July 31, 2023

Filed electronically through Federal Register Portal Request for Information on Advanced Air Mobility.

To: Lauralyn Jean Remo Temprosa, Associate Director, Office of Aviation Analysis, Office of the Secretary, U.S. Department of Transportation, 1200 New Jersey Avenue SE, West Building Room W86–310, Washington, DC 20590

Re: Request for Information on Advanced Air Mobility (Docket No. DOT-OST-2023-0079)

Dear Associate Director Temprosa,

The attached comments regarding Advanced Air Mobility are submitted on behalf of Studio City For Quiet Skies. We represent hundreds of thousands of residents in the Southern San Fernando Valley and Santa Monica Mountains, including Studio City, Sherman Oaks, Encino, Beverly Hills, and other parts of Los Angeles.

This comment is not meant to replace other comments submitted by Studio City For Quiet Skies or any of our members.

EXECUTIVE SUMMARY

The DOT has solicited comment suggestions to help the Government focus on short-term, medium-term, and long-term Advanced Air Mobility (AAM) implementation. Most of the requested action should be completed prior to the scaling up of AAM. The accelerated timeline for commercializing AAM as an air taxi service by 2025, without specific federal regulations in place, must be slowed down.

STUDIES REQUIRED: The rush to implement AAM must be decelerated. The short-term focus should be on conducting thorough health and environmental studies, a cost-benefit analysis, comprehensive and independent research, pilot programs, data analysis, and community outreach to ensure responsible innovation and address potential adverse impacts and concerns, especially to people on the ground. FAA's plan to "streamline" environmental review for AAM must be emphatically rejected.

ASSESS CUMULATIVE IMPACTS: The integration of AAM underneath other aircraft (commercial, general aviation, helicopters) at 400 AGL, and across multiple airports, has the potential to significantly impact

noise levels, visual pollution, and the overall well-being of individuals, as well as have privacy and security implications. Adverse Cumulative Impacts on health, quality of life, sleep patterns, and the environment must be thoroughly studied as part of the NEPA process and closely monitored during early pilot programs. It is crucial to address health and environmental impacts through the implementation of stringent emission standards, flight restrictions, and appropriate regulations. The use of zero-emission vehicles should be prioritized, and regulations should ensure that AAM operations adhere to land use regulations, protect wildlife corridors and natural habitats, and avoid high fire hazard zones.

SET BENCHMARKS FOR DEVELOPMENT: Key considerations include setting benchmarks for development, staged rollout plans, pilot programs, community engagement, equitable access, addressing noise and environmental impacts, and prioritizing safety and public welfare.

FEDERAL REGULATORY FRAMEWORK: Studies and research must guide the establishment of a Regulatory Framework before the implementation of AAM to ensure responsible and effective integration. The public rejects the “fly now, regulate later” approach. It is essential to establish new rules specifically designed for New Entrants like AAM, rather than attempting to modify existing regulations to include AAM. AAM must not be included in ANCA. Federal Regulations should also address major barriers and concerns regarding safety, noise, human health, privacy, economic damage, environmental impacts, and quality of life impacts on the ground from AAM.

ENVIRONMENTAL REVIEW: Environmental review must not be streamlined.

PUBLIC AS FULL STAKEHOLDER: The general public is completely unaware of AAM and how this world-changing technology will alter the character of neighborhoods, cities, states, and the nation, impacting quality of life for all. Providing the public full stakeholder status, along with ensuring absolute transparency, are crucial, and the DOT should prioritize input from the general public rather than solely industry perspectives. Public rejection will be a barrier to AAM implementation.

PUBLIC ENGAGEMENT: Lessons should be learned from previous flawed programs like NextGen, and community engagement for AAM should involve representation of community stakeholders, early involvement in decision-making processes, and at every stage of implementation, meaningful dialogue and collaboration, and the elevation of environmental impacts as a co-equal priority. Community understanding must not be the goal of community engagement for AAM.

LOCAL CONTROL: FAA must not dispute, but rather accommodate, states, cities, and regions local control over land use, infrastructure, electricity demands, aircraft operations, and impacts allows for tailored approaches that prioritize the well-being of local communities. Rushing implementation without comprehensive and thoughtful regulation risks hasty and inadequate oversight of this transformative technology.

MODELING/ASSESSING NOISE PRIOR TO IMPLEMENTATION: Proper modeling and assessment of AAM vehicle noise levels are essential to ensure that communities are not exposed to increased noise levels or undue disturbances. Adequate tools and metrics for decision-making purposes, including N-above, T-above, Lmax, A and C weighting, must be developed to accurately assess noise impacts. Cumulative noise effects from various aircraft types should be computed to understand overall noise burdens.

EQUITY: Equity in transportation must be a priority. AAM for the sole purpose of transporting high-income users must be avoided and distinguished from medical transport usage, with data collection differentiating between these applications for informed decision-making and regulation.

NO NEED BUT GREED: This FAA and aviation industry effort is driven by corporate greed, under the guise of innovation. FAA has not demonstrated an actual need for AAM beyond its limited emergency applications. Transporting the privileged few does not demonstrate need. The climate change crisis must not be ignored to accommodate a frivolous new industry that could strain electric grids nationwide, which instead should be conserved for essential purposes like providing air conditioning for the general populace.

By prioritizing studies, research, pilot programs, data analysis, and addressing concerns including state/local regulation, while involving the public in decision-making, a determination can be made as to whether AAM implementation should move forward. It must be determined whether the benefits of AAM outweigh the substantial cost to the public and the environment.

INTRODUCTION

The aviation industry and FAA are rushing headlong toward implementation of an entirely new mode of aircraft, Advanced Air Mobility (AAM)/Urban Air Mobility (UAM), collectively referred to herein as AAM. Industry expects to introduce their AAM aircraft in Los Angeles by 2025[1] and to scale up by the 2028 Olympics.[2] In fact, Joby's prototype was just approved by FAA and they can expect to *"deliver its first electric aircraft to a customer by 2024 and commercialize an air taxi service by 2025."*[3] According to Joby founder JoeBen Bevirt, receiving the airworthy certificate from FAA "*marks a major step on our journey to scaled production*."[4] According to the United States Government Accountability Office (GAO),"*proponents of AAM envision developing* ***large-scale operations*** *over time, with* ***thousands of aircraft eventually operating in high densities across most urban areas.***"[5]

FAA's newly released plan, Innovate 28, confirms that FAA will do everything in its power, with *"an all hands on deck approach to ensure the necessary steps are taken to enable AAM operations in 2025 while scaling up in 2028,"*[6] and will work to "streamline" environmental review.

The general public has no idea that AAM is coming to their community, and perhaps over their homes. Billy Nolan, FAA Acting Director, who was newly hired at AAM trailblazer, Archer, stated that AAM will be "*certified in just a few years, instead of decades....Not since the dawn of the jet age have we seen so many advances and changes in aerospace.*"[7] Hundreds of millions of dollars have been poured into the

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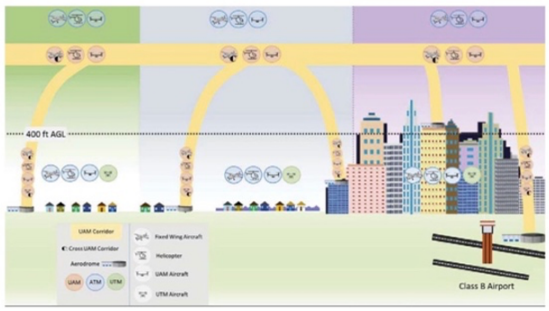
[1] Urban Movement Labs, Integrating Advanced Air Mobility: A Primer for Cities, p.20, Dec. 2022.
[2] APN Aero, LA Looks to Advanced Air Mobility for 2028 Olympics, September 26, 2022; LA Times, Look! Up in the sky! It's an air taxi. They're coming to Los Angeles, June 19, 2022.
[3] TechCrunch, Joby Aviation receives permit to fly first eVTOL built on production line, June 28, 2023.
[4] AVweb, Joby cleared for production flight testing, June 28, 2023.
[5] GAO 22-105020, Transforming Aviation, p.14, May 2022.
[6] FAA, AAM Innovation Plan - Innovate 28, p.5, July 18, 2023.
[7] Reuters, Acting FAA chief expected to join air taxi firm Archer Aviation, May 25, 2023.

AAM industry including from Toyota, Boeing and Delta.[8] Some appear to be anticipating community resistance to world-changing AAM implementation, recommending that *"FAA has a plan in place to prevent noise from becoming a barrier issue for industry."*[9]

Lost in the flurry of this excitement over aviation innovation is the human cost of aircraft impacts. Once the initial prototypes take flight and more are rolled out, the end result will be densely packed, rotor-driven aircraft flying below 400 feet Above Ground Level (AGL)[10] over residential areas, schools, parks, offices, and hospitals. Unfortunately, this development will negatively impact new communities and further intensify the plight of individuals recently affected by the implementation of NextGen relocated and concentrated flight paths, causing increased distress. At these extraordinarily low altitudes, AAM will stack additional adverse impacts to health, safety, privacy, security, and quality of life onto people on the ground, resulting in a minor benefit for the privileged few who use AAM, in exchange for the staggering cost to the many.

See images from Concept of Operations Version 1.0 and Version 2.0 pictured below:



/ FAA's Preliminary Understanding of UAM, UTM, and ATM Operating Environments

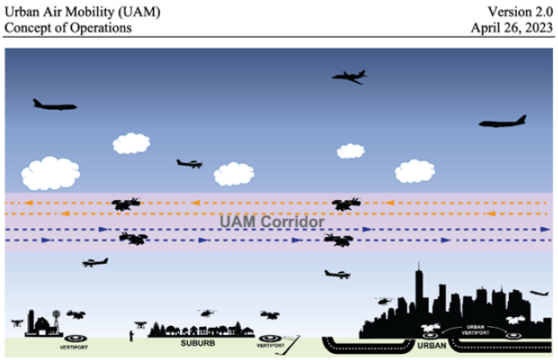


Figure 7: UAM Corridor with Multiple Tracks

KEY TAKEAWAY: To achieve public acceptance of AAM operations, DOT must prioritize input from the public. The AAM Federal Register Notice (AAM FRN) appears to be focused on industry comments with very little concern for the general public. The AAM FRN states, *"DOT seeks comments specifically addressing **public acceptance of AAM operations** and the appropriate means of public engagement necessary to enable AAM operations in the future."* However, the general public will not "accept" the "Jetsons-like" future that awaits them.

KEY TAKEAWAY: Implementation must not occur without a measured and detailed plan in place to study, analyze, test, and resolve crucial issues facing AAM, while learning from the missteps of NextGen.

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[8] TexhXplore, Toyota investing $400 million in flying car company, Jan. 16, 2020; Wisk, Wisk Aero secures 450 million from the Boeing Company to advance certified autonomous electric flight, Jan. 24, 2022; The Verge, Delta Airlines will invest up to $200 million in Joby Aviation to create a 'home-to-airport' air taxi service, Oct. 11, 2022, FutureFlight, SK Telecom makes $100 million investment in Joby's eVTOL Aircraft, June 29, 2023.

[9] NASA, Urban Air Mobility Noise: Current Practice, Gaps, and Recommendations, p.33, October 2020.

[10] NASA, Airport Trajectory Management for Urban Air Mobility, p.6; FAA NextGen Urban Air Mobility, Concept of Operations v. 1.0, p.4-5, April 26, 2023; FAA NextGen Urban Air Mobility, Concept of Operations v. 2.0, pdf p.23, April 26, 2023.

