

Uber Elevate



Uber | BOKA Powell

Uber Air: Designing for the Community

uber.com/elevate

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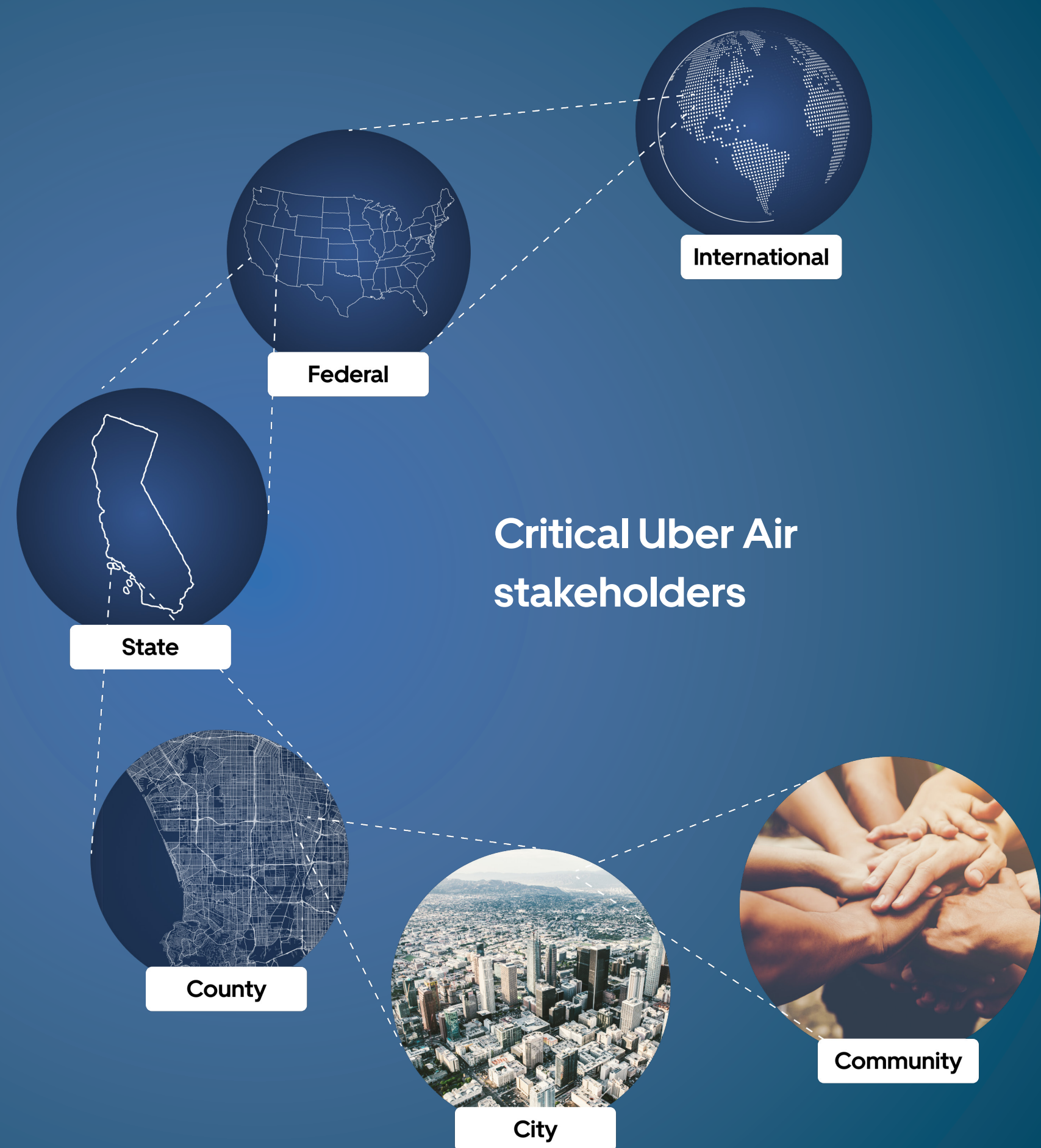


Introduction

The concept of “flying cars” has captured the public imagination ever since the Wright brothers’ first flight in 1903. Now, over a century later, the idea more strongly than ever ignites curiosity and passion as citizens spend increasing amounts of time in the gridlocked traffic that plagues the world’s largest cities. From excitement over making it home for dinner on time because your Uber Air ride could reduce a 2-hour commute to just 20 minutes, to concern about potential noise impacts associated with operations near your neighborhood, the benefits and challenges of urban air mobility (UAM) evoke powerful and very personal emotions.

At Uber Elevate, we seek to build and scale Uber Air, a multimodal transportation product that seamlessly integrates first and last mile ground transportation with a time-saving intra-city flight, in a way that is holistically sustainable for the cities and citizens that we will serve. We anticipate that, at scale, Uber Air can have numerous benefits for communities: helping to achieve environmentally sustainable new forms of urban transportation, workforce development opportunities, increasing the overall robustness of a local transportation system, and improving emergency response capabilities. In recent years, we have announced three target launch cities for Uber Air: Los Angeles, California; Dallas, Texas; and Melbourne, Australia. Interest in UAM, however, has spread globally. Engaging with local government and community stakeholders, as well as federal governments, international agencies, academia, and industry is the key to creating positive outcomes that support local environmental as well as economic and community development objectives. This is especially true in times of crisis which force cities and communities to revolutionize mobility.

This paper outlines our thinking about engagement across the UAM stakeholder map and our vision for working hand in hand with local communities through initial launch and beyond. We reflect on the major themes and learnings from our early stakeholder engagements to help inform our community engagement plan as we go forward. As part of our commitment to community-centric design for UAM transportation networks, we hope to collaboratively define local stakeholder roles and responsibilities early to ensure meaningful public participation in the processes leading to the launch of commercial operations. We discuss key concerns we’ve heard so far from communities, including environmental, safety, privacy, and equity considerations. To conclude, this paper explores how a commitment to meaningful community engagement helps to ensure community acceptance and fully realize the societal benefits of UAM.



