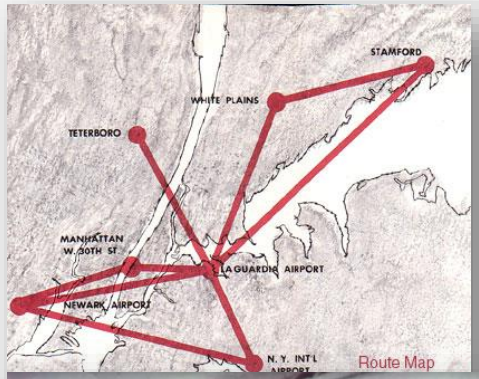
What is Urban Air Mobility?

The safe and efficient system for air passenger and cargo transportation within an urban area, inclusive of small package delivery and other urban Unmanned Aerial Systems (UAS) services, which supports a mix of onboard/ground-piloted and increasingly autonomous operations

https://www.nasa.gov/aero/nasa-embraces-urban-air-mobility

Evolution of Urban Air Mobility

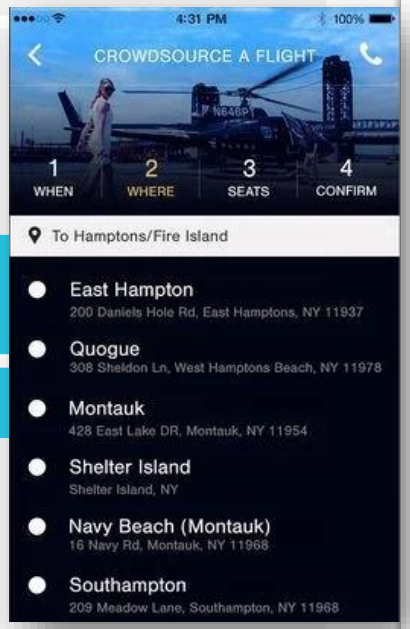


Giuliani Plans To Reduce Copter Flights

One Heliport to Be Shut, To Ease Noise Pollution

By CLIFFORD J. LEVY

Responding to a cascade of complaints about noise and safety, the Giuliani administration said yesterday that it would scale back the number of helicopter flights in New York City by closing one heliport and



1950s

- New York Airways offers passenger services between Manhattan and LaGuardia in the mid 1950s.

1960s and 70s

- Between 1965 and 1968 (resuming in 1977), PanAm offers first/last mile airport connections between JFK and Manhattan/Newark
- In May 1977, a rotor blade breaks off a helicopter on the roof of Manhattan's Pan Am Building, killing 5 people