RESEARCH, STUDY, DATA, COST-BENEFIT ANALYSIS

Short Term and Prior to Implementation

1. **RESEARCH, STUDIES, AND DATA REQUIRED:**

- **KEY TAKEAWAY:** Extensive independent research and resultant data are necessary in the near term, prior to implementation of this untested new modality. The objective of research is to thoroughly examine the potential adverse impacts of the addition of UAM/AAM to the complex National Airspace System (NAS), prior to rollout. This data will serve to guide the establishment of a Regulatory Framework for UAM, which is yet undefined. Research would include a thorough assessment of all potential adverse impacts to the public with an emphasis to people on the ground. It would include community input.

- **KEY TAKEAWAY**: FAA must not assume public benefit without crucial examination of the issues. To do so would express a willingness to retrofit regulation and delay examination of safety and adverse impacts until after implementation. A moratorium must be placed on the implementation of AAM until fulsome studies are completed so that the FAA can make well-informed decisions; assess risks and benefits; draft (but not yet enact) regulations, engage stakeholders; and establish a responsible framework to determine whether AAM should be integrated into our airspace.

- **KEY TAKEAWAY**: FAA's attempt to streamline environmental review must be resoundingly rejected. According to FAA's new Innovate 28 Plan, the FAA has policies and practices in place to conduct environmental review for legacy aviation. However, the FAA is still evaluating how best to **streamline** the environmental review process for new entrants, such as AAM.[11]

- **KEY TAKEAWAY**: "Wait and see" experimentation, followed by examining "lessons learned" has not worked in the past (e.g., NextGen) and has not served the public. If there is not enough data available to establish benefit, implementation must be delayed. FAA must not use the "boil the frog" approach thereby increasing operations incrementally so that the negative impacts appear insignificant at the outset, but lead to unintended consequences that become more pronounced over time. This could include issues related to noise/visual pollution, air quality, safety, and other social and environmental concerns that must be examined and weighed prior to implementation, with data collected from pilot programs, while considering and sharing projections of increased operations.

- Perform a peer-reviewed report on an AAM system of metrics to measure aviation noise impacts and annoyance that reflects the lived experience of AAM, to include N-above, T-above, Lmax, A and C weighting and accounting for ambient noise, as well as cumulative impacts from AAM, Commercial and General Aviation, and health impacts.

[11] FAA, AAM Innovation Plan - Innovate 28, p.25, July 18, 2023.

- Perform a noise exposure and contour including abatement flight corridor development and operational restrictions study based on Advanced Air Mobility early pilot programs including existing and future forecasted flight paths and infrastructure scale such as Vertiport/Vertihub placement for takeoff and landing, safety and emergency response, and travel impacts for passengers getting to and from Vertiports and noise monitoring to measure actual noise from the pilot projects underway.

- Scientific studies and pilot programs are necessary to produce data and analyze the potential and probable impacts from AAM associated with airspace safety, human health, children's education, noise pollution, visual disturbance, privacy infringement within and around new flight paths, security, aircraft infrastructure, and environmental harm. Furthermore, it is important to acknowledge the cumulative impacts resulting from the introduction of this additional layer of aircraft, recognizing that AAM will be additional to other aircraft impacts of all kinds, including low-flying drones.

- Scientific research studies to include:
  - Data to quantify the cost of these impacts, including safety, health, privacy, security, and economic impacts.
  - Data to quantify the cost of impacts that cause environmental degradation to public resources, including air, water, and energy resources.
  - Data to quantify the cost of impacts that cause harm to wildlife, habitat, and public parklands.
  - Study and analysis to determine if there is a genuine public benefit from AAM.
  - Assessment of safety with the addition of this new modality of aircraft, including aircraft, pilots, airspace, Air Traffic Management, and infrastructure.
  - Study necessary law enforcement training requirements. What laws are required for governance of future costs, including but not limited to injury and property damage, and who is responsible for enforcement?

2. **COST-BENEFIT ASSESSMENT/DETERMINATION OF PUBLIC BENEFIT:**

- **KEY TAKEAWAY**: Delaying AAM implementation until comprehensive studies and cost-benefit analysis are completed demonstrates a commitment to responsible innovation. It sends a message that the FAA values the well-being of the public and aims to ensure that new technologies are implemented in a manner that maximizes benefits and minimizes potential harm. By setting this precedent, the FAA establishes a framework for future advancements in aviation that prioritizes thorough examination and public interest**.**

- **KEY TAKEAWAY**: Set benchmarks for development: initial benchmark to include studies and then test implementations, with rollout to be predicated by FAA meeting data, analysis, and community outreach goals. Include trial periods with an opportunity for the public to respond.

- It is our expectation that a unique tool similar to the FAA's "Benefit Cost Analysis"[12] used by Airport Division, will be applied in the case of introduction of new technologies, including AAM, that will dramatically change the aviation landscape, cities and neighborhoods, and impact the general public in entirely new ways. FAA must identify and undertake research and perform a Cost-Benefit analysis, with the goal of protecting communities and their residents from harm.

- Cost-Benefit analysis must include the following costs of AAM: noise, visual clutter, health, children's learning, environmental, air quality, global warming, water degradation, privacy, security, equity, cumulative impacts, infrastructure costs, electrical concerns, economic costs, and safety of passengers and communities.

- The assumption of public benefit is industry-driven, not need-driven, and not supported by evidence and data. The human cost has not yet been considered. The FAA must prove that there is a net benefit to the general public on the ground, not just the "traveling and shipping public," as an initial requirement before moving to the next step toward implementation. Industry greed is not a sufficient factor in the analysis.

- FAA must determine the need for and consequences of the addition of AAM to the NAS. New technologies should be considered separately and cumulatively with existing aircraft.

- Weigh public benefit of AAM improving transportation accessibility or reducing congestion: The assumption that adding 2-4 passenger aircraft for "higher income users"[13] will benefit the general public by reducing traffic on congested roads does not ring true. Filling the sky with AAM aircraft will not reduce the number of cars on the roads. The public would be better served by improving public ground transportation and phasing down the use of cars.

- Weigh the cost of new locations experiencing negative impacts due to noise, congestion shift and increase, grid capacity implications, visual clutter impacts, and infrastructure placement and expansion.

- Back up unsupported claims that UAM/AAM will be clean, quiet, and equitable. This should be examined as part of the cost-benefit analysis:

    - Clean: Clean operation is well into the future. Fossil fuels including aviation fuel and sustainable fuels will be used to operate "all fuel" and "hybrid" models in the near future.[14] Recharging of electric batteries for eVTOL presents challenges to the electric grid.
    - Quiet: Joby's first noise study performed by NASA in Summer 2021, shows noise readings up to 85dB, even though the study was designed to minimize impacts by

[12] FAA Benefit Cost Analysis.
[13] Urban Movement Labs, Integrating Advanced Air Mobility, A Primer for Cities, p.9, Dec. 2022.
[14] NASA, A Proposed Taxonomy for Advanced Air Mobility, 2022.

avoiding terrain and flying only during benign wind conditions.[15] These noise levels will not be acceptable in cities, especially at densities that the AAM industry expects.

- Equitable: It is not likely that AAM, with seating for 2-4 passengers will serve the general public, but it will further exacerbate the equity divide in our nation. Further, it is impossible to serve a community without impacting residents in that same community as AAM will necessarily traverse every area it serves to and from the nearest vertiport. Expecting communities to trade new jobs for harmful health impacts is unfair and does not serve the public.

FEDERAL REGULATION AND STATE/LOCAL REGULATION

Short Term and Prior to Implementation

1. **FEDERAL REGULATORY FRAMEWORK**:

- This AAM FRN is seeking information about "*federal regulations, or other legal authorities that could be created or updated to support AAM in the United States and maintain the* ***regulatory agility*** *necessary to safely enable this new form of transportation."*[16] Indeed, ConOps v.2 confirms that FAA will "*leverage the current regulatory framework and rules"* for AAM.[17] The community rejects the notion of "regulatory agility" for this new entrant into the NAS. "Regulatory Agility" appears to mean that FAA is allowing industry enthusiasts to lead the agency toward speedy, sloppy regulation and implementation of this world-changing technology.

- **KEY TAKAWAY:** AAM requires comprehensive NEW Regulations specific to this unique modality, which is neither helicopter nor plane, and requires extensive new ground-based infrastructure within populated residential and commercial areas. At this point, neither operational nor regulatory infrastructure is known. According to GAO, *"because these new designs have characteristics of both airplanes and helicopters, they do not fit into FAA's definitions for either of those classes"*[18] For FAA to simply create changes to its regulatory definitions in existing rules through the use of "Special Conditions" or "Rules of Particular Applicability" (RPA)[19] in order to include AAM,[20] is ludicrous and presents a myriad of issues surrounding safety, privacy, security, noise, adverse impacts, etc. Most alarmingly, it allows AAM to escape environmental review. There must be unique regulations for New Entrants that are entirely different from today's aircraft.

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[15] NASA Langley Research Center, Acoustic Flight Test of the Joby Aviation Advanced Air Mobility Prototype Vehicle, June 13, 2022.
[16] Federal Register, Request for Information on Advanced Air Mobility, May 17, 2023.
[17] FAA NextGen Urban Air Mobility, Concept of Operations v. 2.0, pdf p.5, April 26, 2023,
[18] GAO 22-105020, Transforming Aviation, May 2022.
[19] Cornell Law School, 14 CFR 1138 – What public comment procedures does the FAA follow for Special Conditions?
[20] Future Flight, FAA redefines commercial operating rules to include new powerlift eVTOL Aircraft, Nov. 22, 2022.

- **KEY TAKEAWAY:** FAA is attempting to "streamline" environmental review for AAM, as clearly stated in its Innovate 28 Plan.[21] Full environmental review under NEPA and CEQA must be required.

- **KEY TAKEAWAY:** It is vital that New Entrants[22] are not given Airport Noise and Capacity Act of 1990 (ANCA) status, and that states, cities, and regions have regulatory ability over land use, aircraft operations, and impacts, thus supporting the health and welfare of their constituents.

- **KEY TAKEAWAY:** A 10-15-year, staged plan for the rollout of new aircraft modalities such as AAM, including testing, is required prior to implementation. Staged rollout must include revokable pilot programs, and stage by stage operational, regulatory, and environmental thresholds that must be met for advancement to the next stage. Every stage would fully consider and incorporate newly available data and analysis, prior to rollout and widespread adoption. A detailed plan would include multiple opportunities for community engagement.

- **KEY TAKEAWAY:** Regulations must address major barriers for AAM regarding safety, noise, human health impacts, loss of privacy, economic damage, environmental impacts, and quality of life impacts on the ground from AAM**.**

- To further "regulatory agility," FAA is proposing new rules to establish easier requirements for pilot certification and operation of AAM aircraft.[23] The official notice of proposal for rulemaking (NPRM), published in the Federal Register on June 14, 2023, allows for pilots *"holding a commercial pilot certificate and an instrument rating to meet powered-lift flight-time experience requirements faster."*[24] Again, using RPA to promote "regulatory agility" instead of measured and staged implementation, including research and study, sets the stage for disaster.

- FAA's Concept of Operations v2.0 (ConOps v2.0)[25] is FAA's second attempt to deal with what *"some predict will be a veritable swarm of electric multicopters buzzing around major cities. It builds on feedback from the first version and fleshes out the overall concept without getting into the weeds of operational and regulatory necessities."*[26] According to the ConOps v2.0 introduction, *"it does not prescribe specific solutions, detailed operational procedures, or implementation methods…"*[27]

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[21] FAA, AAM Innovation Plan - Innovate 28, p.25, July 18, 2023.
[22] New entrants represent an increasing body of actors who are seeking to implement new aviation concepts in airspace where there is currently little managed activity. International Civil Aviation Organization, New Entrants, July 26, 2019.
[23] Federal Register, Integration of Powered-Lift: Pilot Certification and Operations; Misc. Amendments Associated with Rotorcraft and Airplanes, June 14, 2023.
[24] AV Web, FAA proposes rules for powered-lift pilot certification training, June 8, 2023.
[25] FAA NextGen Urban Air Mobility, Concept of Operations v. 2.0, April 26, 2023.
[26] AV Web, FAA starts mapping out eVTOL integration, May 7, 2023.
[27] FAA NextGen Urban Air Mobility, Concept of Operations v. 2.0, pdf p.5, April 26, 2023.