Section 1: Laying the foundation

Connecting with the broader ecosystem of stakeholders

Since its inception, the Elevate team has recognized the importance of engaging broadly across the UAM stakeholder community to gather information, seek input, solicit feedback, collaborate on developing ideas, and address concerns as we lay the foundation to launch Uber Air. Collectively, Elevate has worked together with aviation and other transportation industry groups and regulators to inform UAM standards development and our policy and regulatory approaches to UAM. An important aspect of this ecosystem collaboration has been establishing vehicle partnerships to encourage strong investment in electric vertical take off and landing (eVTOL) aircraft that can be successful at meeting both market and city needs. We have published eVTOL reference designs to encourage industry to develop aircraft that meet high safety, reliability, and environmental (including noise and emission) targets.

Elevate’s eVTOL Common Reference Models, or eCRMs, set baseline capabilities and expectations for vehicle partners developing aircraft to serve the urban ride-sharing mission. Similar to automotive concept cars, the eCRMs are intended to illustrate the benefits of eVTOL aircraft for the Uber Air mission. The eCRMs show how distributed electric propulsion systems can provide redundant propulsion and control (enabling the vehicle to fly and land safely after the failure of any single sub-system) for eVTOL aircraft developed by our partners and deployed in the Uber Air product. Some eVTOL configurations achieve full rotor and propulsion redundancy - a level of robustness that no helicopter can claim today.

The detailed eVTOL requirements document that was developed from these eCRM analytical and performance models also focuses on community-friendly noise goals, encouraging our partners to pursue aircraft that are five times quieter (15 dB) than existing helicopters. Quiet aircraft along with thoughtful infrastructure siting and airspace planning facilitate a low noise environment in communities served by UAM - with eVTOL operations designed to blend into existing ambient noise environments.

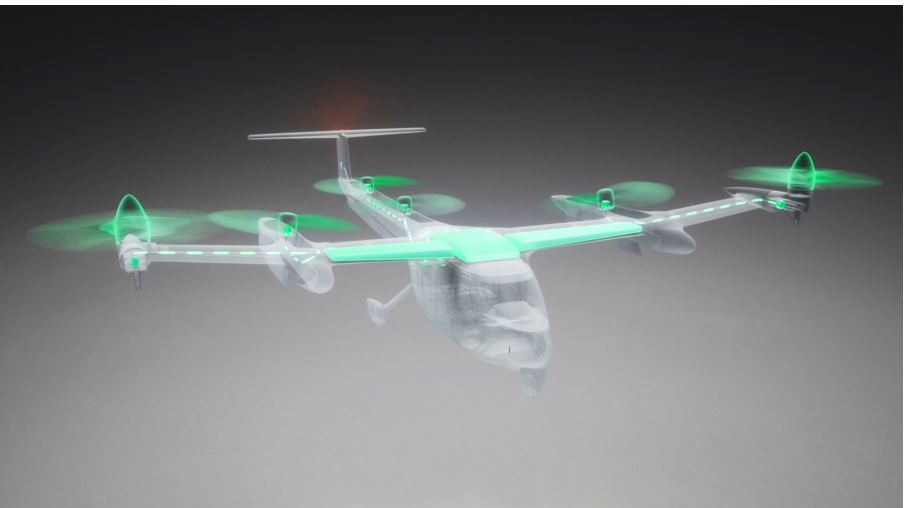
Uber Elevate eCRMs are intentionally designed with the needs of local communities in mind. Uber Elevate eCRM-004 pictured below.



Engineered safety: electric vertical takeoff and landing (eVTOL) aircraft will be certified by relevant civil aviation authorities.



Quiet: many eVTOL aircraft may fly in a wing borne configuration most of the time, resulting in virtually silent overflight.



Green: Fully electric aircraft generate zero emissions while in flight. Coupled with a green electrical grid, they are part of the solution to address humanity’s climate change challenges.

Uber Elevate has focused on 5 main ways of engaging the broader ecosystem:

1. Elevate-led initiatives: Leading initiatives and engagements at the international, national, and local levels. These range from our Elevate Summit, collaborations with universities, and meeting with local community groups, such as Chambers of Commerce and neighborhood groups (detailed in the next section).

2. Industry thought leadership: Providing thought leadership through industry groups and standards developing organizations, such as the General Aviation Manufacturers Association (GAMA), Single European Sky ATM Research Program (SESAR), Aerospace Industries Association (AIA), the National Business Aviation Association (NBAA), Helicopter Association International (HAI), the Aircraft Electronics Association (AEA), Consumer Technology Association (CTA), the US Chamber of Commerce, Airports Council International (ACI), the Commercial Drone Alliance (CDA), Radio Technical Commission for Aeronautics (RTCA), ASTM International, and the National Fire Protection Association (NFPA). We aim to broaden our collaboration with airport industry groups as we consider infrastructure requirements and initiate the process of infrastructure siting.

3. Federal engagement in the US: Engaging with federal agencies, including the FAA and NASA, regarding anticipated certification and regulatory requirements, policy approaches, and federal advisory and research committees, such as participation in NASA's Advanced Air Mobility (AAM) National Campaign.

4. Collaboration with local governments: Engaging one-on-one with local governments and participating in local UAM initiatives, such as collaborating with the City of Los Angeles and the World Economic Forum (WEF) to draft the "[Principles of the Urban Sky](https://www.weforum.org/reports/principles-of-the-urban-sky)."¹ Partnering with cities to define the planning and permitting path for infrastructure and best approach for community engagement.

5. Participation in international standards development: Engaging with international organizations, such as the International Civil Aviation Organization (ICAO) and Global UTM Association (GUTMA), to engage with industry and government stakeholders in the development of global standards across a range of policy areas, including airspace management, aircraft certification approaches, battery safety standards, vertiport standards, and noise standards and evaluation approaches.

