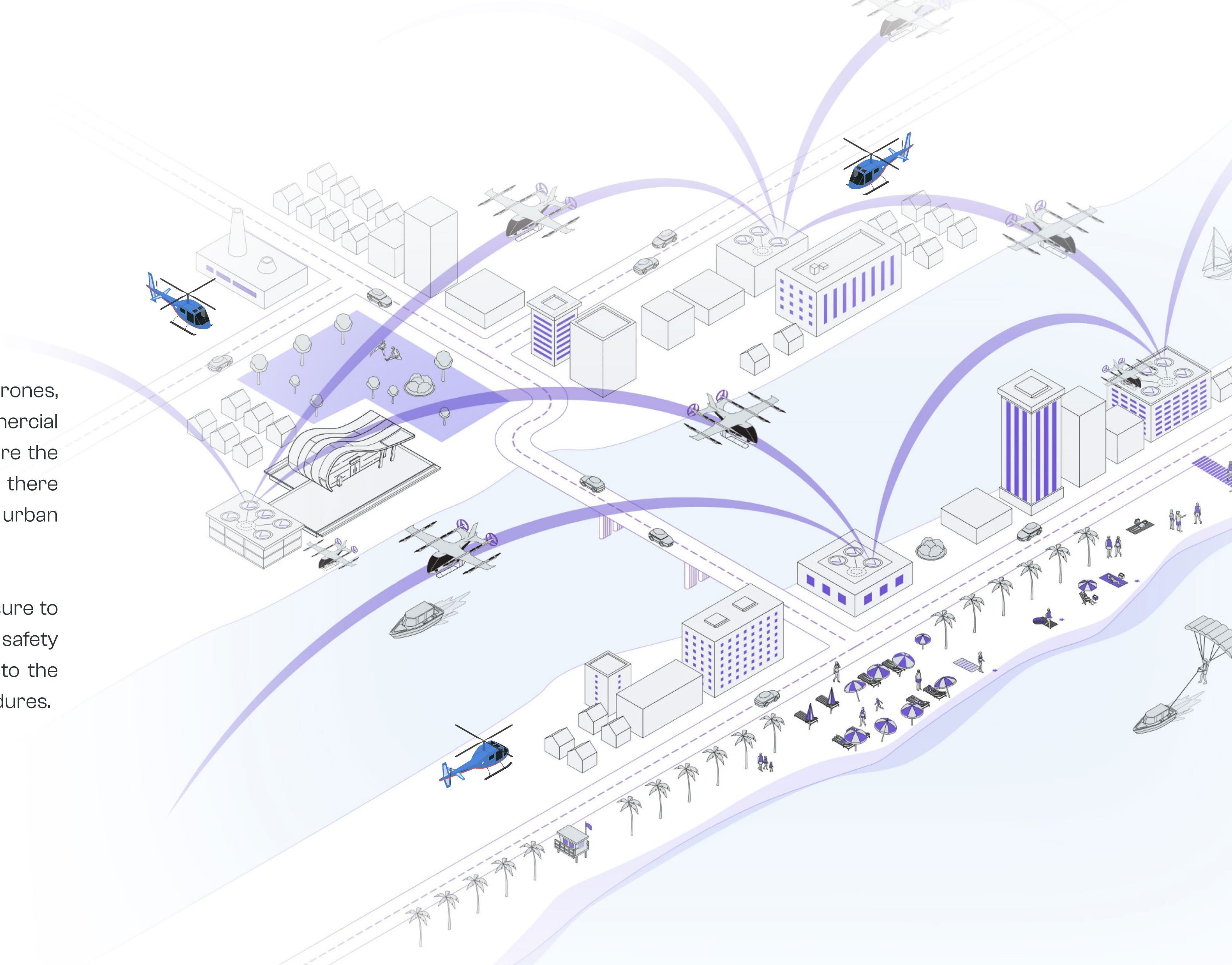
In MDC, new communities are being planned along Transit-Oriented Development (TOD) corridors. This approach could provide an opportunity for vertiports to be integrated with these corridors so that UAM can serve these new communities. There are also existing areas in MDC, such as college campuses, where additional transportation options would be welcome. UAM could serve these large population centers with both cargo and passenger services. Given that MDC is seeking to discourage people from using cars and encourage commuters to choose more sustainable forms of mobility, UAM could be a part of the solution—but only if the vertiports can seamlessly connect people to ground transportation and last-mile micromobility options.