- FAA has recently granted airworthy certificates to novel "drive and fly" prototype aircraft, that use premium gasoline, and are expected to be driven on roads side-by-side with automobiles, and then take off vertically or conventionally when necessary.[28] The plan is for these gas-guzzling road-to-air vehicles to be remotely or autonomously operated by the owner/passenger. FAA should not be passing out airworthy certificates like candy to every novel aircraft unless and until there are specific regulations in place including, but not limited to, safety, security, privacy, noise, air pollution, health impacts, environmental impacts, and equity.

- Regulations must require the inclusion of communities for engagement. Such inclusion must start now, before decisions are made. Community input should be included in defining the research. The research will provide the data citizens need to enter the discussion and to adequately be represented throughout. Currently, Community Engagement is happening after decisions are made. Include Community Groups formed and mobilized in response to NextGen, which relocated and concentrated noise over new communities across the nation. Community Engagement must include representatives of these communities, and all communities now and throughout the regulatory and advisory processes, including implementation, and post implementation.

2. **STATE AND LOCAL CONTROL**:

- **KEY TAKEAWAY:** While recognizing the FAA's authority to manage U.S. airspace, it is equally important to consider the benefits of granting state and local governments control over where AAM flies and its associated infrastructure. State and local governments possess a deep understanding of their communities, including their unique geographical features, population density, and transportation infrastructure. Granting them control over AAM flightpaths and infrastructure allows for customization to local needs, ensuring that operations are aligned with the specific requirements and considerations of each region. According to LADOT, *"while national airspace is regulated by the FAA, it is the local government's responsibility to ensure that the airspace surrounding airports (including heliports and future vertiports) and the designated air routes into and out of an airport are maintained."*[29]

- **KEY TAKEAWAY:** State and local governments are responsible for Land Use and for protecting the welfare and well-being of their residents and the surrounding natural environment.[30] Allowing them to have a say in AAM operations enables them to address and mitigate specific concerns related to land use, energy use, operations, noise, privacy, safety, and environmental protections that may be specific to their communities. By

[28] FutureFlight, With FAA Authorization Aska set to expand flight testing of A5 flying SUV, July 3, 2023; AS Technology, Alef flying car: What we know about the first car certified to fly: design, technology, price, July 3, 2023.
[29] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.17, September 13, 2021.
[30] "*Developing regulations and solutions for aircraft noise requires a multifaceted approach. The City's use of new simulation technology helps inform policy makers, and further ensures the community's interests and the preservation of the natural environment are at the forefront of UAM policy decision making."* Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.7, September 13, 2021.

considering local perspectives and involving communities in decision-making processes, a balance can conceivably be struck between the potential benefits of AAM and the protection of local interests. Granting local authorities control over AAM flightpaths and infrastructure demonstrates a commitment to addressing local concerns. This approach can foster trust, transparency, and engagement among communities.

- **Aviation lobbyists** are trying to prevent state/local governments from interfering with Uncrewed Aerial Systems (UAS), and by extension AAM. In a letter written to Congress on April 11, 2023, a consortium of aviation industry organizations detailed their concerns over state and local government interference with UAS implementation.[31] The letter states that the *"coalition is concerned about efforts by states and municipalities to intrude on the express authority that arises under 49 U.S.C. 40103(b)(1)-(2), among other provisions, with respect to the FAA's exclusive authority to manage U.S. airspace. States and municipalities have attempted to prescribe flightpaths of uncrewed aerial systems (UAS), or to prohibit their operation entirely, in contravention of the FAA's exclusive authority to impose such requirements and limitations."*[32]

- There appears to be a plan to cast all regulation in stone and solely under federal FAA purview by squeezing out local and state legislators so as to avoid any interference with industry implementation goals. According to NASA, it is in the best interest of FAA and industry to "*address certification, standards, and environmental reporting for UAM noise before these vehicles enter service. This is needed so that local communities are not panicked into the establishment of ordinances that will both limit growth of the market and potentially create operationally restricted zones."*[33] To shut out state and local government is simply wrong. State and local government have significant interests in legislating the AAM implementation, including infrastructure.

- Infrastructure concerns include the noise generated from take-off and landing. A study from Bristol University examined the noise from vertiports concluding that noise during take-off and landing may even be louder than the noise at cruising altitude. Accordingly, the placements of vertiports and drone hubs are critical. This is another reason why state and local control is crucial.[34]

- LADOT Policy Framework Considerations outline the importance of listening to the community and enacting regulations that address community concerns. The Policy Framework states that *"the first step is to establish a baseline - define and identify the Angeleno quality of life standards and minimum expectations."*[35] FAA has demonstrated through its NextGen implementation disaster, that without local city involvement, new

[31] Airline lobbyist letter, April 11, 2023.
[32] Airline lobbyist letter, April 11, 2023.
[33] NASA, *Urban Air Mobility Noise: Current Practice, Gaps, and Recommendations*, p.33, 2020.
[34] eVTOL Insights, "Evtol Propellers Louder Over Ground," Say Researchers From Bristol University, May 30, 2023.
[35] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.23, September 13, 2021. It must be noted that the City of LA has not yet engaged its residents but the Policy Framework indicates it will.

programs are doomed to fail while simultaneously eroding public trust. Thus, FAA must allow local control if AAM has any hope of succeeding.

COMMUNITY INVOLVEMENT - CONTINUOUS AS AAM EVOLVES

Short Term/Prior to Implementation; Medium Term; Long Term

(Response to FRN #16 "Environmental Impacts and Public Involvement")

1. **COMMUNITY UNDERSTANDING AND ACCEPTANCE**:

- **KEY TAKEAWAY**: Community understanding, and therefore acceptance, must not be the goal of Community Engagement for AAM.

- **KEY TAKEAWAY:** Apply lessons learned from the flawed NextGen Community Engagement for successful AAM Community Engagement. Include for decision making purposes: adequate representation of the community stakeholders as co-equals to industry stakeholders; community stakeholders involvement early in processes/discussions; communicating so communities understand if they will be impacted and how; providing meaningful dialogue and collaboration to address potential negative impacts before decisions are made; using metrics and thresholds specific to the AAM lived experience of environmental impacts; and elevating environmental impacts as a co-equal priority to efficiency or other criteria that is biased towards negative impacts for design and decision making.

- Thus far there has been no engagement of the community-at-large. Only some community group leaders involved with challenging NextGen implementation have also learned about AAM as part of their research. Aviation industry transparency and a robust system of community engagement must accompany any further development.

- FAA's new strategy of public engagement for the FAA NextGen program is to achieve the goal of "community understanding and acceptance" rather than community problem-solving to avoid harmful impacts. The community rejects this view.

- Community acceptance will not be easily gained and the public's concerns must be respected. If the result of engagement is the public's rejection of AAM, then the AAM concept must be abandoned despite industry outrage. According to GAO, *"AAM Industry Will Need Public Acceptance to Succeed: FAA and NASA officials, and many of the stakeholders we spoke with, said that for the AAM industry to succeed, it will need to convince the public that AAM operations are safe, reliable, quiet, and equitable. Twenty-eight stakeholders we spoke with identified community engagement as an issue that remains to be resolved prior to the widespread adoption of AAM services…. In 2021 we reported that noise from helicopters—the aircraft with flight profiles most similar to eVTOL aircraft—can expose the public to a variety of potentially negative effects, ranging from annoyance to more serious medical problems such as sleep disruptions and cardiovascular*

disease. Although AAM companies have stated that the electric motors used on eVTOL aircraft are significantly quieter than traditional internal combustion engines, these aircraft will still have rapidly spinning propellers, and it is not yet known how much noise they will produce. In addition, some stakeholders identified public perceptions regarding the safety of eVTOL aircraft as vital to community acceptance. They noted that the public has never seen these aircraft in operation, and acceptance of large numbers operating in close proximity to people and buildings will require a concerted effort on the part of industry and government to show these aircraft's safety by demonstrating safe, reliable operations"[36]

- The Aviation-Impacted Communities Alliance (AICA) developed the Project, FAA Community Engagement Scorecard (FAACES) to solicit and summarize feedback from community groups on their experience with FAA Community Engagement for local and national topics in 2020, 2021, and 2022 compared to pre-2020. For "Has the FAA Community Engagement Officer/Ombudsman Improved Community Engagement?" Local Topics - 92% report no, 3% yes and 5% unknown or N/A, and National Topics – 86% no and 14% Unknown or N/A. When asked about "FAA National Programs mentioned by FAA to improve Community Engagement: FAA Noise Portal" – 81% reported not improved, FAA Chatbot – 57% reported not improved and 43% reported not familiar or blank, Neighborhood Environmental Survey (NES) – 24% improved, 52% not improved and 24% not familiar or blank. Although programs and efforts were made to improve Community Engagement they were underperforming.[37] Project Takeaway: The AAM effort should fix past mistakes of community engagement by including the affected or future affected community in the early design and feedback for any such efforts to ensure success.

2. **COMMUNITY STAKEHOLDER REPRESENTATION:**

- Community Group leaders must be accorded full stakeholder status and funding should be provided for community consultants and technical advisors. LADOT in their 2021 Policy Framework noted that, *"the City should create a platform for participation of relevant community groups. The creation of an Advocacy Advisory Committee (AAC) will provide a high-level community lens in the development of a new UAM policy. The intent is that the AAC will document the wants and needs of the communities in which UAM will be implemented."*[38]

- In AICA's FAACES survey, for the question "Does the FAA include adequate community representation?" for NextGen Advisory Committee (NAC) - 90% reported not adequate and the Advanced Aviation Advisory Committee (AAAC) – 43% reported not adequate and 52% not familiar or blank. The FAA has the ability to select the individual(s) to represent the environment or the community and, in some cases, add additional representatives on a task force or advisory committee.[39] The FAA should do a better job of ensuring adequate

[36] GAO 22-105020, Transforming Aviation, p,14, May 2022.
[37] AICA, FAA Community Engagement Scorecard, May 2022-current.
[38] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.11, September 13, 2021.
[39] AICA, FAA Community Engagement Scorecard, May 2022-current.

representation for the community stakeholder that brings the experience of being directly impacted.

- We suggest a pause on forward movement of AAM implementation until Community Representatives achieve full stakeholder status and more is known about this new system of transportation, including full consideration of possible benefits and harmful impacts, as well as human health assessment wherever AAM aircraft are intended to depart, fly, and land.

- The disastrous implementation of NextGen should highlight for the FAA the importance of involving community stakeholders and understanding the impacts on society. FAA is currently undergoing a Noise Policy Review because of widespread public outcry over NextGen adverse impacts. FAA must avoid repeating the mistakes of NextGen and ensure that AAM is integrated responsibly, using a system of metrics that adequately reflects the lived experience of communities, and in a manner that aligns with societal values and expectations. Societal understanding and acceptance must not be the goal. The overwhelming public pushback of NextGen should teach FAA that residents want a real voice in what shapes their community and impacts their quality of life.