¹ <https://www.weforum.org/reports/principles-of-the-urban-sky>

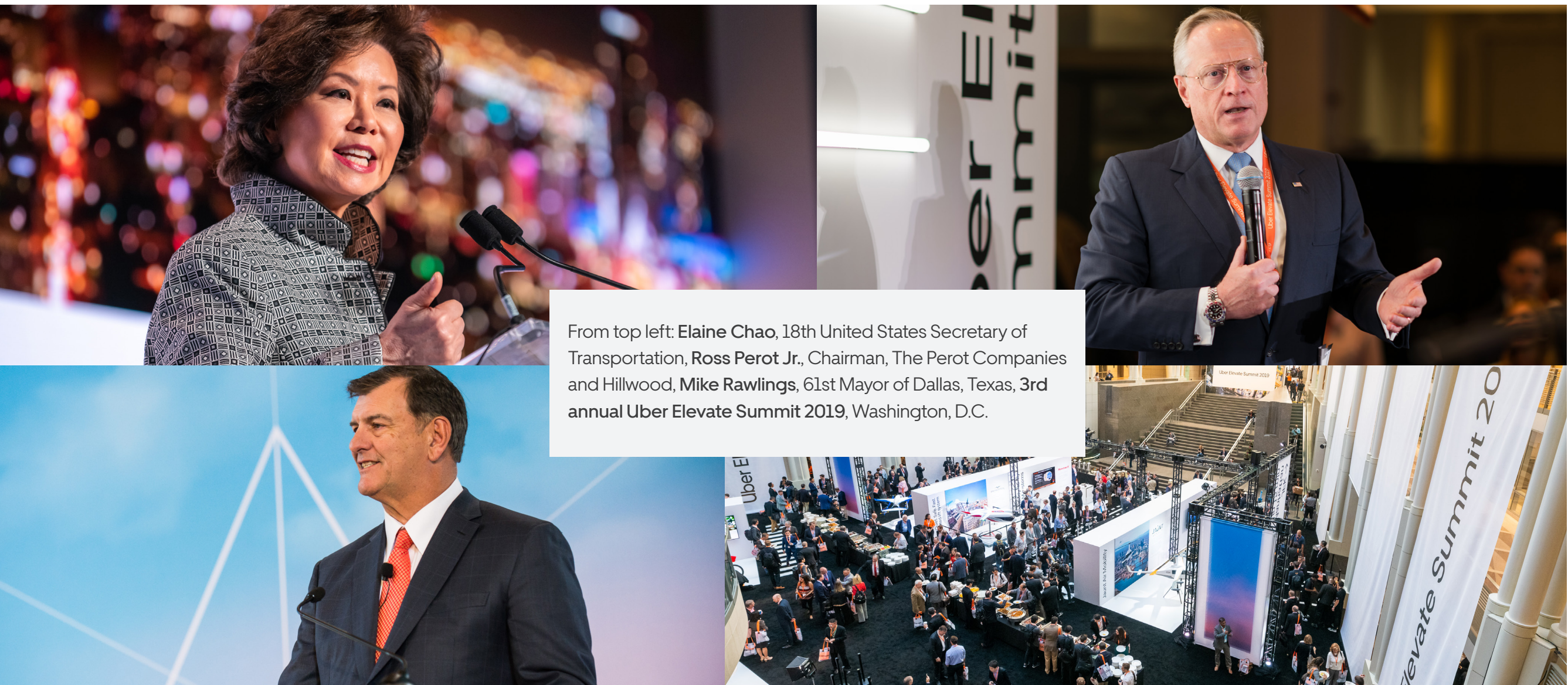
A closer look at Elevate-led engagements in the ecosystem

Since 2017, our Uber Elevate Summits have convened the global UAM industry locally in our US launch communities and in the US capital, enabling anticipated Uber Air launch markets to become center points for UAM investment. Our Elevate Summits also create a venue for UAM industry, federal, state, and local leaders to collaborate on new and innovative opportunities.

At the 2017 Elevate Summit in Dallas, Uber first announced its ambitions for pursuing opportunities in UAM in the city and beyond. Convening local leaders like businessman Ross Perot, Jr. and Dallas mayor Mike Rawlings, Elevate announced its intent in this new sector and outlined the role we intended to play in the ecosystem. This included announcing our initial set of original equipment manufacturer (OEM), infrastructure, and other partners in the Elevate Network.

In 2018, the Elevate Summit brought over 700 of the world’s foremost aviation leaders in industry, government, and academia to Los Angeles, our second announced launch city, to discuss our vision for how urban aviation helps cities become smarter, more liveable, and more efficient. Elaine Chao, United States Secretary of Transportation, focused her remarks on the Department of Transportation's principles for regulating and enabling aviation technology. Dan Ellwell, Acting Administrator of the FAA, and Dr. Jaiwon Shin, Associate Administrator for the Aeronautics Research Mission Directorate, NASA, both spoke about their support of urban air mobility and the impacts a collaboration with Uber would have on the industry at large.

Most recently, we gathered for the 2019 Elevate Summit in Washington, DC knowing that the innovation that is required for our vision is happening in the context of a highly regulated industry. We brought federal, state, and local regulators together with industry leaders for collaborative conversations on how we safely and responsibly usher in new technology for our future riders. Over two days of conversation, we held technical sessions and hands-on demos with the intention of bringing to life the technology behind Uber Air.