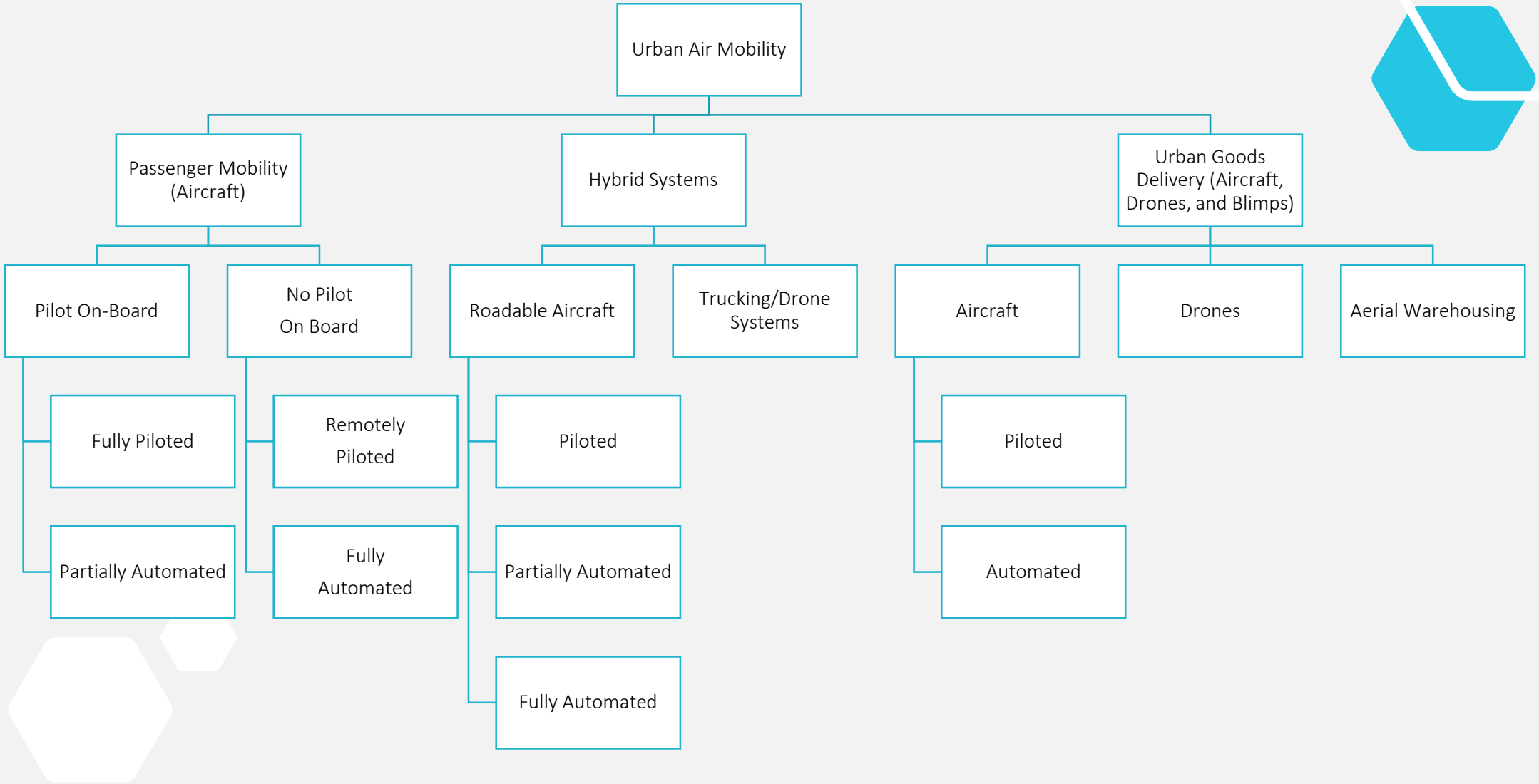
1980s

- Trump Air provides scheduled helicopter service between LaGuardia and Wall Street, connecting to Trump Shuttle flights.

2010s

- BLADE launches in 2014 offering on-demand helicopter service booked through a smartphone. BLADE arranges flights between passengers and charter operators
- In 2018, SkyRyde commenced on-demand flights within Southern California using a Cessna Turbo 182. Also links passengers with charter operators

Urban Air Mobility Taxonomy



(Cohen, Shaheen, Farrar 2019)

Urban Air Mobility Infrastructure

Vertipad:
A single landing pad for pick-up and drop-off with minimal service infrastructure (about ~50 feet x 50 feet)

Vertiport:
1-2 FATOs accompanied by 2-3 parking stands with charging facilities, and a small terminal

Vertihub:
A very large facility with 2 or more FATOs, multiple parking stands with charging facilities, and a larger terminal

Focus Groups Key Findings

- **Public perception of fully automated aircraft is one of the largest barriers.**
- **Cost is a primary consideration for public users when choosing a transportation mode.**
- **Personal security** was an important factor. Personal security includes confidence in aircraft, as well as feeling of security / safety from flying with potentially dangerous or unruly passengers.
- Some participants expressed **privacy concerns** (people flying overhead, sight lines into homes/yards) and increased noise levels as detractors.
- **Most would use UAM for short inter-regional trips** (DC to Baltimore, LA to OC) rather than inter-city.

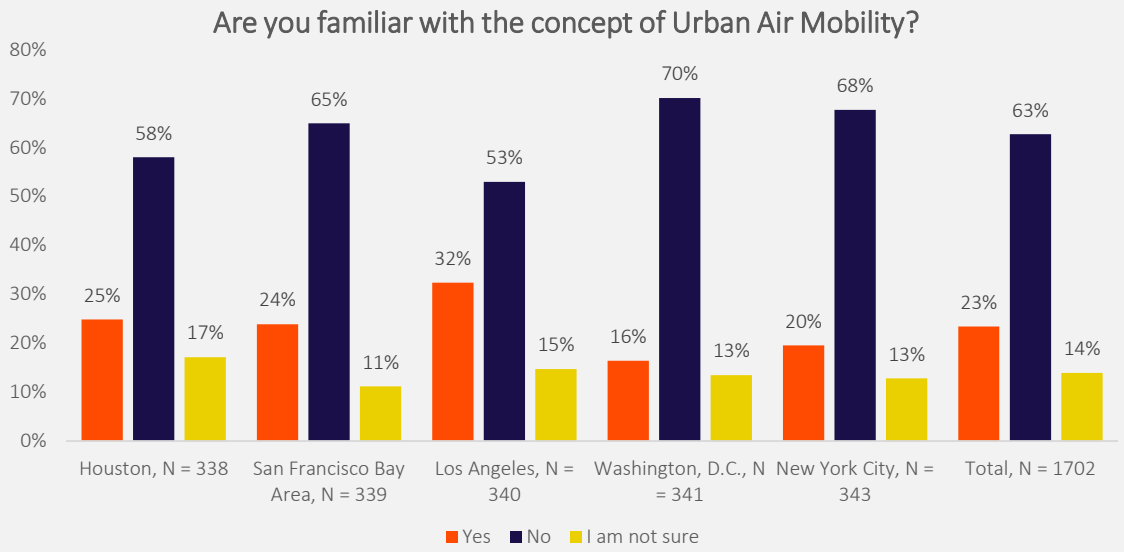
Survey Key Findings

Familiarity

- More respondents familiar to the concept of UAM in LA – perhaps due to increased exposure to concept.