3. **ACTUAL COMMUNITY NOTICE:**

- Effective and transparent communication should be established to ensure that the public is well-informed and engaged throughout the decision-making process. Publishing "constructive" or legal notice[40] in the Federal Register does NOT constitute actual notice. The public has no idea AAM is coming to their neighborhood soon. Learn from the mistakes of NextGen and provide actual notice including pictures of AAM aircraft and the images from FAA's Concept of Operations version 1.0 and version 2.0 that show the stacking of AAM into the existing airspace flight paths. See images on page 4 of this document. Emphasize that AAM aircraft will fly at low altitudes, under 400 feet AGL, the height of a tall building or a baseball field from home plate to the center fence.[41]

- Potentially impacted City Councils need to be notified because not all communities have Roundtables and/or can join a Roundtable given they have restrictive membership (e.g., only adjacent to the airport can attend despite being highly impacted by the Roundtable's primary airport).

- There should be an AAM Community Engagement Guidebook and Checklist, including soliciting feedback from community members.

- FAA's Concept of Operations version 1.0 and version 2.0 have been posted on the FAA website and are intended for industry because the content is technical and not accessible to the general public. Potential public concerns are not addressed in either document. Thus

[40] Constructive notice or legal notice is the legal presumption that a party has notice when it can discover certain facts by due diligence or inquiry into the public records.
[41] Measuringly, 10 common things that are 400 feet big, Jan. 19, 2023.

far, AAM has been a stealth operation with no information provided to the general public. No one has asked the general public if they actually want AAM.[42] When Community Leaders have asked city representatives in Los Angeles about AAM, they have been told "it's too early to worry about it," when in fact those same representatives were already giving presentations to LAWA about AAM "coming soon."[43] The public will continue to be told it's "too early" until it's too late. At that point, like with NextGen, the FAA will claim that it is not feasible to make retroactive changes.

- At a minimum the public should be given the same information and at the same time as any other external stakeholder who receives information. Information should be translated for the general public to understand.

- Industry must not be allowed to perform outreach. Outreach must be unbiased. The community must be involved in the guidelines for community outreach from development to implementation.

- There must be requirements for periodic updates to communities, as well as updates for changes in automation, aircraft, classifications, operations, and policies.

- Community Meetings: Organize community meetings through neighborhood councils and homeowners/residents' associations so that officials, experts, and community members can engage in discussions, address concerns, and gather feedback about the introduction of AAM. These meetings should be accessible, well-advertised, and allow for open dialogue.

- Public Hearings: Hold well-advertised, local public hearings specifically focused on AAM implementation that allow for formal input from the public and interested stakeholders. This process ensures that diverse perspectives are considered, and concerns are addressed in a structured and accountable manner.

- Websites and Online Platforms: Establish dedicated websites and online platforms to serve as centralized sources of information for the public. These platforms can provide updates, FAQs, and contact information for residents to seek clarification or voice their concerns. These websites must be easily understood and widely advertised so that the public knows to visit them for information.

- Social Media Updates: Post information on online platforms such as community Facebook and Instagram pages or on local neighborhood websites such as NextDoor.

- Informational Brochures and Mailers: Distribute informational brochures and mailers to ALL residents in affected areas to provide a concise overview of AAM technology with photographs of the aircraft, informing the homeowner that their home is in the flight path and the potential impacts. The mailer must provide ways for the homeowner to engage in

[42] Future Flight, Alton's experts say advanced air mobility pioneers face obstacles, May 15, 2023.
[43] LAWA BOAC Meeting, at 1:01, Nov. 3, 2022.

the decision-making process. To avoid industry propaganda, all mailers must be approved by Community Leaders who have been accorded full-fledged Stakeholder status.

- Door knocking: This method allows for direct, face-to-face outreach to specific members of the public who will be impacted by AAM.

- Local gatherings: Set up an information booth at local events, farmer's markets or shopping centers to engage with the community.

- Mass broadcast: Public service announcements on radio and television, as well as press releases in newspapers to reach a wide audience.

POTENTIAL ADVERSE IMPACTS

Short Term/Prior to Implementation – All must be studied with data, cost-benefit analysis, and account for scaling up

(Response to FRN #16 "Environmental Impacts and Public Involvement")

1. **NOISE POLLUTION**:

   - **KEY TAKEAWAY**: AAM implementation must avoid repeating the mistakes of the NextGen program by addressing potential aircraft noise concerns and not exposing new areas or increasing noise in already burdened communities. Proper modeling and assessment of AAM vehicle noise levels are essential, and efforts should focus on developing and adopting quieter AAM technologies that minimize noise disturbances and safeguard the quality of life for all affected communities.

   - According to FAA's Don Scata, Jr., *"these (AAM) operations are coming and they're likely going to change the character of how people experience aircraft noise and could change, you know, could expose some communities that already experienced aviation activity to different kinds of noise and it also could expose communities that don't have a lot of aircraft noise to new noise."*[44] The FAA has long emphasized, and often repeats, the policy "not to move noise from one community to another," yet, with the implementation of NextGen, that is precisely what happened to previously unaffected communities.[45] Now, the FAA is on the verge of repeating this pattern with AAM. FAA must fix the monumental problem it created with NextGen, not heap more devastating and concentrated impacts on communities who rarely or never were exposed to aircraft noise. The public won't tolerate AAM that will increase and expose new areas to noise, or AAM that will fly using

[44] Noise Policy Review, Webinar, 5/25/23.
[45] Office of Inspector General, FAA Has Made Progress in Implementing Its Metroplex Program, but Benefits for Airspace Users Have Fallen Short of Expectations, p.36, August 27, 2019.

contentious NextGen paths that relocated jet noise to new areas away from the airport.[46] It is important to note that under FAA's NextGen program, noise drastically increased in communities away from the airport that enjoyed little to no air traffic disturbances.[47] In the 2019 report from the U.S. DOT Office of Inspector General, the FAA acknowledged the presence of *"aircraft noise in areas previously not exposed"* and *"competing priorities"* among industry and community stakeholders.[48] FAA must learn from their colossal NextGen mistake and not expose new areas to noise or increase the noise in areas severely burdened by NextGen concentrated flight paths.

- AAM vehicles powered by traditional rotorcraft systems, can generate significant noise levels, especially as numbers increase.[49] Flying at dramatically low altitudes, the increased presence of aerial vehicles less than 400 feet AGL will lead to noise disturbances for residents living below their flight paths.

- According to LADOT, "*certain land uses that may be sensitive to noise should be carefully considered."*[50] Furthermore *"studies have shown that low community acceptance of transportation increases in areas having low background noise."*[51] Ambient noise levels in the area must be evaluated.

- AAM aircraft are gearing to scale up and infiltrate skies in the US, yet FAA has not done any modeling to determine how loud these vehicles will be individually, and in greater numbers. A "wait and see" approach that Mr. Scata outlined at the NPR webinar, is unacceptable. FAA must work with AAM startup companies, such as Archer, to determine how loud these aircraft are and do the work prior to launching them on an unsuspecting public. The Archer hover test[52] on YouTube is not quiet – it is akin to the sound of a helicopter, and will be disruptive not only during takeoff and landing, but will be sustained noise at a much lower altitude, under 400 AGL.[53] Most AAM companies that post videos of their flights on YouTube remove the actual aircraft audio and play only soft music instead.

- A study's findings regarding the increased stress caused by drone noise provide a strong argument against the extensive implementation of AAM systems. The study demonstrates

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[46] During Noise Policy Review Webinars, FAA's Don Scata, Jr. acknowledged that most NextGen complaints, now post-NextGen, are from communities away from the airport. Prior to NextGen, complaints were from those located near the airport.

[47] For example, Hollywood Burbank Airport's (BUR) complaints rose from 575 complaints in 2016 to almost 4 million complaints today.

[48] Office of Inspector General, FAA Has Made Progress in Implementing Its Metroplex Program, but Benefits for Airspace Users Have Fallen Short of Expectations, p.36, August 27, 2019.

[49] UC Berkeley, Urban Air Mobility: Opportunities and Obstacles, p.6, 2021.

[50] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.16, September 13, 2021.

[51] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.21, September 13, 2021.

[52] Archer YouTube video, Archer's First Hover Test Flight | Maker eVTOL Aircraft, 2022.

[53] According to LADOT, *"While the noisiest part of flight is typically experienced during takeoff and landing, overflight of sensitive areas is also a concern and an important factor in public acceptance. Los Angeles can work closely with the FAA and aircraft operators to define flight corridors that maximize safety and minimize any negative impacts on Angelenos."* Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.19, September 13, 2021.

that exposure to drone noise leads to elevated stress levels, even after the noise is reduced. This suggests that the constant presence of AAM vehicles in urban areas could have a long-lasting negative impact on the physical and mental well-being of residents. Given the potential increase in air traffic with AAM, the noise pollution generated by these vehicles could significantly contribute to chronic stress and related health issues.[54]

- NASA awarded a Boston University team funding to help develop safe and "quiet" AAM vehicles, yet that seems to be a nearly impossible task. In Queensland, Australia, the automated drones from a delivery company are already enroute shattering peaceful neighborhoods with "a cacophony of noise, like a swarm of angry bees" that some have "compared to that of a chainsaw."[55] According to the Boston University Aeroacoustician, "*what I do know is that when the logistics are sorted out, if the vehicles create too much noise, all of the effort will be for naught, because community complaints will halt their adoption*."[56]

2. **NOISE METRICS**:

- **KEY TAKEAWAY:** AAM is an unknown Novel Entrant in the NAS. Unique and more sensitive metrics, and/or combination of metrics must be required for decision- making purposes for each new entrant, as well as new ways to compute overlaying cumulative noise impacts for areas with multiple aircraft (commercial jets, general aviation, helicopters, supersonic, drones, AAM) that are stacked in a narrow corridor.

- **KEY TAKEAWAY**: It is essential that FAA engages in noise modeling and simulation before simply letting AAM aircraft loose in the NAS.[57] FAA's Don Scata Jr. queried at the May 25, 2023 Noise Policy Review Webinar, whether *"we have the right tools and methodologies to do the net analysis that's needed in the absence of scaled and mature operations."* Stating further, that "*there should be interim standards that we revisit in a few years once we have better understanding of how and when and where these operations are occurring, or how loud they are, what they sound like or should once the research and analysis tools has evolved."*[58] The concept of **"**fly now, regulate later**"** is absurd. Simply doing an Environmental Review after the fact is unacceptable to the public and violates NEPA.[59] There must be studies, research, noise modeling, and pilot programs prior to AAM commercialization.

- As AAM becomes more widely adopted and integrated into urban and suburban environments, the number of low flying AAM aircraft in the skies is expected to increase significantly. With potentially large numbers of AAM aircraft operating simultaneously, it is

[54] Future Flight, Drone noise causes increased stress, study finds, Nov. 14, 2022.
[55] Venture Beat, Customers compare the noise from Alphabet spinout wing's delivery drones to a chainsaw, Dec. 27, 2018.
[56] Boston University, Delivery drones and rotor-powered rideshares sound great – and noisy, March 14, 2023.
[57] ARUP, Urban Air Mobility: Simulating the sounds of future cities, Oct. 2022.
[58] Noise Policy Review, Webinar, 5/25/23.
[59] In the LAX case, *City of Los Angeles v. Stephen Dickson et. al.*, the 9th Circuit Court of Appeals found that FAA violated NEPA for establishing flight paths without environmental review. See Aviation Airport Development Law, 9th Circuit Issues Unprecedented Order Against FAA, March 16, 2023.

essential to implement strict noise standards to prevent excessive noise levels from adversely affecting the quality of life for residents in these areas.