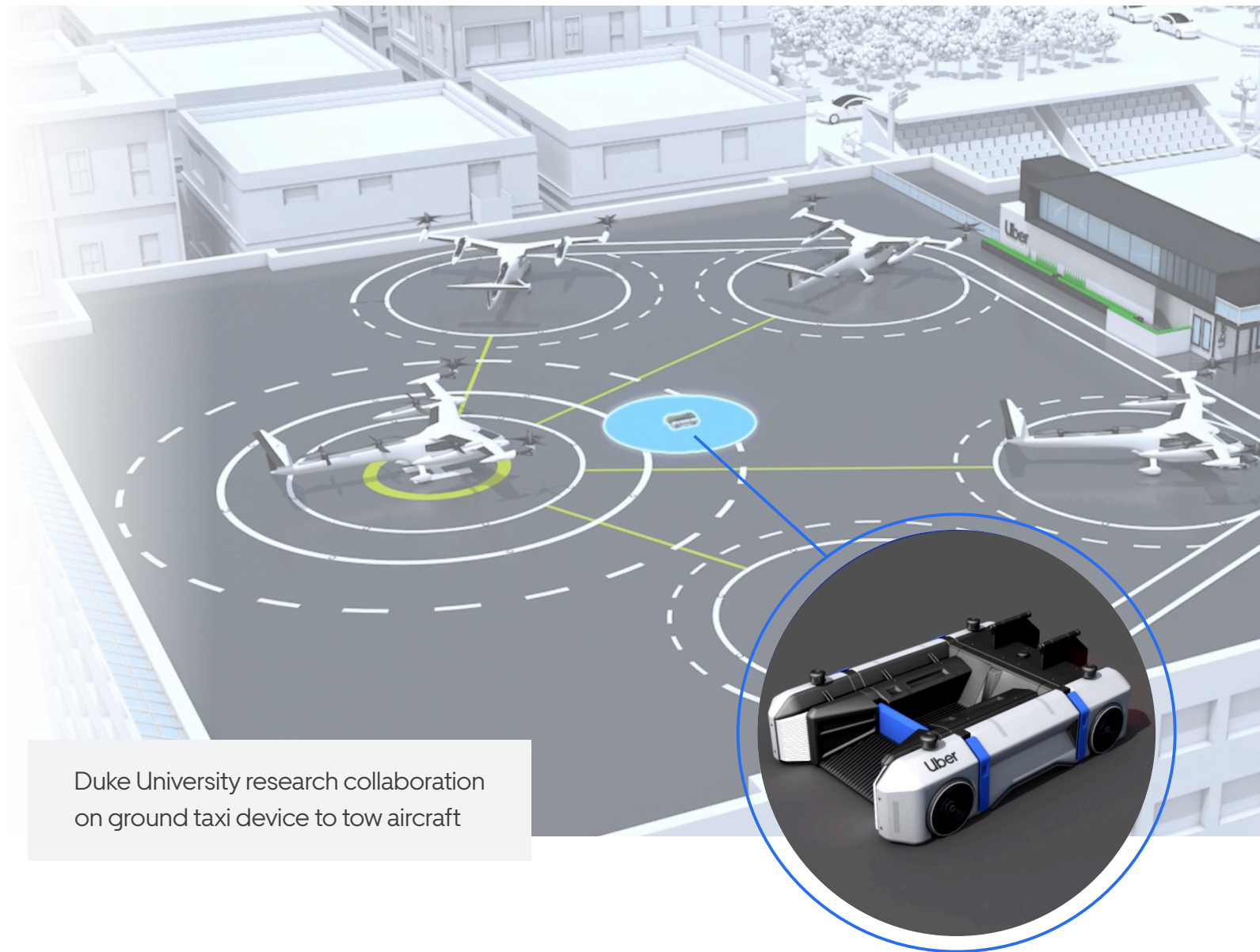
From top left: Elaine Chao, 18th United States Secretary of Transportation, Ross Perot Jr., Chairman, The Perot Companies and Hillwood, Mike Rawlings, 61st Mayor of Dallas, Texas, 3rd annual Uber Elevate Summit 2019, Washington, D.C.

Educational collaboration

At Uber Elevate, we seek to inspire and empower students of all ages from grade school to grad school to contribute to the UAM ecosystem. Our engagements in academia have become symbiotic relationships through which we are able to inspire the next generation to seek new careers in STEM and create venues for technical collaboration. Working together with Bell in 2018, we organized a STEM day and virtual reality demo with KIPP Academy of Innovation in East Los Angeles, sharing what the future of urban air mobility could look like and what young students could do to be a part of its development. In 2019, we started a collaboration with students from the Pratt School of Engineering at Duke University on aircraft ground taxi solutions for Uber Air operations. Elevate engineers and designers met with students on a weekly basis over the course of eight months to develop an autonomous robotic aircraft taxi device to tow eVTOL vehicles in and out of passenger loading zones at Uber Air skyports. Not only did this relationship result in the conceptual design of a taxibot, but it also incubated a student-led startup focused on productionizing autonomous tow vehicles.

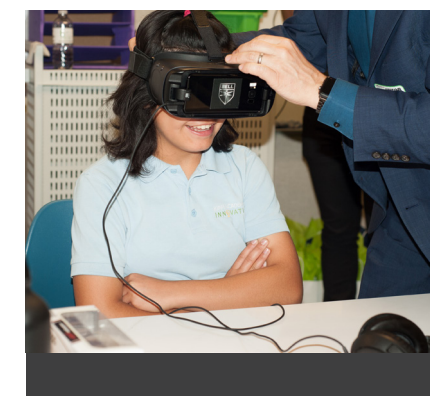
Additionally, our ongoing work with several graduate programs is shaping the technology that enables Uber Air. Since 2018, we have been working with Dr. Jayant Sirohi and Chloe Johnson from the Cockrell School of Engineering at UT Austin and Army Research Lab (ARL) to unlock critical propulsion technology that affects vehicle sustainability, acoustics, and safety. Their work in stacked co-rotating rotors shows improvements in performance, lower noise profiles, and increased system redundancy when compared to a conventional four-bladed rotor. Uber Elevate is also sponsoring a Research Chair at Ecole Polytechnique in Paris, France on the topic of integrated urban mobility. The Research Chair develops fundamental research projects that support Elevate's vision of the future of transportation. Current work includes the optimization of airspace deconfliction, economics models of UAM deployment, and visual simulation tools.

Pivoting to a roster of virtual events and mentorship has allowed us to interface with a variety of students and community members in 2020. In April, we partnered with the Smithsonian Air & Space Museum to bring three kid-friendly fireside chats over Facebook Live - The Future of Transportation, Keeping You Safe When You Fly, and Aviation Career Paths - reaching an audience of thousands of school age students and their family members. We've engaged with the Teneo Kids virtual classroom, Girls Inc., and the STARTedUp Foundation. We've also partnered with the Jacobs Technion-Cornell Institute Urban Tech Hub in New York City to support innovation challenges, closely working with students to conceptualize, develop, and explore the projects at the intersection of UAM and urban technology.



