Statement of

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Before the Subcommittee on Aviation Hearing on

"FAA Reauthorization: Harnessing the Evolution of Flight to Deliver for the American People"

March 30, 2023

Opening Statement

Chairman S. Graves, Chairman G. Graves, Ranking Member Larsen, Ranking Member Cohen, and Members of Congress - my name is Clint Harper. I am an Advanced Air Mobility (AAM) subject matter expert and community advocate. I am honored to appear before you and this Committee to discuss my experiences and takeaways from working with state and local governments and assisting them with their Advanced Air Mobility (AAM) integration goals in hopes that lessons learned may be captured in the upcoming Federal Aviation Administration's (FAA) Reauthorization Bill. But first, I would like to establish the context that shapes my understanding of AAM and its role in a city's transportation system.

My aviation career started 24 years ago in the United States Air Force. I first enlisted as a communication, navigation, and sensor technician on the AC-130H Spectre Gunships. This highly specialized airframe exposed me to various aircraft avionics and sensor systems. In addition, it taught me how these aircraft systems work together to enable safe passage through our National Airspace System (NAS) and in complex contingency environments. In 2004, I was eager to learn something new and was approved to re-train in the Airfield Management career field. Airfield Managers start their careers as flight dispatchers to learn the nuances of flight operations; this prepares them to better understand how the airfield system plays into flight planning, and to take on progressively more complex roles in airfield operations, airfield management, and airfield capital improvement planning. This experience provided a diverse and dynamic aviation foundation to serve me well as I transitioned to civilian life following my military retirement in 2014.

Like many transitioning veterans, I was hit with the reality that despite my well-rounded experience within aviation, getting a job interview proved difficult without a four-year degree. To remedy this, I opted to enroll in the urban planning program at the University of Utah. Since I was a child, I have always been fascinated with the built environment and the various systems that make a city function. In this program, I was exposed to the tireless work of land use planners, transportation planners, urban designers, and economic developers. I quickly grew a deep appreciation for the work that these planners accomplished to advance solutions for some of society's most complex issues, such as homelessness, transportation inequities, and food insecurity. It did not take long for me to start questioning the role of aviation in solving or exasperating these deeper societal problems. I hastily concluded that aviation was disproportionately serving higher-income professionals at the expense of lower-income and marginalized communities around airports, where aviation-induced negative externalities are concentrated; this disturbed me to the point that I vowed to abandon my aviation experience and seek work in a more traditional planning field.

I immersed myself in urban design, food system planning, and transportation planning. I was reinvigorated at the prospect of advancing human-scaled design that promoted multimodal solutions that started and ended with an active transportation trip. With my remaining GI Bill, I attended culinary school to learn more deeply how whole fresh foods can serve as a cornerstone in healthy communities and the built environment. Still, something was not sitting right with me. Aviation provided me with so much, and ignoring the pull back towards it wasn't easy. Finally, I confided in a mentor, and he asked why I desired to leave aviation. After explaining myself, he suggested I re-engage within the aviation industry and bring with me the lessons I learned in planning. He assured me that there was a need within aviation to resolve the very issues that I was so passionate about. This conversation catalyzed my re-entry into aviation and sparked my interest in furthering solutions around aviation and community integration.

Upon my final semester, I obtained a job as a transportation planning intern at the Utah Department of Transportation. As fate would have it, my first day was also the first day of the Department's new Aeronautics Director. As we spent time together during onboarding, he listened to my ideas and vowed to give them a platform. He worked with the Planning Director

to create an innovative partnership where I would split time between the Transportation Planning Division and the Division of Aeronautics. While at the Planning Division, I advocated for the recognition of aviation as a part of the broader transportation system. While at the Aeronautics Division, I advocated for multimodal solutions, equity, and economic development as a part of the Division's aviation system planning efforts. I visited Associations of Governments, Metropolitan Planning Organizations, Economic Development Districts, and local governments to educate them on the potential of the airport resources within their respective jurisdictions. I helped them see airports as transportation infrastructure waiting to be activated to anchor new economic activity centers.