- AAM must meet stringent noise standard due to multiple rotorcrafts operating at an extremely low altitude over populated urban areas.[60] Noise metrics and thresholds must be used to account for the number of noise events as well as the sustained duration of an aircraft that is expected to fly at a low altitude below 400 feet AGL. Regulatory authorities must formulate stricter noise standards addressing the unique characteristics of AAM noise if they hope to achieve successful deployment of AAM in urban spaces.[61]

- Lower thresholds for Findings of Significant Impact are likewise necessary for these same areas with multiple types of stacked aircraft. Thresholds for determining the significance of impact must reflect the local noise environments including low ambient noise areas and exacerbated impacts due to mountainous terrain.

- LADOT Framework further states that there should be "sensitive" Land Use considerations and "*acceptable noise levels will vary for different land uses…"*[62] There are *"special circumstances"* that exacerbate noise and the perception of noise. Low ambient noise levels and noise in hillside/canyon/mountain terrain that amplifies and echoes should be recognized as areas for aircraft to avoid, and residents should be protected by instituting lower noise thresholds that take into consideration these "special circumstances." Areas with wildlife and natural habitat in public parklands and open space, whose viability are threatened by loud noise, must also be considered and preserved.

- Specific to Los Angeles, Freytag and Associates produced a report about the contested relocated flight paths over the Santa Monica Mountains. Their findings can be easily extended to AAM. The report finds that *"residents are more sensitive to aircraft noise in quiet areas such as the Santa Monica Mountains. The primary reason is the low-level background noise environment. Noise annoyance by intrusive events, such as aircraft flyovers, is closely related to the "signal-to-noise" ratio; that is the level of the intrusive noise relative to the background (or ambient) noise. The FAA only assesses the CNEL/DNL noise contribution from aircraft activity and ignores the effects of low ambient noise levels. However, it is well understood that noise intrusion into quiet areas creates a greater noise impact."*[63] Freytag further states that, *"The DNL or CNEL metrics enable FAA prediction of no significant noise impact with substantial increases in aircraft activity offset by minor reductions in individual aircraft noise levels."*[64] He suggests the use of Number-Above and Time-Above metrics for decision making purposes.

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[60] UC Berkeley, Urban Air Mobility: Opportunities and Obstacles, p.6, 2021.
[61] EVreporter, Noise and Vibrations Considerations in eVTOL Aircraft, January 24, 2023.
[62] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.16, September 13, 2021.
[63] Freytag and Associates, Review of Aircraft Noise Technical Report, January 13, 2020.
[64] Freytag and Associates, Review of Aircraft Noise Technical Report, January 13, 2020.

- For current decision-making purposes, the following metrics, or a combination of metrics, must be required for AAM and New Entrants while considering ways to compute overlaying cumulative noise impacts for areas with multiple, stacked aircraft:

    - Number-Above Metric**:** The Number-Above (N-Above) metric is an established noise measurement parameter used in the aviation industry for conventional aircraft and should be extended to AAM because it will reflect AAM impacts. AAM aircraft are expected to operate in populated areas where noise pollution is a significant concern. By utilizing the N-Above metric, which quantifies the number of instances where noise levels exceed a certain threshold, one can assess the potential impact of these aircraft on local communities. With the expected scaling up of AAM in the NAS, this metric may provide a clear and objective measurement, for decision making purposes, of the number of noise events that exceed the specified limits.

    - Sound Pressure Level (SPL): SPL is a straightforward metric that measures the intensity or loudness of a sound. It quantifies the pressure variations caused by sound waves and is usually expressed in decibels (dB).[65] SPL can provide a general indication of the overall noise level produced by an aircraft, including its engines and other sources.

    - Maximum Sound Level (Lmax): Lmax is a metric used to measure the highest level of sound reached during a specific event or period of time. It represents the peak intensity or loudness of a sound and is typically expressed in decibels (dB). Lmax provides valuable information about the most intense noise produced by an aircraft or any other source, helping to assess and evaluate its impact on the surrounding environment. By measuring Lmax, we can better understand the highest noise levels experienced and take appropriate measures to mitigate or manage the associated effects.

    - Combination of Above Metrics: N-Above, SPL and Lmax can work together. SPL provides a general indication of the overall noise level produced by an aircraft. Lmax refers to the highest level reached during a particular event, capturing the loudest noise produced. N-Above is a measure that indicates the number of events where the sound level exceeded a certain Lmax threshold, demonstrating the frequency of occurrences at specific noise levels. For example, combining SPL, Lmax, and N-Above can demonstrate 50 N-Above events at an Lmax level of 60 dB.

    - Time-Above Metric: The Time-Above (T-Above) metric is used as a measure of aircraft noise and is defined as the total amount of time that an aircraft spends above a certain noise threshold during a specific period. It provides an indication of the cumulative impact of aircraft noise over time rather than focusing solely on individual noise events. However, T-Above metric does not provide the

[65] EVreporter, Noise and Vibrations Considerations in eVTOL Aircraft, January 24, 2023.

maximum noise level reached during the given time period so it may not adequately account for the intensity of the noise exposure.[66]

- The following supplemental metrics must be explored and researched for future use:

    - Perceived Noise Level (PNL): PNL takes into account the human perception of noise and provides a more accurate representation of how noise is perceived. PNL incorporates additional factors such as frequency weighting (e.g., A-weighting or EPNdB) and psychoacoustic weighting to account for the sensitivity of the human ear to different frequencies.[67]

    - Effective Perceived Noise in Decibels (EPNdB): EPNdb is a variation of Effective PNL that presents the perceived loudness in decibels for easier comparison with other noise metrics. This metric aims to capture the subjective experience of noise, or human annoyance, which can be particularly useful in urban environments where the impact on communities is a concern.[68] The current proposal on noise standards for AAM recommends the usage of the EPNdB index, which is a combination of 1) loudness – the perceived volume or intensity of a sound – measured in decibels (dB), and 2) pitch – the perceived frequency of a sound, measured in hertz (Hz).[69] The EPNdB index takes into account how the human ear perceives different frequencies and loudness levels, providing a more accurate representation of the noise impact.

    - Timbre: There are no regulatory standards for sensory properties related to timbre. Timbre refers to the character of a sound that distinguishes it from other sounds with the same loudness and pitch. Some recommend that noise standards for AAM be expanded to include timbre[70] The types of timbre including: continuous, interrupted, impulsive, background, fluctuating, and intermittent noise should be considered in detail.[71]

    - Blade Passing Frequency (BPF): The BPF is a tonal component of noise, specific to rotorcraft noise, that corresponds to the frequency at which the rotor blades pass a certain point.[72] It is often measured in dBA or dB(C) and is particularly relevant for assessing the disturbance caused by rotorcraft noise by capturing the unique noise signature of AAM rotor aircraft with multiple propellers.

- According to the Neighborhood Environmental Survey of January 2021 (NES), there has been a substantial change in the public's perception of aviation noise with a much higher

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[66] Noise Quest, Penn State Univ, Noise Basics.
[67] EVreporter, Noise and Vibrations Considerations in eVTOL Aircraft, January 24, 2023.
[68] ICAO, Noise Certification Workshop, 2006.
[69] NIH, UAM Noise, Further Considerations on Indoor Space, September 8, 2022.
[70] NIH, UAM Noise, Further Considerations on Indoor Space, September 8, 2022.
[71] NIH, UAM Noise, Further Considerations on Indoor Space, September 8, 2022.
[72] Journal of the American Helicopter Society, Acoustic Analysis and Sound Quality Assessment of a Quiet Helicopter for Air Taxi Operations, July 2022.

level of annoyance than in past studies. The way noise is measured and modeled must be changed to reflect this new public perception by using decision-making metrics that will accurately assess noise. According to LADOT Policy Framework, "*psychoacoustic researchers are working to determine the annoyance, acceptance, and perceptibility of UAM aircraft and understand if existing aircraft/transportation noise metrics are appropriate or new noise metrics are required to better characterize human response*."[73]

3. **VISUAL POLLUTION/VISUAL CLUTTER**:

- **KEY TAKEAWAY:** Metric(s) should be used to capture the visual pollution/visual clutter such as N-Above at specific heights for different physical shaped and/or illuminated aviation vehicles for pilot programs, and then further applied to any early implementations for data collection to determine future standards.

- AAM will be a sea change impacting everyone and a visual blight on our landscape. It will alter the character of neighborhoods, cities, states, and the nation, impacting quality of life for all. An overcrowding of low-altitude aircraft creating unwanted visual disturbances will not be accepted by the public.[74]

- Protected national parkland, such as the Santa Monica Mountains, where people from around globe come to hike, will be impacted by the visual blight of multiple low-flying rotorcraft AAM aircraft, potentially affecting tourism in scenic areas.

- Seleta Reynolds is the former general manager of the Los Angeles Department of Transportation who is now the Chief Innovation Officer and head of the Department of Strategic Innovation at L.A. Metro. She sits on an advisory committee helping to shape the FAA's policies on air taxis. She is skeptical about freeways in the air: *"When it comes to the passenger transport, I am not yet fully convinced that the benefits outweigh the impact. Do we have a right or an expectation to be able to look up at an uncrowded sky, at a clear sky? Does that public space have a value in tangible terms of what you see in the sky? I think it's a real important question for this industry to think about. And I don't hear a lot of that discussion yet."*[75]

- Ms. Reynolds is asking the types of questions that must be asked. There has not been widespread proliferation of information to communities. If communities knew that eventually there would be thousands of AAM vehicles buzzing treetops directly overhead, most would strenuously object.

Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.39, September 13, 2021.

[74] UC Berkeley, Urban Air Mobility: Opportunities and Obstacles, p.6, 2021.

[75] LA Times/Aviation Pros, Look! Up in the sky! It's an air taxi. They are coming to Los Angeles, June 20, 2022.

4. **HEALTH IMPACTS**:

- **KEY TAKEAWAY:** AAM will likely use fossil fuels containing jet fuels in the near-term to mid-term.[76] The use of fossil fuels, particularly in low-altitude operations of AAM, pose significant health risks due to emissions such as lead, toxic chemicals, nitrogen oxides, and ultrafine particulate matter. These pollutants can lead to severe health effects, including cardiovascular diseases, respiratory problems, and increased stress levels. The noise pollution generated by AAM vehicles, along with other aircraft, further exacerbates these risks and can have detrimental effects on mental health and well-being. Strict emission standards, flight restrictions, and the implementation of appropriate noise and other regulations and are crucial to mitigate these health concerns and protect communities.

- Using combustible fuels at altitudes below a mere 400 feet AGL pose much worse health risks than jet aircraft flying at or below the mixing level of 3,000 feet,[77] the level at which particulates fall to the ground rather than being absorbed into the atmosphere. Health effects of jet pollution are severe. Jet fuel emissions are a toxic stew of benzene and hazardous chemicals. Fine particulate emissions are dangerous and cause respiratory disease, heart disease and cancer.

- Emissions such as nitrogen oxides and ultrafine particulate matter, can contribute to the development or exacerbation of cardiovascular conditions.[78] These pollutants can enter the bloodstream through inhalation and promote the formation of plaques in arteries, increase the risk of blood clotting, and elevate blood pressure. Prolonged exposure to these pollutants may increase the likelihood of cardiovascular diseases, including heart attacks, strokes, and heart failure.[79]

- Similarly, nitrogen oxides, carbon monoxide, and ultrafine particulate matter can be harmful to the respiratory system. Inhalation of these pollutants can irritate the airways, trigger inflammation in the lungs, and worsen existing respiratory conditions such as asthma, chronic obstructive pulmonary disease (COPD), and bronchitis.[80] Ultrafine particulate matter, specifically, can penetrate deep into the lungs and contribute to respiratory symptoms and reduced lung function.[81] Furthermore, symptoms such as coughing, wheezing, shortness of breath, and throat irritation can occur. “Sensitive receptors” such as individuals with pre-existing respiratory conditions, children, and the elderly may be more susceptible to these effects.[82]

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[76] Aviation Week, New Shapes, SAF And AAM Spell Business Aviation’s Future, October 26, 2022.
[77] Federal Register EPA, Control of Air Pollution from Aircraft Engines: Emission Standards and Test Procedures, Feb. 3, 2022.
[78] LA Times, Plane exhaust can be harming communities up to 10 miles from LAX, May 29, 2014.
[79] Time magazine, How Loud Noise Exposure is Linked to Heart Disease, 2/6/2018; World Health Organization, Environmental noise guidelines for the European region, Jan. 30, 2019.
[80] LA Times, Plane exhaust can be harming communities up to 10 miles from LAX, May 29, 2014.
[81] Wall Street Journal, Lawmaker Urges LaGuardia Flight Path Changes, Aug. 21, 2018
[82] The Guardian, Sonic doom: how noise pollution kills thousands each year, July 3, 2018.