Duke University research collaboration on ground taxi device to tow aircraft

In collaboration with Bell, we organized a STEM day and virtual reality demo with KIPP Academy of Innovation in East Los Angeles



Interfacing with the community and understanding impacts: Uber Copter case study

In advance of the anticipated 2023 launch of the Uber Air product with eVTOL aircraft, we recognize the importance of understanding how riders and broader communities are likely to engage with and respond to future urban air mobility operations by testing a service offering using existing technologies. To that end, in 2019 we launched the Uber Copter product in New York City as the first Uber product offering that seamlessly integrated multiple modes of transportation (ground and air) in a single trip. This service afforded us the opportunity to begin to build the operational and technical foundations for Uber Air.



From the start, Uber Copter was designed and developed with community impacts in mind. While there is no way to completely eliminate the community impact challenges traditional helicopters present, especially in regards to noise (hence our vision for eVTOL-based UAM), we wanted to be community-centric in our approach. We considered four main factors to mitigate community impacts to the maximum extent possible: safety, market selection, operational hours, and technology-enabled insights and feedback channels.

Designing Uber Copter operations to minimize community impact



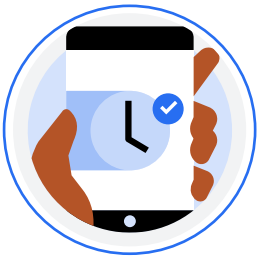
Safety

Through careful due diligence, HeliFlite Shares, LLC (“HeliFlite”) was selected as Uber Copter’s Direct Air Carrier partner to conduct flights for our multimodal trips. HeliFlite has over 20 years of experience in the aviation industry and has flown over 40,000 accident-free hours in its commercial operations. HeliFlite holds the Wyvern Wingman and ARGUS Platinum safety ratings, which are awarded to operators after successful completion of intense operations, maintenance, and safety system audits conducted by accredited industry experts. HeliFlite operates a fleet of FAA-certified Category A twin-engine helicopters equipped with sophisticated systems, such as terrain awareness and weather radar, that enhance safety.



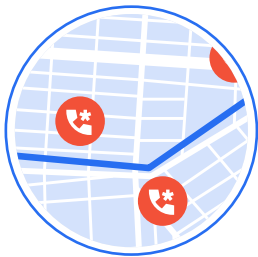
Market selection

We selected New York City as the launch market for Uber Copter for its existing volume of and familiarity with helicopter traffic, well-established heliport infrastructure and routes, and high volume of Uber ground trips along our chosen route. Launching in a market where the “framework” for urban aviation exists allowed us to easily integrate our small scale operations seamlessly without creating significant disruption to the community.



Operational hours

For Uber Copter, we explicitly limited our days and hours of operation to weekdays in the afternoon to early evening. By only operating during these peak hours, community background noise was expected to be higher, reducing the overall impact of Uber Copter operations while still garnering critical operational learnings for future Uber Air operations.



Technology-enabled insights and feedback channels

We combined our real-time flight monitoring capabilities with location based information from New York City’s 311 reporting system to gain insights into potential community noise impacts from our direct air carrier partner’s operations. This information enabled us to have constructive and data driven conversations with our aviation partner, air traffic control personnel, and community stakeholders regarding observed helicopter routing and flight altitudes.

Uber and our operator partner HeliFlite established ongoing communications with the FAA, the Port Authority of New York and New Jersey, as well as air traffic control personnel in the region to discuss noise concerns and to better understand how airport tower personnel manage both helicopter and commercial traffic. Our goal was to understand community concerns regarding helicopter operations as well as the traffic management challenges faced by air traffic controllers.



Engaging community stakeholders

In addition to the way we designed our operations, we also proactively engaged with community stakeholders to establish lines of communication for feedback, ensure transparency, and generate awareness about our long-term vision. Over the past year and half, we have focused on a core group of stakeholders on this front:

Local elected officials, policy makers, and the community

We engaged with the offices of local elected officials to understand community noise and helicopter safety concerns and to discuss the long term vision for Uber Air using eVTOL. We have met with U.S. Representatives from local districts and plan to continue this engagement with a broader set of NYC elected officials, policy makers, and community groups. Because we appreciate that local stakeholders have varied views on urban aviation, we made efforts to open pathways for communication and feedback and endeavour to remain transparent in the nature and scope of our aviation interests in the area.

Local aviation authorities

We met with a broad range of local aviation stakeholders within the Port Authority of New York and New Jersey (PANYNJ, operator of John F. Kennedy International, LaGuardia, and Stewart International airports in NY and Newark International and Teterboro airports in NJ) to discuss helicopter air taxi operations. We continue to collaborate with the PANYNJ to evaluate infrastructure and airspace considerations related to future UAM operations.

NYC aviation industry

We have engaged with the operators of all heliports in Manhattan and joined the Eastern Region Helicopter Council to participate in, and remain sensitive to, local aviation matters.

Academic institutions

We have participated in multiple Cornell Tech academic programs and speaking engagements to more widely bring the vision of urban air mobility to the NYC community and excite student populations with research challenges to make that successful. We are reaching out to a variety of academic institutions, including those with programs in urban technology, public policy, mechanical engineering, and aviation programs.



**CORNELL
TECH**

**THE PORT AUTHORITY
OF NEW YORK & NEW JERSEY**



While New York City is not a designated launch market for Uber Air, we see the potential for eVTOLs and urban air mobility in this market. Our operations and community engagement efforts to date have reinforced that engaging early and often with key stakeholders is critical, particularly as we move forward with these new vehicle technologies and infrastructure.