As this work gained momentum, a new buzz emerged around electric aircraft with vertical takeoff and landing capabilities. Aircraft manufacturers proposed a new transportation mode that would revolutionize the transportation system. These electric vertical takeoff and landing aircraft, more affectionally referred to today as eVTOLs, promised to eliminate emissions, dramatically reduce noise, and be more accessible to a broader range of residents; this was the aviation opportunity to blend my passion for aviation and land use / transportation planning. I immediately got to work educating communities on AAM and how we might prepare.

Unfortunately, cities had grown weary of new mobility technologies. Ride-sharing services and electric scooters launched and scaled rapidly in cities in 2012 and 2017. Without collaboration and an opportunity to properly plan, cities struggled to understand the impacts on safety, the environment, and infrastructure. These events flagged a need for cities to understand and prepare for new mobility technology, such as AAM, while also protecting community interests.

The City of Los Angeles led in this regard when it created Urban Movement Labs (UML), a transportation incubator designed to foster innovation and collaboration between government, industry, and the community. UML was launched with the goal of bringing together stakeholders from across the mobility industry to address common challenges and opportunities. City officials recognized that they needed to work more closely with industry partners to address these challenges and create a more sustainable and equitable transportation system.

Advanced Air Mobility became part of UML's portfolio in late 2020. In early 2021, I was hired as the program's Advanced Air Mobility Fellow. My role involved engaging with city officials, industry partners, and community stakeholders to explore the technical, regulatory, and policy challenges of integrating AAM into the urban transportation system. Some of the specific activities that I led included hosting a series of AAM-focused outreach events with community-based organizations, transportation advocacy groups, and other stakeholders; as well as collaborating with the FAA, NASA, and other jurisdictions to identify regulatory challenges and opportunities; and finally, working with AAM industry partners to identify potential use cases and operational scenarios for AAM in urban environments.

In this role, I was led by some of the most knowledgeable, thoughtful, and compassionate leaders across all planning disciplines. I am genuinely grateful for the opportunity to learn from them and to have their leadership shape who I am today. Not only did I get to work with the great staff within the City of Los Angeles, but I also enjoyed the opportunity to interact and collaborate with cities around the globe as they also explored the integration of AAM technologies into their transportation systems.

With this context, the following sections detail my observations with recommendations that are aggregated from my entire body of work. I hope you find these insights helpful and actionable as you consider the FAA Reauthorization Bill and the role of AAM in reshaping our cities for a more sustainable future.

Observation 1: Today, aviation users enjoy benefits to the detriment of residents who are the least likely to have the means to access aviation services. Conversely, those with the least access to aviation services are more likely to bear the burden of aviation's negative externalities.

Airport Economic Impact Studies across the nation communicate the economic benefits of airports and promote airports as 'economic engines.' Airport supporters herald these results as reasons why continued support for the airport is vital to the community. What is often lost and not studied in these reports is precisely who and who is not benefiting from aviation-enabled economic benefits. In the paper, *The Spatial Distribution of Airport-Related Economic Activity*,

the author explores the link between airports and economic impact at the regional scale. Findings show that economic benefits for many airports are often disproportionately concentrated far enough away from the airport where negative externalities are no longer a quality-of-life factor. These findings mean that those suffering from exposure to noise and emissions are less likely to enjoy economic benefits. Because communities adjacent to neighborhoods are often low-income, marginalized communities, they are also less likely to have the economic means to access airport services directly. Access to benefits and freedom from negative externalities are simply not equitably distributed for most airports.

The role of multimodal connectivity in encouraging equitable advanced air mobility outcomes is paramount in fostering a sustainable and inclusive transportation ecosystem. By integrating different modes of transportation, such as public transit and active transportation, good multimodal connectivity enables seamless and efficient travel for people across various socio-economic backgrounds. This holistic approach to surface transportation and aviation infrastructure offers potential to bridge the gap between urban and rural communities, providing access to essential services and employment opportunities while fostering social cohesion. Moreover, it reduces the divide that often exacerbates inequitable outcomes, ensuring that the benefits of advanced air mobility are shared more evenly. By promoting universal accessibility and affordability, multimodal connectivity plays a vital role in mitigating disparities in transportation, ultimately contributing to a more just and sustainable society. A multimodal hub that features an aviation component ensures that infrastructure investments benefit all other users of that transportation hub.