- A recent New York Times article reveals the growing body of research relating to NextGen aircraft noise that rocks neighborhoods every 3 minutes with an "ear-piercing roar," more than 280 times per day. It is not just "annoying" but is a *"largely unrecognized health threat that is increasing the risk of hypertension, stroke, and heart attacks,"* and is even capable of triggering an immediate heart attack.[83] Jarring sounds that break through the ambience of a quiet room, such as recurring jet noise, are detrimental to health. This is because *"with every 10 dB increase, the sense of loudness to the ear generally doubles."*[84] Thus, the shift from no noise to sudden loud noise makes it seem 500 times louder when it's only 4 times louder.

- The noise generated by low-flying AAM, combined and stacked with helicopters and jets, can lead to psychological stress. Prolonged exposure to excessive noise can increase stress levels, disrupt sleep patterns, and contribute to mental health issues such as anxiety and depression. These psychological stressors can have indirect effects on cardiovascular health and overall well-being. Noise also increases disruption in schools and interferes with students' ability to learn.[85]

- A study's findings regarding the increased stress caused by drone noise would likely also apply to AAM. The study demonstrates that exposure to drone noise leads to elevated stress levels, even after the noise is reduced. This suggests that the constant presence of AAM vehicles in urban areas could have a long-lasting negative impact on the physical and mental well-being of residents. The anticipated surge in air traffic due to AAM, coupled with the accompanying noise pollution produced by these vehicles alongside other overlapping aircraft, has the potential to considerably contribute to chronic stress and its associated health concerns.[86]

- Implementing strict emission standards and flight restrictions in populated areas is essential to reduce the health risks associated with low-altitude operations using fossil fuel-powered AAM systems. Implementing appropriate noise and other regulations specifically for AAM are crucial for safeguarding the health of individuals in communities affected by AAM operations.

3. <u>ENVIRONMENTAL ADVERSE IMPACTS</u>:

- **KEY TAKEAWAY:** Implementing low-flying AAM vehicles requires careful consideration of its environmental impacts. Wildlife corridors and natural habitats in public parkland and open space, whose viability are threatened by loud noise, should be carved out and preserved. Avoiding Very High Fire Hazard Severity Zones is crucial. Engine failure or collision with another AAM vehicle flying in close 2-way corridors, over public parkland, particularly in California where wildfires spread rampantly and catastrophically, must be avoided.

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[83] New York Times, Noise Could Take Years Off Your Life. Here's How, June 9, 2023.
[84] New York Times, Noise Could Take Years Off Your Life. Here's How, June 9, 2023.
[85] UN Environment Programme, Air pollution linked to "huge" reduction in Intelligence, October 11, 2018
[86] Future Flight, Drone noise causes increased stress, study finds, Nov. 14, 2022.

Adherence to land use regulations must be ensured to protect the environment prior to AAM implementation

- CEQA: The California Environmental Quality Act (CEQA) mandates a comprehensive evaluation of the environmental impacts associated with proposed projects.[87] AAM has the potential to introduce significant changes to the environment, including noise pollution and air quality. Through CEQA, potential impacts of AAM can be identified and assessed, and strategies can be developed to mitigate noise and air pollution, and other environmental concerns. This ensures that the implementation of AAM aligns with sustainability goals and minimizes harm to the environment and public health. Furthermore, AAM aircraft require the development of infrastructure such as vertiports and charging stations. These infrastructure projects may have significant implications for land use and community resources, and must be thoroughly evaluated under CEQA. Finally, the CEQA process will encourage public participation and transparency in the AAM decision-making process, allowing affected communities to voice concerns, provide input, and influence the outcome of AAM implementation in their communities.

- Constrict to freeway corridors: Freeway arteries already serve as transportation corridors, designed to accommodate high volumes of traffic and are subject to high levels of ambient noise. By concentrating AAM flights over these existing noisy freeway or highway arteries, the impact of additional noise generated by AAM operations can be mitigated, thereby addressing noise pollution concerns. Restricting AAM flights to designated air corridors along freeways will also reduce disturbances to residential areas and sensitive ecosystems with lower ambient noise levels.[88]

- Create carveouts for protected parkland, wildlife corridors, natural habitat: Carving out protected parkland and wildlife corridors from AAM flight paths would help preserve valuable and vulnerable natural habitats and ensure minimal noise and visual disruption to wildlife populations while prioritizing biodiversity and the ecological balance.[89]

- Disturbance to wildlife: AAM systems operating at low altitudes could have significant consequences for wildlife populations, especially in and around public parkland areas.[90] The noise, vibrations, and visual presence of low-flying aircraft can disrupt the natural behavior patterns of animals, leading to stress, altered migration patterns, and reduced reproductive success. Some species, particularly those sensitive to disturbances, may be driven away

[87] CEQA, The California Environmental Quality Act, 1970.
[88] *"While determining the configuration of UAM corridors, DCP and LADOT may want to consider paths that minimize flights over residential areas; and largely constrain paths to noise generating transportation paths – freeways, rail lines, and main arterials…"* Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.12, September 13, 2021.
[89] *"Limitations placed on vehicle specification, time of day access, alternating flight paths, and planned restrictions* ***over sensitive biological areas*** *are a few of the foreseen means to mitigate negative affects (sic) for all stakeholders."* Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, September 13, 2021.
[90] Plos One Study, Unmanned Aircraft Systems as a new source of disturbance for wildlife: A systematic review, June 21, 2017.

from their natural habitats or even abandon nesting sites, resulting in a disruption to local ecosystems and biodiversity.[91]

- Habitat fragmentation: Public parklands often serve as essential wildlife habitats, providing a safe haven for a diverse range of species. The introduction of AAM low-flying aircraft could contribute to habitat fragmentation, dividing these natural spaces into smaller, isolated patches. This fragmentation disrupts the connectivity between habitats, hindering the movement and migration of wildlife. It can lead to reduced genetic diversity, limit access to food and water sources, and increase the risk of population decline or local extinctions.[92]

- According to the Los Angeles Audubon Society, noise impacts all wildlife groups and *"extends to all species within those groups … not simply a few species that are highly sensitive while other species are not sensitive."*[93] Specific to the Southern San Fernando Valley and Santa Monica Mountains, 43 species of wildlife, including "watch list" species, "are found in these areas that are most impacted by the increased airplane noise."[94] FAA is already defying Land Use regulations by relocating NextGen aircraft flight paths to this federally protected parkland.[95] Compounding the contested jet noise and pollution with extremely low-flying AAM aircraft would be devastating.

- Wildlife collision risk: Low-flying AAM aircraft operating in proximity to public parkland pose a collision risk to wildlife, particularly birds.[96] The potential for collisions increases when aircraft share airspace with wildlife, especially in areas where birds frequently forage, breed, or roost. Collisions can result in injury or death to individual animals, disrupt breeding cycles, and have cascading effects on the overall health of bird populations and other wildlife species.[97]

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[91] Audubon Society Report: Adverse Impacts of Airplane Noise on Wildlife in the Eastern Santa Monica Mountains and San Fernando Valley, January 10, 2020.
[92] New York Times, Animals are running out of places to live, Dec. 9, 2022.
[93] Audubon Society Report: Adverse Impacts of Airplane Noise on Wildlife in the Eastern Santa Monica Mountains and San Fernando Valley, January 10, 2020.
[94] Audubon Society Report: Adverse Impacts of Airplane Noise on Wildlife in the Eastern Santa Monica Mountains and San Fernando Valley, January 10, 2020.
[95] U.S. Department of Transportation Act of 1966, Section 4(f).
[96] Golden Gate Audubon Society, Drone Dangers and Birds.
[97] Golden Gate Audubon Society, Drone Dangers and Birds; SFGate, One-in-a-million incident: the mystery of a dead hawk at Delores Park, Jan. 13, 2020.

Image below of AAM over a hiking trail from Urban Movement Labs Report:[98]

- Battery waste challenge: The challenge of battery waste from eVTOL could pose significant environmental concerns. When electric vehicle batteries are improperly disposed of and end up in landfills, their cells can release toxic substances, including heavy metals, into the environment. Recycling these batteries poses its own set of challenges due to chemistry, construction, and the presence of tough glues that hold the cells together. Developing effective recycling methods is vital to prevent pollution and maximize the reuse of valuable battery metals. The most common recycling methods of pyrometallurgy and hydrometallurgy, involve burning or dunking batteries in acid to extract valuable metals from the cathodes. However, these processes produce extensive waste and emit greenhouse gases.[99] These environmental costs must be studied and weighed against the benefit of AAM.

4. **AIR QUALITY DEGRADATION:**

- **KEY TAKEAWAY**: The current limitations of battery technology and the lack of widely available sustainable fuels mean that until eVTOL vehicles become more prevalent, many AAM operations will rely on combustion engines, emitting air pollutants. Using alternative/sustainable fuels and even hybrid models (electric + fuel) contribute to emissions, and pose challenges regarding infrastructure and availability. Fossil fuel-powered AAM models and hybrid models that use traditional jet fuel, release pollutants that contribute to air pollution, compromising air quality, human health, and the environment. At 400 feet AGL, ultrafine particles emitted from AAM aircraft will significantly degrade air quality, posing substantial risks to human health, and is therefore unconscionable. AAM implementation must be delayed until zero-emission vehicles can be guaranteed.

[98]Urban Movement Labs, Integrating Advanced Air Mobility: A Primer for Cities, p.9, Dec. 2022.
[99] Science, A battery dilemma, May 20, 2021.

- Until electric-powered AAM vehicles are widely available, some AAM will be powered by combustion engines and will increase emissions of air pollutants. At the National Business Aviation Association's convention and exhibition held in Orlando, Florida in October, 2022, the keynote panel on sustainability discussed the range of solutions to drive aviation to a greener future, including sustainable aviation fuels, electric and hybrid-electric propulsion and hydrogen, none of which will even *"come close to being a silver bullet by 2050."*[100] Furthermore, there is a limitation to today's batteries. Erik Lindbergh, co-founder and chairman of VerdeGo Aero, stated, *"Batteries are tough. They're really tough… And we're starting to see that in the advanced air mobility industry."*[101]

- According to LADOT, UAM is an "evolving industry" and "*UAM aircraft promise quieter and greater efficiency over time,"* therefore a *"flexible UAM policy should establish clear criteria to incentivize operators"* that have zero emissions in order to help decarbonize L.A.'s transportation system.[102]

- In addition to fully electric models, AAM will likely have "all fossil fuel models"[103] and "hybrid models" powered by a combination of conventional[104] or sustainable fuels, and electricity, due to the limitations of current battery technology that *"falls short when compared with fossil fuel in terms of specific density."*[105] Los Angeles plans to regulate emissions by limiting fleet size according to fuel type: all fossil-fuel, hybrid, and all-electric.[106]

- Some hybrid models may be powered by hydrogen fuel cells, emitting water vapor as a byproduct. However, hydrogen power, as a future fuel, poses infrastructure obstacles regarding production, distribution and storage.[107] Hybrid models will likely use traditional jet fuel, derived from crude oil, that release pollutants such as carbon dioxide, nitrogen oxide, sulfur oxides, and particulate matter. These emissions contribute to air pollution and have detrimental effects on air quality, human health, and the environment.