Section 2: Building together towards launch

Defining community engagement goals and objectives

Transportation infrastructure and services ultimately exist to serve the communities in which they are located. Understanding this from the conception of Uber Air, strategic and intentional community engagement at the local level has been a focal point for the Uber Elevate team. Because community acceptance is critical for the success and scaling of Uber Air, one of our top priorities has been to work closely with local government officials and communities in our launch markets. We worked with Nation Partners and 89 Degrees East, leading global consulting groups that have extensive experience engaging local communities for many large transportation infrastructure projects, to define a comprehensive community engagement approach with the goals of building trust among local stakeholders and informing the planning and development process for Uber Air skyport infrastructure and operations. Together, we developed a communications and engagement strategy. The core objectives of this strategy are to build support for UAM through engagement and understanding community needs, to build awareness of Uber as a key player and trusted partner in the ecosystem, and to inform, engage, and involve local communities and stakeholders in decisions that affect them.

Additionally, we identified key priorities that will help us achieve these goals:

- 1.** Develop genuine relationships with the local community
- 2.** Deliver factual information in a timely, reliable, and accessible manner along with well-planned community engagements and UAM educational experiences
- 3.** Understand local sentiment and identify and respond to community concerns



Framework for local engagement in the near term

As we look towards a 2023 launch, we continue to work in close collaboration with our launch communities. For Uber Air to be successful and provide the numerous benefits to cities around the world that we are confident it can, community support and acceptance is essential. By proactively engaging communities in compelling, accessible, and clear ways to share and plan for our vision, we can grow understanding, clarify misconceptions, and create positive outcomes that support local environmental as well as economic and community development objectives. Our community-focused approach to designing all aspects of the Uber Air product, from network aircraft standards to skyport placement, promotes transportation efficiency and equity, providing seamless access to Uber Air users while minimizing negative externalities associated with aircraft operations.

Leading up to launch, we plan to adopt the International Association for Public Participation’s “Public Participation Spectrum” approach to ensure that communities and local, regional, and national-level government stakeholder groups are informed about and can provide feedback on the early launch plans for Uber Air in their cities (i.e., guidance on permit requirements and environmental review procedures, stakeholder engagement, and public-private partnership opportunities).

From left: Eric Garcetti, 42nd Mayor of Los Angeles, Dara Khosrowshahi, Chief Executive Officer, Uber



Spectrum of Public Participation Options

We will work with local governments and communities to determine optimal participation levels during various stages of UAM development

	Public participation goal	Promise to the public
Inform	To provide the public with balance and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	We will keep you informed.
Consult	To provide the public with balance and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision. We will seek your feedback on drafts and proposals.
Involve	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.
Collaborate	To partner with the public in each aspect of the decision including the development of alternative and the identification of the preferred solution.	We will work together with you to formulate solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.
Empower	To place final decision making in the hands of the public.	We will implement what you decide.

Source: International Association for Public Transportation

Working with local governments and communities to achieve holistic sustainability

Because they play a role in both facilitating conversations between the community and industry and providing an open forum for policy discussions, local governments are particularly important in helping the UAM industry achieve holistic sustainability. From an environmental perspective, many cities have already committed to programs to reduce carbon emissions from transportation. For example, Los Angeles has committed to achieving net zero carbon emissions by 2050, and London is hoping to achieve this goal even earlier, by 2030. These policies reflect the interests of citizens to strive for better environmental outcomes. As a shared



electric transportation solution, Uber Air can play a critical role in helping to achieve those goals. With our Green Future program, Uber has committed \$800 million to help hundreds of thousands of drivers convert to electric vehicles over the next five years, with the ultimate goal of building an on-demand mobility platform that only serves trips through zero emission vehicles, micromobility, and transit by 2040.

We must also ensure that Uber Air infrastructure and operations are planned with regard for the rich historical and cultural assets of a community and the community's transportation needs, and commit to a vision where the benefits of urban air mobility (including improved mobility and economic development) are broadly distributed. Potential environmental impacts, including environmental justice concerns that could be generated by a project or air service, should be avoided or minimized.

As developers evaluate locations to build skyports and other UAM infrastructure, local governments are essential in contributing input to ensure benefit to the entire community. Local governments are well positioned to understand the unique needs of different neighborhoods when considering skyport placement and operational volume, and have traditionally been responsible for providing policy guidance for heliport permitting. Well thought out community planning, permitting, and environmental review processes ensure that the full range of potential impacts are considered in the siting of infrastructure and the airspace procedure design and implementation processes.

In the United States, both the FAA and NASA are dedicating significant resources to working with the UAM industry to develop scalable standards and regulations to facilitate a safe, efficient, and equitable operating environment for UAM operations in the National Airspace System (NAS). In 2018, the FAA's NextGen Office released an initial overarching [Concept of Operations for Unmanned Aircraft Systems \(UAS\) Traffic Management \(UTM\) V1.0](https://utm.arc.nasa.gov/docs/2018-UTM-ConOps-v1.0.pdf)² that presented a vision and described the associated operational and technical requirements for developing a supporting architecture and operating within a UTM ecosystem. This UTM Concept of Operations was the product of more than four years of joint research with NASA. The FAA has continued to refine these anticipated requirements for the UAS industry in its March 2020 [Concept of Operations for Unmanned Aircraft Systems \(UAS\) Traffic Management \(UTM\) V2.0](https://www.faa.gov/uas/research_development/traffic_management/media/UTM_ConOps_v2.pdf)³. Building on this work and in conjunction with NASA and numerous UAM industry stakeholders, the FAA's NextGen office released a [Concept of Operations for Urban Air Mobility \(UAM\) V1.0](https://nari.arc.nasa.gov/sites/default/files/attachments/UAM_ConOps_v1.0.pdf)⁴ in June 2020. These documents detail a community consensus policy framework for UAS and UAM operations in an urban environment, including the roles of the local community and local government.

The UAM community consensus policy framework outlined in the FAA's UAM Concept of Operations V1.0 specifically envisions an enhanced role for state and local governments while maintaining the responsibilities that they have today. Community considerations and public acceptance are important factors when evaluating the locations of skyports, especially as operations begin to scale. The UAM community consensus framework calls on ecosystem participants to work with local governments to develop effective community engagement programs that provide mechanisms for feedback.

