Uber Elevate

Mark Moore, Elevate Director of Strategy
HeliExpo 2020, Anaheim
January 29, 2020
Scale makes the difference... (a few months ago)

60+ Countries
75M+ Monthly active riders

15M+ Daily trips
>10B Total rider trips served
Scale makes the difference… \(\text{today}\)

- **66** Countries
- **100M+** Monthly active riders
- **19M+** Daily trips
- **>15B** Total rider trips served

![Graph showing total trips served by quarter (billions)](image)
Uber partners with Hyundai on electric air taxi

SEOUL (Reuters) - U.S. ride-hailing company Uber Technologies Inc (UBER.N) and South Korean automaker Hyundai Motor (005380.KS) have teamed up to develop electric air taxis, joining the global race to make small self-flying cars to ease urban congestion.

Last year, Hyundai hired Shin Jai-won, a veteran aeronautics engineer from NASA, to head its newly established Urban Air Mobility Division, and pledged to invest 1.8 trillion won ($1.5 billion) in what it called “urban air mobility” by 2025.
Toyota makes a big bet on secretive flying taxi startup Joby Aviation

Toyota will work with Joby to design and build a fleet of vertical takeoff and landing (VTOL) aircraft for use in a ride-hailing service. The Japanese auto giant was part of a previous Joby funding round that closed in 2018, helping the secretive startup raise $100 million. Obviously Toyota liked what it saw, because it stepped up to lead this latest round of fundraising, bringing Joby’s total raise to $720 million. Joby recently announced a deal with Uber to deploy its air taxis on its ride-hailing network — though it’s unclear whether Toyota’s air taxis will make the cut.
Joby plans to build massive factory for aircraft in Marina
UAM Milestones Go Vertical: Joby Gets Toyota Funding, and What’s Apple’s Angle?

Last week, Joby Aviation raised $590mm in Series C funding led by Toyota, while Apple retained a specialist in drone aviation law as a Washington lobbyist. These events suggest that UAM is progressing faster than our previous expectations, and believe it is important that investors take note today.
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Urban Air Mobility is one of the most exciting areas of emerging technology today.

These vehicles have the potential to create new mobility options for millions and change how people travel to and around cities, as well as to and from rural areas. This potential has stimulated billions of dollars of investment in UAM technology. On January 8, 2020, I attended the Consumer Electronics Show in Las Vegas, Nevada. During my visit, I participated in a first-of-its kind roundtable on the future of Urban Air Mobility co-hosted by the Consumer Technology Association and the Aerospace Industries Association.

Let me share some thoughts about how the United States—specifically, the Federal Aviation Administration, which is part of the U.S. Department of Transportation—is approaching this technology.

First, as with every other mode of transportation, safety is our Number One priority. UAM aircraft, and the infrastructure that supports these novel operations, will require a level of safety commensurate with the complexity of any operation that engages in passenger carriage for hire. So the commercial availability of UAM technology in the United States will depend upon companies developing robust, reliable, and technically capable designs that have been shown to be compliant with the applicable airworthiness and safety regulations.

As you know, Urban Air Mobility vehicles are not helicopters or scaled-up drones. They are complex systems involving infrastructure, new systems and new aircraft. A segregated approach to airspace integration may work for initial, low-volume operations resembling existing helicopter corridors in large urban areas. But a long-term solution that accommodates hundreds- if not thousands- of these air vehicles operating simultaneously over urban landscapes is a complex challenge. It will involve advanced concepts in Air Traffic Management Systems and Trajectory Based Operations, to name a few.

The Department’s FAA will be working with state and local governments and stakeholders over the next two years to define the requirements for these unique types of operations. Let me note that, consistent with this Administration’s approach to new technologies, the FAA has shifted from prescriptive rules to performance-based regulations. This approach will ensure that, as UAM technology and operations evolve,
Six aircraft intended for urban air mobility application are “well along” in pursuing type certification with the Federal Aviation Administration, said Jay Merkle, head of the FAA’s UAS integration office, at the Transportation Review Board’s annual meeting in Orlando, Fla.