Recommendation 1: Seek to balance who is burdened by aviation with who benefits while prioritizing equity in all AAM ecosystem areas and multimodal development.

It is recognized that the FAA's number one priority is safety. Therefore, looking at safety through the lens of equity is helpful. Scheduled passenger airline service holds the title of the safest mode of transportation. Crash risk mitigation is maximized for aircrew, passengers, and non-participating bystanders. This mitigation is accomplished through harmonizing various parts of Title 14 of the Code of Federal Regulations (CFR), Chapter 1.

The FAA identifies five ecosystem areas of AAM: Aircraft, Airspace, Operations, Infrastructure, and Community. These ecosystem areas correspond with various sections of Title 14, CFR, Chapter 1.

A dive into 14 CFR, Chapter 1 shows that the advancement of aviation safety in scheduled passenger airline service has been achieved through the harmonious interplay of numerous parts of the CFR that correspond with the FAA's five AAM ecosystem areas. These regulations create a comprehensive framework that ensures the highest levels of safety. Unfortunately, this same level of harmony is not achieved as clearly for Part 135, *On-Demand and Commuter Operations*, and Part 91, *General Aviation;* this is especially true for private infrastructure where regulatory enforcement and airspace protections are not evenly applied (explained in more detail in Observation 4). To be clear, I do not recommend applying the same rigorous standards from Part 121 to Part 135 but challenge the FAA to be deliberate and seek out similar harmonization across the different areas.

For example, a Part 121 operation, if experiencing engine troubles upon takeoff, can rest easier knowing that Part 121 uses aircraft certified under Part 25. Part 25 ensure that aircraft feature one-engine inoperative capabilities for continued safe, albeit degraded, flight. The airspace surrounding airports accommodating Part 25 aircraft and Part 121 operations is protected to prevent obstacles and hazards through Part 77. Part 139 ensures that the receiving airport is capable of responding to the incident and features more stringent design standards to ensure the airfield environment is safe for a variety of emergency scenarios.

In comparison, for eVTOL certification, the FAA proposes a requirement for a controlled emergency landing, yet it is not defined where this landing is likely to occur. If following Part 135 precedents, an emergency landing will occur out in the community. Do city leaders and community members know where the location of a possible emergency eVTOL landing may occur, should they experience power issues on takeoff? This risk should not just be mitigated on the aircraft, as the proposed airworthiness criteria addresses, but should also be addressed in airspace protections, infrastructure design, and operation specifications specific to urban hazards. Another concern is that in the event of an emergency landing away from the heliport or vertiport,

will the community's fire department be able to respond to the incident with the right equipment, resources, and trained crews? It is this harmonization that the FAA should be seeking in addressing the entire AAM ecosystem. While this section's focus is on crash risk mitigation, equity concerns also include noise and emissions exposure, access to economic benefits, freedom from negative externalities, and more.

Legislation should be comprehensive in its approach to supporting AAM integration into communities. Funding for research into developing strategies to maximizing equitable outcomes should be included in reauthorization legislation. Results from these studies should inform strategies to extend AAM services to underserved communities, including suburban and rural areas, particularly in a natural disaster where aviation infrastructure and services are critical to disaster resiliency.

Observation 2: Cities are struggling with the complex issues of today and have little bandwidth to dedicate to emerging, but not yet real, technologies.

Urban Movement Labs was created to explore emerging transportation technologies and help city staff remain focused on day-to-day issues. By creating a dedicated "innovation group," local jurisdictions can explore new technologies and consider their implications on the community before being confronted with an urgent need for responsive policies and regulations. Funding this type of effort is challenging and often not included in city budgets as resources are understandably allocated to present and more immediate issues.