² <https://utm.arc.nasa.gov/docs/2018-UTM-ConOps-v1.0.pdf>

³ https://www.faa.gov/uas/research_development/traffic_management/media/UTM_ConOps_v2.pdf

⁴ https://nari.arc.nasa.gov/sites/default/files/attachments/UAM_ConOps_v1.0.pdf

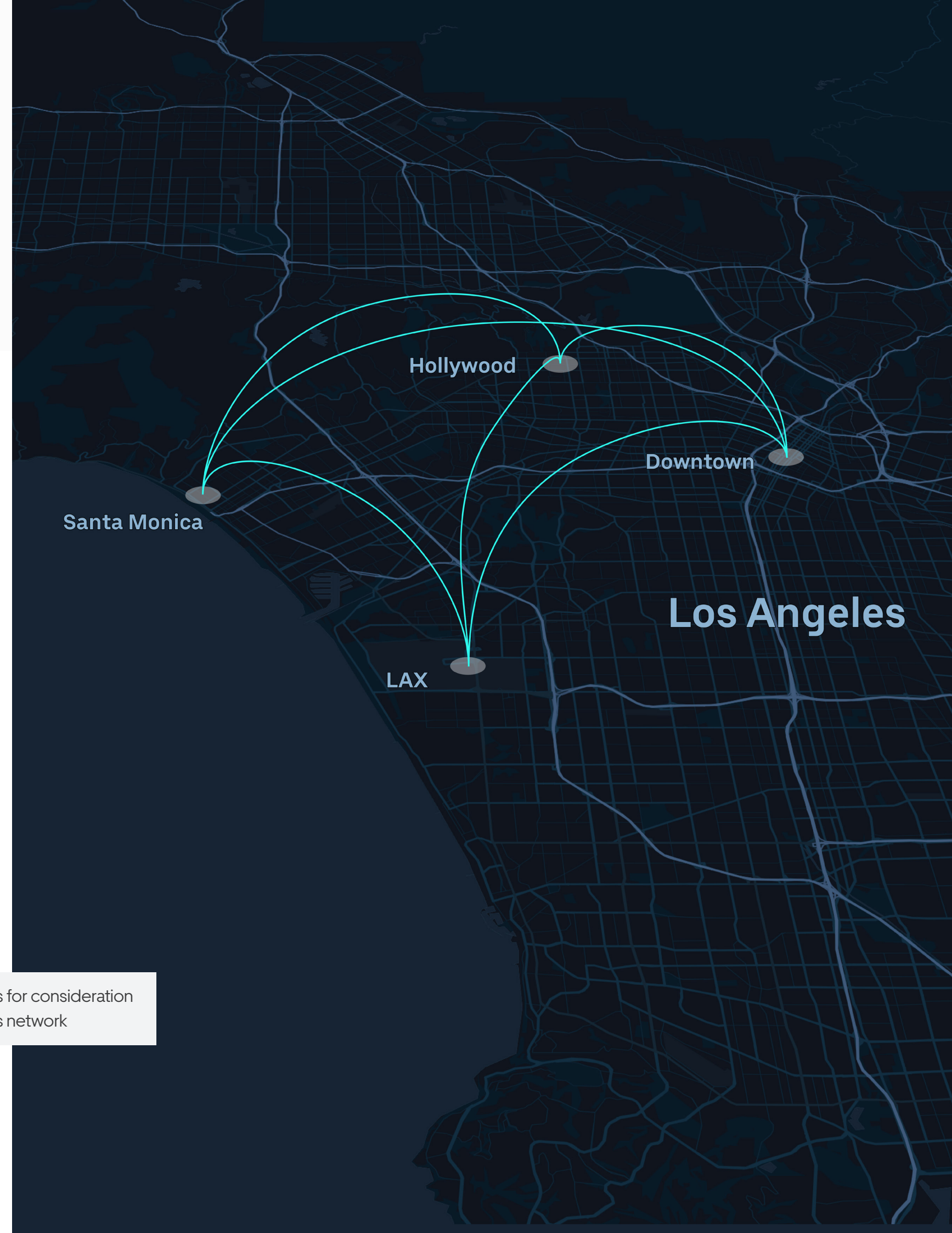
Using data analysis to target and inform initial community outreach

Elevate plans to engage with communities early and often as we plan for infrastructure to ensure facility designs and air service offerings reflect community input. We strive to be intentional about securing community feedback as we hope to gain community support for aerial ridesharing services.

To support our understanding of demand and evaluations of infrastructure locations, we have developed sophisticated modeling tools that can help us to identify and evaluate, at a high level, different configurations for locations for a system of skyports (including existing airports and heliports) with associated activity levels and anticipated infrastructure requirements and airspace operational approaches. We power this modeling tool with thousands of in-market surveys, multimodal trip data, historical weather information, noise estimates, and airspace considerations to capture multidisciplinary tradeoffs for Uber Air. These tools help us communicate with stakeholders and inform the sequencing of skyport development over time (and understand how demand may evolve).

Additionally, system simulation technology can be used to evaluate background noise levels across an entire city, allowing us to consider the optimal siting of facilities and flight paths (with the goal of blending into the urban soundscape). Modeling and simulation results will inform feasibility studies, alternatives analysis, environmental analysis, and community engagement activities through the facility development process. We plan to use these tools to help effectively communicate with citizens about these new technologies and utilize their feedback in the design of local Uber Air facilities and operations.

Illustrative nodes for consideration
in a Los Angeles network





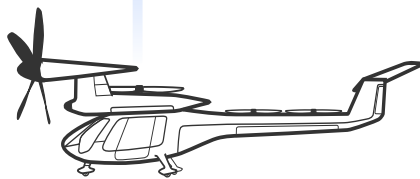
Section 3: Strengthening the feedback loop on key issues as we scale

As we've engaged with local governments and communities around the world in recent years, we've seen several key themes emerge that the public would like to know more about. This section summarizes those themes and explores how we will continue to work closely with the local community to ensure delivery of benefits and mitigation of potential impacts.