- Alternative, more sustainable fuels are not yet widely available for use in hybrid AAM models and still contribute to local emissions. Jet fuel alternatives have been developed to decrease CO2 emissions, such as Fischer–Tropsch Synthetic Paraffinic Kerosene (FT-SPK), Hydro-processed Esters and Fatty Acids (HEFA), and Alcohol-To-Jet (ATJ). These biofuels

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[100] Aviation Week, New Shapes, SAF And AAM Spell Business Aviation's Future, October 26, 2022.
[101] Aviation Week, New Shapes, SAF And AAM Spell Business Aviation's Future, October 26, 2022.
[102] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.13, September 13, 2021.
[103] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.29, September 13, 2021.
[104] NASA, A Proposed Taxonomy for Advanced Air Mobility, 2022.
[105] Science Direct, Transportation Research Part D: Transport and Environment, Volume 91, On the design of environmentally sustainable aircraft for urban air mobility, Feb. 2021.
[106] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.29, September 13, 2021.
[107] Vertical Mag, Hydrogen poses opportunities infrastructure challenges, January 5, 2021.

have lower greenhouse gas emissions; however, they are blended with 50% jet fuel (kerosene (Jet A-1) derived from crude oil).[108]

- According to ConOps v. 1, AAM aircraft are expected to fly below 400 feet AGL.[109] At such low altitudes, far below the mixing level of 3,000 feet,[110] ultrafine particulate matter emitted from AAM "all fossil fuel models" and "hybrid models" using combustion fossil fuels, will fall to the ground and degrade air quality, thereby posing a significant risk to human health.[111]

- AAM operations are expected to take place in urban and densely populated areas, where air pollution is already a concern. The concentration of fuel-powered AAM vehicles in these areas could result in localized air pollution hotspots. Cumulative air pollution should be calculated for assessment and regulatory requirement and/or for social justice implications. The emissions from numerous aircraft operating in close proximity could worsen air quality and impact the health and well-being of residents, especially if proper emission controls and mitigation measures are not implemented.

5. **GLOBAL WARMING IMPACTS**:

- **KEY TAKEAWAY:** The development and operation of AAM require significant infrastructure, including vertiports, charging stations, and maintenance facilities. The construction and maintenance of these facilities, as well as the manufacturing processes for AAM vehicles, and the vehicles themselves (if powered by fossil fuels), contribute to greenhouse gas emissions.

- Until electric-powered AAM vehicles are widely available, AAM will be powered by fossil fuels or hybrid vehicles.[112] As AAM scales up, the energy requirements for operating fleets of air taxis could be substantial. The majority of current aviation fuels release greenhouse gases when burned. If AAM relies on similar fuel sources, they would contribute to carbon dioxide emissions, a major driver of global warming.

- Even if alternative, sustainable fuels are used, their production and distribution still have associated carbon footprints, and the availability of these alternatives are currently limited.[113]

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[108] Science Direct, Transportation Research Part D: Transport and Environment, Volume 91, On the design of environmentally sustainable aircraft for urban air mobility, Feb. 2021.
[109] FAA NextGen Urban Air Mobility, Concept of Operations v. 1.0, p.4, April 26, 2023.
[110] Federal Register EPA, Control of Air Pollution from Aircraft Engines: Emission Standards and Test Procedures, Feb. 3, 2022.
[111] LA Times, Plane exhaust can be harming communities up to 10 miles from LAX, May 29, 2014.
[112] Science Direct, Transportation Research Part D: Transport and Environment, Volume 91, On the design of environmentally sustainable aircraft for urban air mobility, Feb. 2021.
[113] McKinsey & Co., Charting the global energy landscape to 2050, July 7, 2022.

- Batteries contribute to global warming because they are recharged from electric grids still dependent on non-renewable sources, and have a low number of recharge–discharge cycles.[114]

- Even electrification of AAM may not be enough to offset the gains in efficiency if AAM is primarily used for short-haul trips within urban areas. The energy efficiency benefits may be limited compared to other transportation alternatives.

6. **WATER DEGRADATION IMPACTS**:

- Construction of vertiports and charging stations, may involve land disturbance and the use of construction materials. Stormwater runoff from these construction sites can carry pollutants, including sediment, construction chemicals, and other contaminants, into nearby water bodies.[115] Improper management of construction activities and inadequate sediment and erosion control measures can lead to water pollution.

- AAM vehicles require fuel or energy sources to operate. In the case of conventional aircraft, fuel spills during refueling or maintenance activities can occur, leading to the potential contamination of soil and water. While eVTOL vehicles eliminate the risk of fuel spills, there may still be a need for other fluids, such as coolants and lubricants, which can pose a risk if not properly managed.

7. **PRIVACY**:

- **KEY TAKEAWAY:** The operation of AAM at low altitudes, under 400 feet AGL, raise valid concerns about privacy implications for the public.[116] Privacy concerns associated with AAM operations is a major barrier to adoption by the public. It must be addressed, analyzed and studied prior to implementation, and as a part of early pilot programs. It requires strict regulation and privacy safeguards, including flight restrictions, data protection regulations, and data collection regulations.

- Visual Intrusion: AAM vehicles flying at low altitudes will likely have direct line-of-sight into private spaces, such as homes and backyards, potentially intruding on individuals' visual privacy. The presence of AAM vehicles hovering above residential areas will impact individuals' sense of security and privacy and make them feel like they are under constantly under observation.[117]

- Tracking and Surveillance: Continuous aerial monitoring by AAM vehicles might enable persistent tracking and surveillance capabilities from vehicle camera systems.[118] This could

[114] Science Direct, Transportation Research Part D: Transport and Environment, Volume 91, On the design of environmentally sustainable aircraft for urban air mobility, Feb. 2021.
[115] EPA, Stormwater Discharge from Construction Activities, 2022.
[116] UC Berkeley, Urban Air Mobility: Opportunities and Obstacles, p. 6, 2021.
[117] UC Berkeley, The Potential Societal Barriers of Urban Air Mobility (UAM), p.17, Nov. 21, 2018.
[118] NASA, A review of cybersecurity vulnerabilities for Urban Air Mobility, 2020.

potentially erode individuals' privacy by allowing for real-time tracking of activities or enabling the creation of detailed movement profiles.

- Data Collection: AAM aircraft could be equipped with sensors, cameras, or other data-gathering technologies. This data collection potential raises concerns about the collection, storage, and usage of personal passenger information, potentially infringing upon individuals' privacy rights.

8. **SECURITY**

(Response to FRN # 12 "National Security and Aviation Security Implications"):

- **KEY TAKEAWAY:** AAM must include strict regulations and comprehensive security and cybersecurity protocols. This Novel Entrant relies heavily on advanced and sophisticated technologies, including complex software, communication networks, and data processing algorithms. These technologies introduce vulnerabilities that can be exploited by malicious actors.[119] Security concerns will be a barrier to public trust thereby necessitating complete transparency.

- Fully autonomous AAM is referenced in the FRN as the eventual goal. Autonomous AAM present even greater security risks and must be strictly regulated with robust cybersecurity, rigorous privacy protection mechanisms, and stringent safety and airspace control mechanisms. Hacking into autonomous AAM systems could result in unauthorized control or manipulation of autonomous aircraft, leading to potential safety hazards, disruptions, or even intentional harm. A technical glitch or software error in autonomous aircraft could result in loss of control, unpredictable behavior, or even accidents.

9. **EQUITY/ACCESSIBILITY**:

- **KEY TAKEAWAY:** Focusing on serving the wealthy as the primary users of AAM hinders social justice in transportation, perpetuates inequalities and is a barrier to AAM adoption. Equitable access and inclusive transportation investments are essential for AAM adoption to benefit all.

- **KEY TAKEAWAY:** Distinguish between using AAM for medical necessity vs. general transportation for high-income users. Data collection should be required for all early pilot programs to differentiate these applications and enable informed decision-making and regulation.

- According to Urban Movement Labs, a group spearheading AAM in Los Angeles, AAM will mostly be *"available as a service to higher income users"*[120] Delta wants air taxis to land on

[119] NASA, A review of cybersecurity vulnerabilities for Urban Air Mobility, 2020.
[120] Urban Movement Labs, Integrating Advanced Air Mobility: A Primer for Cities, p.9, Dec. 2022.

the tarmac next to its aircraft and deliver their "premium" passengers directly to and from their homes for true "home to seat" service for the greatest time savings.[121]

- The focus on developing AAM infrastructure and services primarily for the wealthy merely to avoid congestion, will exacerbate existing inequalities.[122] The allocation of public resources to accommodate AAM could divert funds and attention away from improving public transportation systems that serve a broader population. Instead of investing in affordable and accessible mass transit options that benefit the majority, resources are channeled into a novelty that caters primarily to the wealthy. This inequitable distribution of resources could perpetuate societal divisions and hinder progress toward a more inclusive transportation system.

- The general public will likely view AAM in the same capacity as private jets. There are many who perceive business aviation users as "fat cats."[123] Currently there is a backlash against celebrities using private jets.[124] It's become increasingly unacceptable in the public's view.

- AAM may hold promise for certain niche applications or specific situations, such as medical emergencies,[125] however, it is essential to approach its implementation with caution and prioritize solutions that offer broad societal benefits rather than catering primarily to the wealthy. We must prioritize transportation investments that better serve the needs of all, rather than the elite few.

10. **CUMULATIVE IMPACTS**:

- **KEY TAKEAWAY:** AAM, when stacked underneath different aircraft types (commercial/general aviation/helicopters) and from multiple airports, will contribute to noise, visual pollution, health, and environmental adverse Cumulative Impacts. AAM will also compound adverse effects on quality of life, sleep patterns, and overall well-being of individuals residing in the vicinity. This must be studied for NEPA and tracked in early pilot programs.

- NEPA requires that the FAA evaluate the impact of its action *"when added to other past, present, and reasonably foreseeable future actions,"* whether direct or indirect.[126]

- According to ConOps v.2, the first places most people are likely to encounter AAM aircraft will be where they now see jets, general aviation aircraft, and conventional helicopters, in existing airspace designation.[127] Integrating AAM systems beneath jets and helicopters in narrow corridors will add another layer of traffic to an already congested airspace.

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[121] Aviation Week, New Shapes, SAF And AAM Spell Business Aviation's Future, October 26, 2022.
[122] UC Berkeley, Urban Air Mobility: Opportunities and Obstacles, p.6, 2021.
[123] Aviation Week, New Shapes, SAF And AAM Spell Business Aviation's Future, October 26, 2022.
[124] Forbes, Taylor Swift provokes backlash and mockery after topping list of private jet polluters, June 30, 2022.
[125] UC Berkeley, Urban Air Mobility: Opportunities and Obstacles, p. 6, 2021.
[126] 40 CFR 1508.7, 1508.8
[127] FAA NextGen Urban Air Mobility, Concept of Operations v. 2.0, pdf p.5., April 26, 2023.

- FAA's Don Scata Jr. confirmed that AAM *"could expose some communities that already experienced aviation activity to different kinds of noise and it also could expose communities that don't have a lot of aircraft noise to new noise."* [128] At extraordinarily low altitudes, AAM will stack additional adverse impacts to health, safety, privacy, security, and quality of life onto people on the ground, resulting in a benefit for the privileged few who use AAM, in exchange for the startling cost to the many.