**Ensure the low-level airspace safely integrates all urban airspace users.**

The low-level airspace today can be a crowded place. Drones, helicopters, general aviation aircraft, as well as commercial aircraft on final approach or departure paths often share the urban skies. If UAM operations are to launch in MDC, there must be clear strategies for integrating eVTOLs into the urban airspace and mitigating safety risks.

Furthermore, the airspace design must consider exposure to noise, operational tempo, visual impacts, and mitigate safety risks. Ongoing community engagement will be critical to the development of acceptable airspace designs and procedures.





## Plan infrastructure with an integrated strategy.

With new technologies and forms of mobility entering the market, there will likely be commonalities in physical and digital infrastructure requirements. For example, electric cars require an expanding charging network. Likewise, eVTOLs will require power and charging facilities to be available at vertiports and maintenance facilities. Although cars and eVTOLs will have very different charging and power requirements, early strategic planning will help cities and counties minimize costs and mitigate risks so that vertiports and the electrical infrastructure may be future-proofed. Importantly, an integrated, system-of-systems approach to planning and designing the ground and digital infrastructure will be critical for UAM to not only launch but scale over time.

MDC is already thinking about the digital policies that need to be in place to monitor and manage the movement of ground mobility vehicles. Mobility data specifications are already being used to monitor the location of each scooter or bike and their status. Similar approaches may be needed to integrate digital policies across all mobility modes so that the community can be sure that bikes as well as eVTOLs are adhering to community requirements.

### Going forward, planners should consider strategies to:

- Integrate UAM with local strategic plans for transportation, infrastructure, sustainability;
- Integrate UAM operations and infrastructure plans with local resiliency plans;
- Integrate UAM with last-mile solutions, such as micromobility;
- Engage with city transportation and public works officials to integrate UAM into strategic plans;
- Engage with land use planners to understand constraints and opportunities to enhance connectivity and equity in transportation access.

# 2 EQUITY AND COMMUNITY ENGAGEMENT ARE KEY TO ACCEPTANCE OF UAM



When it comes to UAM, equity and community engagement must be considered together. UAM offers the potential for multiple public benefits, including humanitarian use cases (e.g., emergency response, pandemic relief, and medical use cases); and economic development, including opportunities for vertiports to serve as a catalyst to revitalize neighborhoods and support job creation and workforce development.

Social equity issues related to UAM are complex and include challenges such as affordability, accessibility, gentrification and displacement around vertiports, and impacts of flight paths and vertiports on neighborhoods and underserved populations.

Stakeholder and community engagement are vital to ensure that the planning process incorporates social equity, inclusion, and environmental justice. The public sector can play a key role in guiding equitable outcomes through community engagement and ensuring full and fair participation of all in UAM planning and decision-making.

In order to ensure broad public benefit and to minimize the impact of any adverse impacts, local jurisdictions and public agencies should consider the following:





**Ensure that infrastructure and air routes provide equitable access for all users, and do not disproportionately affect underserved communities and vulnerable populations.**

Local jurisdictions should consider the impacts of UAM service, infrastructure, and flight paths on underserved communities and vulnerable populations. They should also consider the equity impacts associated with flight paths and en route operations such as the location and time of operations; air congestion and operations tempo; and the impacts of air traffic over sensitive land uses (e.g., noise and visual pollution). Finally, local jurisdictions should also consider the equity issues associated with and/or influenced by vertiport placement such as direct environmental impacts, and issues of gentrification and displacement.

In order to address these considerations, local jurisdictions, public agencies and planners can work collectively to address community concerns and mitigate potential adverse impacts by integrating environmental justice principles and strategies into the planning and implementation of key UAM services and policies that may impact underserved communities and vulnerable populations. These impacts include secondary effects such as the potential re-allocation of limited public resources for UAM at the expense of other public sector investments which may have a broader reach.

Additionally, universal design principles can be applied to UAM aircraft, facilities, and other physical and digital infrastructure to ensure access for all people, regardless of age, income, disability, or other factors.