Furthermore, finding staff with a mix of land use and transportation planning experience is relatively easy as most university planning programs include courses, and even specialty tracks, on such topics. In a typical transportation planning course, students are exposed primarily to surface transportation modes, such as street and highway planning, transit planning, and active transportation planning. Absent from these courses, though, is aviation. Many large and medium cities support at least one airport, and often many. However, it is unfortunate that these airports exist in silos where aviation is the sole focus within the silo, and other transportation modes are the focus outside of the silo. This phenomenon is reflected in planning programs across the

country. If students do desire an aviation planning course, or even an introduction to aviation, they must seek an aviation-specific program.

Non-profits like Urban Movement Labs, the Community Air Mobility Initiative, AeroX, MassAutonomy, and the newly formed Advanced Air Mobility Institute aim to bridge this gap and support communities in advancing technology fostering holistic integration. Non-profits, however, do not create guiding policies within cities; this is a function reserved for cities. Some communities might engage consultant support, but to even do this effectively, project managers must have a baseline foundation of aviation knowledge that is largely absent today.

Finally, cities have developed tools to manage new mobility technologies. Los Angeles Department of Transportation's Mobility Data Specification (MDS) is an example of such a tool. Digital infrastructure tools, like the MDS, are playing a crucial role in helping cities plan for future enabled by new mobility technologies. As cities continue to grapple with the rapid growth of new mobility technologies, such as ride-hailing, bike-sharing, electric scooters, and AAM, they need better tools and data to manage these services effectively. The MDS provides a standardized format for sharing information about mobility services, allowing cities to collect and analyze data from different transportation providers in a consistent and transparent manner. This helps cities to identify trends, monitor compliance with regulations, and improve urban transportation planning. By promoting transparency and accountability among transportation providers, the MDS and other digital infrastructure tools are helping cities to create a more sustainable and equitable transportation system that benefits everyone.

Recommendations 2: The FAA Reauthorization Bill should incentivize cities to dedicate resources to exploring and engaging with AAM-specific issues related to challenges within local transportation systems, and the further development of digital infrastructure tools. This can be accomplished through targeted grants and fellowships that fund staff dedicated to understanding the implications of AAM on urban environments. The legislation should also consider ways to incentivize university planning programs to include aviation courses.

In the short term, to address more immediate needs, legislation should consider ways to fund non-profit organizations that provide research and technical support to cities and educate staff on roles and responsibilities as they begin to integrate AAM technologies; this might include work that identifies where a city's transportation system is struggling to meet critical needs, such as emergency and medical transport, and disaster response. For example, congested freight corridors might benefit from an AAM intervention if it can reduce exposure to truck noise and emissions along busy corridors. Likewise, an underutilized and struggling small general aviation airport might benefit from a land use and transportation strategy that leverages connectivity opportunities to create jobs and economic activity centers made possible by new AAM-enabled connectivity. Furthermore, funding to further develop digital infrastructure tools, specific to AAM, but compatible with existing toolsets is critical for cities to oversee AAM operations and promote the safety and wellbeing of all residents.

In conclusion, the pending FAA Reauthorization Bill presents a unique opportunity to create incentives and funding opportunities that further community interests in AAM technologies. Cities must have access to resources to explore and engage with residents and AAM interventions to leverage these new technologies for each locality's unique benefit.

Observation 3: Federal, State, and local aviation professionals are often unaware of how aviation fits into the larger transportation system.

While cities have identified a need to be more attuned to aviation integration matters, they should not shoulder all of this work. Instead, aviation professionals at the State and Federal levels should also be more aware of aviation's role in the larger transportation system. It is recognized that the FAA has Congressionally mandated jurisdictional authority of the National Airspace System (NAS), however, when community members have an issue with decisions that expose them to more aviation noise and emissions, their first stop is usually not the FAA, but their local elected officials and city staff; this often results in a scenario where FAA staff struggle to understand and empathize with local sensitivities. This struggle makes creating holistic and collaborative solutions difficult for all involved stakeholders.

Recommendation 3: The FAA Reauthorization Bill should fund educational programs and resources to increase the awareness of aviation professionals on how aviation fits into larger transportation systems and how residents perceive aviation's negative externalities and benefits.