- Counter to FAA's golden rule not to move noise from one area to another, FAA admitted in the 2019 US DOT Office of Inspector General report[129] to exposing new areas to aircraft impacts under NextGen relocated flight paths across the country. Yet, FAA is adding insult to grievous injury by layering AAM Cumulative Impacts on already impacted and beleaguered communities.

11. **INCREASED ELECTRICITY DEMAND**:

(Response to FRN #11 "What respondents believe are existing barriers to success of AAM implementation" and FRN #7 "Anticipated Power Requirements")

- **KEY TAKEAWAY:** To support the anticipated increase in electricity demand from AAM operations, substantial upgrades to the power grid infrastructure may be necessary. This can involve significant investments in transmission lines, substations, and distribution networks to accommodate the additional power load. Upgrading the power grid on such a scale can be time-consuming, expensive, and disruptive to local communities. Moreover, the associated construction and maintenance activities can lead to further inconveniences for residents and potential environmental impacts.

- **KEY TAKEAWAY:** The world is in a climate emergency[130] and can't afford to share electric grids with this elite new industry that is planning large scale operations. It comes down to a choice: private transport for the wealthy or air conditioning for the masses.

- The widespread adoption of AAM in densely populated areas like Los Angeles is likely to place a significant burden on the existing power grid. AAM aircraft, especially those with electric propulsion systems, will require substantial amounts of electricity to operate. Charging stations and infrastructure for electric AAM aircraft will need to be established, leading to an increased demand for electricity. This surge in demand can strain an already strained power grid, potentially leading to power outages, decreased reliability, and increased costs for electricity consumers. In areas where electricity infrastructure is already strained or outdated, the introduction of AAM can exacerbate existing disparities.

- According to Urban Movement Labs, Los Angeles, as one of the first cities to implement AAM, will be *"the model city for safe, sustainable, equitable, and efficient movement of*

[128] Noise Policy Review, Webinar, 5/25/23.
[129] Office of Inspector General, FAA Has Made Progress in Implementing Its Metroplex Program, but Benefits for Airspace Users Have Fallen Short of Expectations, p.36, August 27, 2019.
[130] Wall Street Journal, Extreme heatwaves across the world, July 19, 2023.

people and goods and replicate these learnings around the world."[131] How can Los Angeles use precious electric grid resources for a novelty like flying taxis that will only serve the wealthy few, when it can't even handle electrifying busses – a mode of transportation that all people can afford. A Los Angeles Times article highlights *"a variety of obstacles to full fleet electrification (of busses) by 2030, including "costs, performance, electrical grid capacity, supply chain and utilities' lead times, and market availability."*[132] In addition, California must get its High-Speed Rail (HSR) project on track before even considering electric flying taxis that only hold 2-4 people. Clean energy HSR has been delayed for decades and it would defy logic for AAM to surpass HSR in implementation.[133] Clean transportation for the masses must be realized before the novelty of flying taxis, catering to the wealthy, can even be considered.

- The reliance on a centralized power grid for AAM operations introduces potential vulnerabilities and security concerns. Disruptions in the power supply, whether due to natural disasters, cyberattacks, or other factors, can have widespread implications for AAM services. The resiliency of the power grid becomes a critical factor in ensuring the reliability and safety of AAM operations. Without contingency plans and redundant power supply systems, the entire AAM network could be exposed to risks and compromises in the event of power grid failures.

12. **INFRASTRUCTURE ECONOMIC COSTS**

(Response to FRN #11 "What respondents believe are existing barriers to success of AAM implementation"; FRN #7 "Anticipated Power Requirements"; FRN #13 "Vertiport Development and Operations"):

- **KEY TAKEAWAY:** AAM is being "packaged" as a way to alleviate traffic congestion, yet that is really nothing more than a sales pitch.[134] Given its limited seating capacity of 2-4 people, AAM will primarily be a service for the wealthy so that they can avoid traffic congestion, but it won't reduce traffic on the roads. The infrastructure required to support AAM operations, including vertiports, charging stations, maintenance facilities, and airspace management systems, would demand substantial investments. Who will pay for infrastructure build, operation and maintenance? It could come at a significant cost to taxpayers and public funds, potentially diverting funds from other critical areas such as healthcare, education, or transportation infrastructure on the ground, and not justifiable from a cost-benefit standpoint. It raises concerns about the allocation of resources and the inequity of using public funds, and whether the benefits derived from AAM would outweigh the financial burden imposed on society.

[131] Urban Movement Labs, Integrating Advanced Air Mobility, A Primer for Cities, p.16, Dec. 2022.
[132] LA Times, Put the brakes on L.A. all electric bus plan? No way, May 24, 2023.
[133] Railway Technology, Will California ever get its high-speed rail, Feb. 21, 2023.
[134] UECNA, UECNA calls for a night ban on drones and flying taxis, July 6, 2021.

- Hybrid models that could be eventually fueled by hydrogen cells will face unique hydrogen infrastructure demands such as production, storage, distribution and refueling, as well as requiring on-the-ground fueling stations.[135]

- By allocating significant resources to develop AAM infrastructure, there is also an opportunity cost associated with potentially more effective and equitable solutions to address traffic congestion. Investments could be better directed toward improving existing transportation modes, enhancing public transit, and promoting sustainable alternatives such as electric busses, electric vehicles, and expanded bike lanes. These solutions have the potential to benefit a larger portion of the population, improve overall traffic conditions, and mitigate environmental impacts at a more reasonable cost.

13. **SAFETY:**

(Response to FRN #2 "Safety Enhancements)

- **KEY TAKEAWAY:** Many key issues required for safe implementation of AAM are unresolved. Though safety of the aircraft in the air is always considered a priority, it is important to remember that these Novel Entrants into the airspace have not yet been tested, have no specific regulation, and, at such low altitudes, potential collisions will also pose safety concerns for those on the ground.

- Mid-air collisions: FAA posted renderings of what AAM "flight corridors" would look like with "two-way" traffic in opposing directions with a passing lane in between. There appears to be no separation standards in place. The potential for a mid-air collision appears to be highly likely. See image below:

- According to ConOps v.2.0, AAM *"operators remain responsible for the safe conduct of operations, including operating relative to other aircraft, weather, terrain, and hazards and*

[135] NASA, A Proposed Taxonomy for Advanced Air Mobility, 2022.

avoiding unsafe conditions."[136] Self-governed operators seem like a prescription for disaster. This "fly now, regulate later" strategy must be abandoned if FAA intends to maintain that "safety" is its number one priority.

- Air Traffic Control (ATC) management is necessary to ensure flight safety. However, ConOps v.2.0 indicates that "*ATC may issue traffic advisories regarding known UAM operations (e.g., active UAM Corridors) to aircraft receiving ATC service*s."[137] Furthermore, LADOT confirms that "*for UAM operations, tactical separations within designated 'UAM Corridors' is allocated to the UAM community with no tactical ATC services provided by the FAA. ATC may provide advisories regarding UAM operations to other aircraft on a workload-permitting basis."* Self-governance of AAM operators does not instill a sense of security for those traveling in air taxis or for those on the ground. Moreover, the inadequacy of ATC to fulfill their conventional responsibilities in maintaining airspace separation and safety has become a matter of national concern.[138] With the expansion of AAM, the ATC workforce must also grow to ensure the safety of the AAM two-lane corridor.

- The safety of those on the ground, communities under the aircraft, is never adequately considered. Vehicles flying lower than 400 feet AGL present unprecedented challenges. As noted in Los Angeles 2021 Urban Airport Mobility: Policy Framework Considerations, "*Operating in low-level airspace increases the importance of existing and new regulations that address safety systems in UAM aircraft designs and operations*"[139] The potential for mid-air vehicle complications resulting in a crash to the ground must be considered. Safety is paramount in the air and on the ground -- people in their homes, offices, and schools, as well as to users of UAM.

14. **SAFETY CONCERNS OVER AUTOMATION STRATEGY**

(Response to FRN #19 "Automation Standards"):

- **KEY TAKEAWAY:** The AAM FRN includes an AAM automation strategy such as *"simplified vehicle operations, remotely piloted operations, autonomous operations, and remotely supervised flight operations."*[140] This must be decades into the future and implementation should not even be a consideration right now.

- **KEY TAKEAWAY:** The significant number of crashes involving Tesla Autopilot raises doubts about the reliability and safety of automation systems like those proposed for AAM. The fatal accidents underscore the need for decades of comprehensive testing, improved technologies, and stringent safety regulations to ensure that autonomous systems are genuinely safe and ready for widespread use. The lack of aircraft separation on an AAM two-lane, two-way highway in the sky creates a severe risk of collisions, which would surely

[136] FAA NextGen Urban Air Mobility, Concept of Operations v. 2.0, April 26, 2023, pdf p.28.
[137] FAA NextGen Urban Air Mobility, Concept of Operations v. 2.0, April 26, 2023, pdf p.21.
[138] CNN, Air Traffic Controllers have some airlines planning scheduling cuts, April 6, 2023.
[139] Los Angeles Department of Transportation, Urban Air Mobility, Policy Framework Considerations, p.14, September 13, 2021.
[140] Federal Register, Request for Information on Advanced Air Mobility, May 17, 2023.

result in grave injury or death for both passengers on board and individuals on the ground, even in the absence of automation. Adding in automation would be catastrophic.

- There will likely be significant concerns associated with remotely piloted and autonomous AAM from the perspective of the user and those on the ground beneath the AAM aircraft.[141]

- In mid-2022, the National Highway Traffic Safety Administration (NHTSA), revealed vehicles running autopilot software/driver assistance systems have been involved in 392 reported crashes during the previous year, raising significant concerns about the safety and readiness of AAM automation technology. Tesla Autopilot accounted for nearly 70 percent of the 392 crashes, with a majority of the fatalities and serious injuries associated with Tesla vehicles. This data contradicts Tesla's claims that Autopilot is safer than normal driving and highlights the real-world performance issues of these futuristic features.[142]

- The most recent data just released shows that the number of crashes due to Tesla's Autopilot have grown significantly, along with fatalities and serious injuries. NHTSA's list released in June of 2022 only included a partial accounting of Tesla's Autopilot accidents. The most recent statistics include 736 crashes and 17 fatalities solely for Tesla's Autopilot system. Missy Cummings, a former NHTSA safety advisor and professor at George Mason University's College of Engineering and Computing, said *"the surge in Tesla crashes is troubling. One likely cause, she said, is the expanded rollout over the past year and a half…"*[143] Furthermore, transportation safety experts have expressed apprehension about the safety of AAM automation technology, particularly when it is being tested and trained on public roads alongside other drivers. Federal officials have intensified investigations into Tesla, with numerous probes, recalls, and public admonishments directed at the company.[144]

CONCLUSION

The current state of AAM has been characterized by a lack of public visibility and an inadequate response to the important concerns raised in this comment. Before considering the implementation of AAM, it is imperative to undertake thorough research and study to determine its value and provide evidence that it will benefit society, as well as establishing early pilot programs to obtain data for addressing concerns throughout this comment. Specific federal regulations must be established, while prioritizing transparency. The "fly now, regulate later" approach must be replaced with responsible, comprehensive, and collaborative regulation at all levels of government. Local control is vital to ensure appropriate land use and to prioritize public welfare. Safeguarding public transparency and granting the community full stakeholder status during every phase of development is of the utmost importance.

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[141] UC Berkeley, Urban Air Mobility: Opportunities and Obstacles, 2021, p.7
[142] Technology, Teslas running Autopilot involved in 273 crashes reported since last year, June 15, 2022.
[143] Washington Post, 17 fatalities, 736 crashes: The shocking toll of Tesla's Autopilot, June 10, 2023
[144] Technology, Teslas running Autopilot involved in 273 crashes reported since last year, June 15, 2022.