Local jurisdictions should ensure that underserved communities and vulnerable populations share in the broader benefits of UAM such as economic and workforce development opportunities. In the future, electrification and automation may be able to help reduce the costs and expand the availability of UAM. In the meantime, public agencies may be able to support equitable outcomes through various pricing models, subsidies, and programs that expand UAM access to underserved communities and vulnerable populations.

## Ensure broad and meaningful public involvement in the transportation planning process for UAM.

Stakeholder and community engagement will be an essential part of maximizing the broader public benefits while also understanding and mitigating the adverse impacts of vertiports and flight paths on underserved populations and communities. Planners should consider integrating advanced air mobility into planning processes to understand community concerns and empower stakeholders. There are several tools available to achieve this, including:

- Increasing the involvement of underserved communities and vulnerable populations in UAM studies and data collection activities;
- Engaging community stakeholders and the public to understand the public's interests, goals, and concerns regarding UAM planning and implementation through focus groups, surveys, town halls, and other engagement methods;
- Incorporating community feedback in the planning, design, and implementation of UAM such as infrastructure siting, flight paths, and service characteristics;
- Conducting education and outreach, especially among underserved communities and vulnerable populations about UAM and its impacts;
- Conducting education and outreach in different languages to ensure the widest reach possible. For MDC, this should include conducting community outreach in Spanish and Creole as well.



# 3 STAKEHOLDERS WANT TO LEARN MORE ABOUT INFRASTRUCTURE FINANCING AND PLANNING



Early investment in infrastructure will be critical to attracting aircraft operators and realizing the mobility and community benefits of UAM. An ideal UAM system is a well-planned urban network using existing airfields and newly sponsored, public or private infrastructure (known as vertiports). This allows for continued capitalization of existing assets, development of new resources, flexibility for users, and an opportunity to scale and then expand access as the industry matures.

MDC stakeholders had many questions about vertiports. They wanted to know how construction will be funded, whether vertiports will be agnostic, and the differences between UAM infrastructure that is public and private. Proactive efforts to decide how vertiports will be funded and who will be responsible for the infrastructure will enable MDC and communities to fully realize the benefits that UAM could deliver.

### Evaluate how ground infrastructure may be funded and the conditions required.

Communities and governments have many questions about how the ground infrastructure for eVTOLs will be funded. There is substantial private capital lined up to build the initial vertiport networks utilized by this new and transformative form of transportation. In working with industry to deploy this capital and design this new transportation system, communities could benefit from enhanced connectivity without the expenditure of scarce public funds. As the industry matures and scales, communities can determine whether public investment is beneficial. States, municipalities, local and tribal governments, and other governmental entities can make those determinations based on their communities' interests.

Whether cities can or should finance a project is not the only question a community should consider. The source of funding can also directly impact how aviation infrastructure impacts and serves the community. If a project uses Federal funding, the vertiport operator cannot turn away an aircraft that did not abide by the vertiports' operating rules. Alternatively, privately funded vertiports can prevent operators from landing if they do not respect the operating rules agreed upon during the permitting process. Comparisons about funding and operating conditions are discussed in the next section when comparing public and private vertiports. To date, some transportation projects are funded by public-private partnerships (PPP), which may be another potential option for cities and communities to consider.





### Ensure vertiports are agnostic.

The ground infrastructure where eVTOLs will land and take off must be agnostic so that it provides access to all eVTOL operators. Communities are unlikely to permit vertiports to solely serve a single fleet operator and, as such, they will not support the development of multiple vertiports within short distances. Furthermore, the potential noise and visual impact from UAM would discourage non-agnostic ground infrastructure. If the local governments decide to invest in the development of ground infrastructure, they would expect to minimize their risk and ensure that it is agnostic to eVTOL designs and fleet operators.





## The differences between private and public vertiports.

Stakeholders also had questions about the difference between private and public vertiports. Below is a summary of how they differ.

**Private-Use Infrastructure** | Generally, private use infrastructure is an asset that has been financed privately. However, private-use aviation infrastructure doesn't mean "exclusive-use" infrastructure. Just like a hospital can be privately built, owned, and operated in a manner that is open to any patient that walks through the door, many vertiport developers intend to provide an openly accessible and agnostic facility. In the UAM context, this would operate like an airport – where a vertiport is free to be used by any individual who books a flight and any airline that operates an aircraft in and out of the facility. The vertiport operator would make the landing pad, passenger gates, charging equipment, aviation aids, and general facilities available to a multitude of aircraft operators. Ultimately, passengers will have choices in where they travel to and from, what aircraft they travel on, and what operator they choose to book through.