This could be accomplished by providing additional staff and resources to FAA offices that regularly interact with local jurisdictions to understand local sensitivities better. This effort should be ongoing, as one-off studies often focus on a small number of present-day issues where in reality, problems have evolved and morphed over time, masking root causes. Ongoing dialogue and listening sessions can help FAA staff develop responses and interventions to an issue's root cause or help to explain why a decision was made and how it ultimately benefits the community.

There is also an opportunity for universities with aviation-specific programs to develop community-focused planning courses that provide meaningful training and understanding of local community sensitivities; this could help bridge the gap between general planning programs and specialty disciplines like airport operations, air traffic control, and airspace regulations. In turn, this would provide better-prepared professionals to advance the FAA's mission of safety and efficiency in U.S. airspace systems while promoting an understanding of local community interests and needs through the lens of equity.

In summary, we must consider both the technical aspects and public acceptance criteria when planning future AAM initiatives. The pending FAA Reauthorization Bill is a unique opportunity to create incentives and funding opportunities that further community interests and AAM technologies. With thoughtful planning, we can ensure the success of new innovative aviation approaches while still maintaining public acceptability.

Observation 4: We are evolving from an unstable infrastructure foundation.

Despite the recent hype around the term "Urban Air Mobility," we must recognize that urban aviation has a long history in cities, dating back to the 1950s. However, the current structure of urban aviation has been largely built on an unstable foundation. Heliports are not always built to FAA design standard. Even when they are, they are rarely inspected regularly to ensure they

continue to meet design standards. As a result, it takes little time to find heliport facilities rife with obstruction hazards, equipment in disrepair, and other undocumented and unmitigated risks.

Today, an airport or heliport is entered into the FAA's Airport Master Record system via the submission of the FAA Form 7480-1, *Notice for Construction, Alteration, and Deactivation of Airports.* This form collects all pertinent information to populate the FAA Form 5010, which is then used as a reference data sheet that contains information relevant to safe flight, including landing surface dimensions, known flight hazards, noise-sensitive areas, and other information.

Airports today are typically inspected every one to three years for smaller general aviation airports and annually for large airports supporting scheduled passenger airline service. Information on each airport's 5010 entry is updated to ensure operators have the most up-to-date information. In the interim, for new or short-term hazards, airport operators communicate risk to aircrews via the Notice to Air Missions (NOTAM) system. The importance of this system made national news in January when the NOTAM system experienced a system-wide outage, forcing the FAA to issue a 'ground stop' across the nation.

Heliports, on the other hand, are typically not part of the National Plan of Integrated Airport System, nor are they typically part of a Statewide Aviation System Plan. 99% of heliports are privately developed and operated. They are not subject to a rigorous inspection protocol where new risks are identified and communicated to aircrews. Furthermore, most heliports are not part of the NOTAM system. Operators often rely on local knowledge and experience to anticipate hazards and risks. When the 5010 database is consulted, it is possible that information is out of date or inaccurate, sometimes by decades. A 2019 NASA report (ACN: 1599969) estimated that 1,600 to 1,800 heliports in the United States are not included in the 5010 database. If a heliport does not exist in the 5010 system, new airspace entrants, including eVTOL operators, will not be aware of their existence and associated hazards.

Some states, such as California, inspect hospital heliports, but staffing and resource constraints still make this task challenging. Many city officials are unaware of the inherent risks in today's legacy system; those that are aware need help to find resources and trained staff to remedy the

issue. This reality may be perceived as acceptable today, likely because the relatively low tempo of urban aviation operations makes the risk probability of an incident low. However, as operations scale, these unmitigated risks threaten to expose residents to aviation hazards on an unprecedented scale. For example, the Uber Elevate White Paper, *Fast-Forwarding to a Future of On-Demand Urban Air Transportation*, states that on-demand charter and commuter operations (operated under 14 CFR Part 135) have twice the fatality rate of privately operated cars. This statistic indicates that risk probability within urban environments may be higher than we know.