Designing to minimize environmental impacts

Noise

Recognizing that low noise is key to community acceptance of Uber Air, we are taking a holistic approach to quantifying urban acoustic footprints today and pursuing operational approaches that minimize the additive noise and other impacts from eVTOL operations. We are working closely with leaders at FAA, NASA, and the US DOT's Volpe National Transportation Systems Center (Volpe Center) to ensure that our approaches (both in terms of metrics and analysis) to ambient noise and operational noise are appropriate for use in planning and environmental reviews. Once affirmed, we can work with local jurisdictions and permitting authorities to apply these techniques to our evaluations of infrastructure locations. We are also exploring noise perception research with NASA to facilitate new ways to analyze electric aircraft noise.



Carbon emissions

Sustainable transportation is at the core of what we hope to achieve with Uber Air. From utilizing a fleet of all electric aircraft to minimizing ground leg carbon emissions, we're taking an intentional approach to sustainability to ensure the service we create will be good for the community and the environment. Based on our emissions analysis, with high aircraft utilization and load factors, the entire lifecycle emissions of an Uber Air eVTOL aircraft are expected to be significantly lower than [internal combustion automobiles](https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub)⁵ on a per passenger mile basis. In addition, since the eVTOLs operating as part of the Uber Air product will be battery electric, there will be zero emissions produced during flight. This compounding effect results in a positive step change for cities aiming to reduce their carbon footprint, by replacing thousands of fuel burning cars with clean, electric aircraft. Our efforts to make zero emissions air trips that ultimately connect with zero emissions ground trips will work in tandem with energy industry and government efforts to move towards zero emissions from upstream energy as well.

⁵ <https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub>



Minimal visual impact

In addition to our focus on creating a low noise environment, we also strive to minimize the visual impact of Uber Air operations. We will achieve this goal through collaborative dialogue with communities and air navigation service providers like the FAA to facilitate flight operations at altitudes and along routes that mitigate both community noise and visual impacts.



Crawl-walk-run reality

We are utilizing a crawl-walk-run approach to rolling out Uber Air operations. This means that initial Uber Air operations in any given city will be limited to a handful of eVTOL vehicles landing at 3-5 skyports (most likely leveraging existing infrastructure such as airports and heliports). This number will scale gradually and responsibly to tens and possibly hundreds of vehicles in service over a period of 5-10 years as community acceptance and interest dictates, among other factors.



Shared service

Uber Air is a shared product that aims for high utilization of each eVTOL vehicle operating in the network. Our reference eVTOL aircraft are currently scoped to accommodate 3-4 passengers who will be pooled together at the skyport as part of a seamless multi-modal aerial ridesharing experience. The intent is not for each individual person to ultimately own an eVTOL aircraft, as with personal car ownership, but rather to create a network that maximizes the utilization of each individual aircraft - creating a pooled community resource that minimizes the total number of vehicles in the sky.



Ensuring equitable access

As with many new technologies, our aim is to increase affordability of the Uber Air product over time as we are able to scale operations and continue to improve technology. Affordability in the long term is an important part of eliminating or mitigating financial barriers to using UAM that may block equitable access. Leveraging the size and reach of Uber's existing ground transportation platform, we anticipate being able to drive high utilization of Uber Air eVTOL aircraft, not only reducing prices to riders, but also decreasing per passenger mile carbon emissions.

Advancing safety and protecting privacy

Given the nature of urban air mobility, eVTOL aircraft will fly over densely populated areas. The safety and privacy of people both in the aircraft and on the ground are of utmost importance. In an effort to make Uber Air a safe and reliable air transportation product, a Safety Management System (SMS) and other safety initiatives will be incorporated into Uber Air operations. This includes a comprehensive framework to manage operational risks. As is the case with both general and commercial aviation today, Elevate is advocating for the implementation of voluntary safety programs that leverage recorded data as well as voluntary reports of safety issues to proactively identify and mitigate emerging safety issues. As operations scale, these programs will provide opportunities for the sharing of safety information for the purpose of continually improving safety performance. Additionally, Elevate is committed to developing a robust passenger security screening program to support Uber Air operations.

As UAM operations begin to scale in a region, ensuring transparency with local communities is essential to mutually-beneficial growth. As highlighted in the World Economic Forum's "[Principles of the Urban Sky](https://www.weforum.org/reports/principles-of-the-urban-sky/principles-of-the-urban-sky#report-nav)"⁶, purpose-driven sharing of information about UAM network impact will facilitate a productive conversation between citizens, local governments, national airspace regulators, aircraft manufacturers, and operators.

We also envision near real-time data availability for local emergency services. As data associated with travel and mobility patterns, such as time-stamped location data, can easily be used to identify individuals and potentially sensitive information about their behaviors, the potential privacy impact of sharing certain types of data needs to be considered before any information is exchanged. In particular, sharing any safety-related information should be conducted in accordance with international aviation standards as well as national policies and regulations that afford appropriate protections to the providers of such information.

Concluding thoughts

Uber Air is just one part of Uber's vision for a holistically sustainable transportation future that serves cities around the world. Our objective at Uber Elevate is to build long term engagements across the UAM ecosystem steered by shared values and organized around accountability and continuous communication to inform and support the creation of sustainable UAM networks. Working closely with communities and local governments is particularly important to ensuring that the benefits UAM has to offer are fully and equitably achieved.

We are collaborating to create a future where riders can fluidly move between a variety of environmentally responsible air and ground transportation modes, reducing the need for personal car ownership. Today, most people build their lives around transportation with only limited and often time consuming options available to move between work, home, and leisure. As we are able to reach scale, continually making Uber Air more affordable, Uber Air riders will have a transportation option that is built to improve individual quality of life while also helping their communities to achieve environmental, economic, and social goals. Beyond helping communities to reduce carbon emissions, mature UAM networks will also help to create jobs and diverse workforces in addition to fostering more robust and resilient transportation systems within and between cities.

Uber Elevate

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