**Public-Use Infrastructure** | Generally, public-use infrastructure is an asset that has been financed with public resources. While there are certain advantages, public-use infrastructure isn't always more beneficial to a community. It's true the U.S. has historically taken a different approach to commercial aviation infrastructure investment than much of the world; consisting of publicly owned and operated airports. This approach helped establish the premier aviation system that has set the expectation for public access and social benefit. However, Federal requirements on public-use infrastructure also drive some of our communities' biggest complaints about aviation, including lack of local influence over the amount of noise produced and the time of operations. Public-use infrastructure, particularly that which is funded through Federal programs, is federally mandated to serve all aircraft and operators that can safely take off and land from said facility.

**Functional Differences – Private vs. Public** | Private infrastructure provides more control over the operation of the facility and the aircraft that use it than is possible with public infrastructure. Whereas public-use facilities are limited in their ability to control which aircraft operate from it, a private-use facility can limit access in the interest of its community. This could include limiting access to aircraft over certain noise thresholds, establishing operational hours and curfews, and holding users accountable for poor operational decisions that negatively impact a community. Public-use infrastructure would have difficulty putting in place similar parameters and constraints on a site-by-site basis.

# CONCLUSION

These interviews provided some early insight into the questions, concerns, and viewpoints of governmental and business stakeholders in MDC. Our interviewees were generally excited about this new form of transportation but at the same time, they cautioned us to avoid the mistakes of the past where new technologies benefited some but negatively affected others in the community.

Preparing the UAM ecosystem—the infrastructure, policies, and technologies—requires a holistic approach. If UAM is to successfully launch and scale in MDC, the ecosystem development process will require a human- and community-centered approach that extends well beyond engineering requirements. The proposal to introduce eVTOL UAM flights will require continued consultation with the community, with consideration toward providing workforce development opportunities for underserved communities, delivering meaningful long-term community benefits, and ensuring UAM are accessible. Many questions are yet to be answered but continued community engagement and consultation will be key as planning commences.



An aerial photograph of a city skyline, likely Miami, featuring several tall skyscrapers and a beach area. A drone is flying in the sky in the upper left corner. The sky is a mix of light blue and white clouds. The city buildings are in various colors, including white, blue, and orange. The beach is sandy and has some blue umbrellas. The ocean is a vibrant turquoise color.

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- Miami-Dade County Department of Transportation and Public Works (DTPW)
- Miami-Dade County Transportation Planning Organization

## About us



Eve Air Mobility, an Embraer Company, is dedicated to safely enabling the global Urban Air Mobility ecosystem for all. Benefitting from a startup mindset, and backed by Embraer's more than 50-year history of aircraft manufacturing and certification expertise, Eve offers a comprehensive approach to scaling the UAM industry by providing a holistic ecosystem of services. Its advanced electric vertical aircraft (EVA), coupled with its comprehensive global services and support network, and a unique air traffic management solution, make it a trusted and experienced partner. Eve is the first company to graduate from EmbraerX, the disruptive innovation division of Embraer, which has a proud 40+ year history in Florida.



Skyports Infrastructure is the leading enabler of advanced air mobility (AAM) and provides the critical link between the ground and the sky. The company designs, builds, and operates take-off and landing infrastructure for air taxis, and partners with world-class electric vertical take-off and landing (eVTOL) passenger and cargo vehicle manufacturers around the world to enable safe, sustainable and efficient flight operations within urban and suburban environments. Skyports also provides drone delivery through its logistics arm, Delivery by Skyports, which is already proving the viability of the company's best-in-class unmanned systems technologies within the medical, e-commerce, maritime and logistics sectors.



The Community Air Mobility Initiative (CAMI) is a nonprofit organization founded to support the responsible integration of urban air mobility into communities through education, communication, and collaboration. CAMI connects communities and industry by providing expertise and resources to decision makers, the public, and the media at the state and local level. CAMI provides communities and the decision makers that support them with the information and tools that will be vital to the successful integration of aviation into our daily transportation options.



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