In the 2021 paper, *A Retrospective & Historical Analysis of Vertical Lift Infrastructure,* the authors explored the role of infrastructure in helicopter accidents. In the majority of the reviewed accidents that occurred on heliports, infrastructure was identified as a common key factor. Obstructions were the most common issue. Facility design and size were a factor in 90% and 40% of accidents, respectively. Wind was a factor in 30% of accidents. These are avoidable incidents through proper design, inspection, and risk mitigation.

Recommendation 4: The FAA Reauthorization Bill should include measures that help cities better regulate and manage urban aviation systems that include private facilities, through inspections, active risk mitigation, and communication.

Legislation should consider ways to reduce costs for states and cities in meeting their obligation to provide a safe and efficient urban aviation system containing private infrastructure where the FAA does not have jurisdictional authority. This effort might include supporting university planning programs with heliport (and future vertiport) faculty design familiarization, inspection procedures, and risk mitigation strategies. Funding organizations like NASA or even non-profit organizations to help inventory and inspect infrastructure to establish a new baseline before the implementation of AAM can serve to reduce risk and set new precedent for safety.

Through these efforts, we can create a safe environment for communities and encourage Advanced Air Mobility (AAM) development from a strong foundation. Ultimately, this paves the way for adopting AAM systems and a safe scaling to higher operation tempos in urban environments.

Observation 5: The aviation industry is not taking advantage of existing talent to the maximum extent possible.

All major media outlets frequently cover the aviation industry's pilot shortage. However, what's often overlooked is the similar shortage of all other supporting roles and functions. From maintainers to dispatchers to air traffic controllers, many supporting functions are not receiving the attention they deserve.

As outlined in my opening statement, much of my experience in this space comes from my military service. Having spent much of my military career in a contingency mode, dynamic and ongoing risk mitigation is a critical part of safe operations. Unfortunately, many military Airfield Managers are often faced with a typical response to their job applications. Military airfield management is unjustifiably seen as 'different.' With this statement, transitioning veterans are bypassed and unable prove their value.

Furthermore, in addressing workforce challenges, diversity is vital. I am very encouraged by the diversity that AAM is attracting. Seeing women, people of color, and diverse backgrounds is a welcome change to the aviation workforce landscape. The example that the Choctaw Nation provides in its leadership is inspiring and similar programs should be encouraged through funding and support.

Recommendation 5: The FAA Reauthorization Bill should include measures to encourage diversity in the aviation workforce, provide training and education programs for transitioning veterans, and incentivize private companies and organizations to assist with the recruitment of new personnel.

Diversity is a critical factor in successful operations when we consider risk mitigation and safety. By having a diverse workforce, we can better understand and respond to the nuances of different communities. Furthermore, veterans often have a unique combination of valuable experiences in the aviation industry. The wealth of knowledge they bring from their respective branches should be encouraged through measures such as the transitioning veteran training programs and incentives for private companies.

By including funding and support measures in the FAA Reauthorization Bill, we can ensure a well-rounded aviation workforce is ready for AAM's challenges. Additionally, this would further bolster an environment where equity, risk mitigation, and safety are top priorities, allowing AAM systems to operate safely and securely. Ultimately, this will enable communities from all walks of life to enjoy the benefits of AAM-supported operations.

Conclusion

In conclusion, support from Congress for these recommendations will help create a safe environment for communities and encourages the development of Advanced Air Mobility (AAM) from a strong foundation. This foundation, in turn, will pave the way for adopting AAM systems and a safe scaling to higher operation tempos in urban environments. Thank you for your time and consideration in this vital matter. I am confident that together we can create an environment where everyone can take advantage of Advanced Air Mobility's incredible potential.

This testimony has been submitted as part of the pending FAA Reauthorization Bill, and I am confident it will help ensure safety for all communities affected by AAM operations. We must invest in our infrastructure, our workforce, promote diversity, and provide opportunities for our veterans to serve in critical aviation leadership roles. Only then can we realize the incredible potential that this new mode has to offer.

Thank you once again for allowing me to share my perspective. I look forward to partnering with you to bring forth a new frontier in aviation and transportation.