Commenting on future transportation technology coming to the world of aviation, Merkle ensured the audience that urban air mobility (UAM) is “more than just hype ... this is more than just promotional videos.” He described the sector as meeting future demand for regional aerial trips ranging from 30 miles to 300 miles.
Six Urban Air Mobility Aircraft ‘Well Along’ in Type Certification, FAA’s Merkle Says

By Brian Garrett-Glaser | January 14, 2020
Send Feedback

air taxi, certification, FAA

“"It is absolutely not true that there need to be all new regulations" governing UAM, Merkle said during a speech at AUVSI’s Xponential conference. “We really cracked the code on how to take decades-old aviation [rules] and get to the essence of each of those requirements and say 'What was the safety goal here?'”

“We found out through Part 23, we can really bring an aircraft through the process and address all the concerns,” Merkle said at the time.

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"We think that’s going to be a very important area over the next few years and we see that as we solve the problems with small UAS and beyond visual line of sight, we’ll be turning more and more of our attention to this urban air mobility," Merkle said. "To that end, we are continuing and starting to work on community engagement."

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Community Noise
Where we are today
Skyport Noise Goal Basis

Assumptions
- 400 foot stand off distance
- Stage 3 Appendix H Levels Approach EPNL Used
- Flights weighted to maintained constant 1 hour $L_{eq}$ including night time hour penalties

FAA Perspective
- 14 CFR Part 150 Appendix A Sec A150.101 Part B
- 65 DNL Acceptable for any community zoning region
- (including residential, schools, hospitals, churches)

Background noise data collection completed in Dallas-Ft Worth area, expanding to LA and Melbourne enabling Skyport selection with 65 dB compatibility
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Only limited helicopter operations are currently permitted within cities
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Each 3dB Reduction allows 2x More Operations

Need higher throughput for viable economics

Min. acceptable basis is to have equivalent impact with increased throughput
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(2) FATO + (6) Pad Skyport ~ 500 daily flights

(4) FATO + (12) Pad Skyport ~ 1,200 daily flights
Skyport DNL Contours

65 dB Day-night average sound level (DNL) contours are generated using FAA’s Aviation Environment Design Tool (AEDT)

40 daily operations

Helicopter

eVTOL

40 daily operations
Skyport DNL Contours

65 dB Day-night average sound level (DNL) contours are generated using FAA’s Aviation Environment Design Tool (AEDT).

- Helicopter: 40 daily operations
- eVTOL: 500 daily operations
Skyport DNL Contours

65 dB Day-night average sound level (DNL) contours are generated using FAA’s Aviation Environment Design Tool (AEDT)
Assumptions
Allowable Leq background increase of 1.5 dB(A) [FAA 5050.4B]
Stage 3 Appendix J Levels Used, Adjusted to 1000 feet

Residential Leq Levels

<table>
<thead>
<tr>
<th>City</th>
<th>Land Use</th>
<th>Expected [dBA]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>Sensitive</td>
<td>45</td>
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<tr>
<td></td>
<td>Residential</td>
<td>Day 50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Night 45</td>
</tr>
<tr>
<td>San Francisco</td>
<td>Residential</td>
<td>45</td>
</tr>
<tr>
<td>San Diego</td>
<td>Low Dens. Residential</td>
<td>Day 50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Night 45</td>
</tr>
<tr>
<td></td>
<td>High Dens. Residential</td>
<td>Day 55</td>
</tr>
</tbody>
</table>

23 Flights / hr  
San Francisco

74 Day Flts / hr  
San Diego Low Density Residential & LA

235 Day Flts / hr  
San Diego High Density Residential
Community Noise
Where we’re going in 2020
We are advancing noise on 3 major fronts
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Integrating noise into our Flux market simulations

Building ambient noise data layers into Flux

Overlaying DNL contours and AEDT data across simulated mission days

Designing dynamic networks and routes with ambient noise and AEDT as major constraints
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Communicating existing noise thresholds to cities and communities
- Collecting additional ambient noise data in launch markets and communities
- Informing city stakeholders of noise studies on regular bases
- Highlighting acoustic UAM impacts to city planners

Uber
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Codeveloping UAM noise metrics with city insights and feedback
- Coordinating with FAA and NASA on acoustic research and simulations
- Psychoacoustic / Human Perception tests
- Quantifying UAM impacts in cities with AC-150 and identifying gaps
- Continued assessment of Part 36 for eVTOL