Initial Reactions

- Generally, neutral to positive reactions to the UAM Concept, with some skepticism
- Reactions varied across demographic categories.



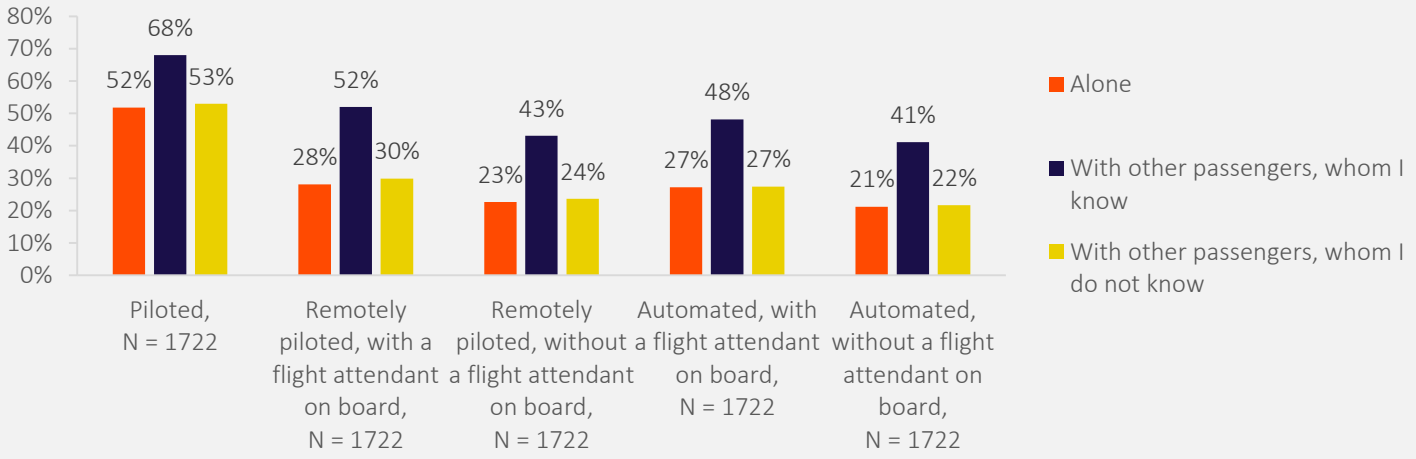
	Excited	Happy	Neutral	Confused	Concerned	Surprised	Skeptical	Amused
GEOGRAPHIC LOCATION				**Survey Results**				
Houston, N = 344	32%	24%	27%	8%	9%	11%	19%	3%
San Francisco Bay Area, N = 337	33%	25%	27%	8%	9%	11%	20%	3%
Los Angeles, N = 345	32%	24%	27%	8%	9%	11%	19%	3%
Washington, D.C., N = 341	32%	24%	27%	8%	9%	11%	20%	3%
New York City, N = 344	32%	24%	27%	8%	9%	11%	19%	3%
GENDER				**Survey Results**				
Female, N = 976	26%	22%	26%	10%	11%	11%	20%	4%
Male, N = 734	37%	23%	23%	6%	10%	8%	18%	4%
INCOME				**Survey Results**				
Less than $10,000, N = 78	14%	17%	40%	8%	3%	4%	10%	3%
$10,000 - $14,999, N = 53	19%	23%	30%	6%	6%	6%	6%	6%
$15,000 - $24,999, N = 101	25%	12%	36%	7%	3%	6%	7%	3%
$25,000 - $49,999, N = 212	28%	15%	27%	8%	5%	3%	11%	2%
$50,000 - $74,999, N = 210	28%	22%	25%	7%	4%	5%	8%	0%
$75,000 - $99,999, N = 192	30%	30%	14%	7%	5%	2%	9%	1%
$100,000 - $149,999, N = 182	36%	14%	25%	4%	6%	1%	12%	2%
$150,000 - $199,999, N = 101	27%	21%	20%	8%	6%	6%	9%	2%
$200,000 or more, N = 112	35%	12%	21%	7%	11%	4%	11%	0%
AGE				**Survey Results**				
18 - 24 years, N = 110	22%	25%	34%	5%	2%	4%	5%	2%
25 - 34 years, N = 271	32%	28%	19%	4%	4%	3%	8%	1%
35 - 44 years, N = 191	43%	16%	17%	6%	5%	2%	8%	3%
45 - 54 years, N = 132	30%	16%	21%	8%	9%	3%	9%	2%
55 - 64 years, N = 178	26%	15%	29%	9%	7%	4%	8%	1%
65 - 74 years, N = 169	14%	12%	33%	9%	6%	4%	18%	1%
75+ years, N = 42	10%	14%	31%	10%	7%	2%	24%	0%

Survey Key Findings

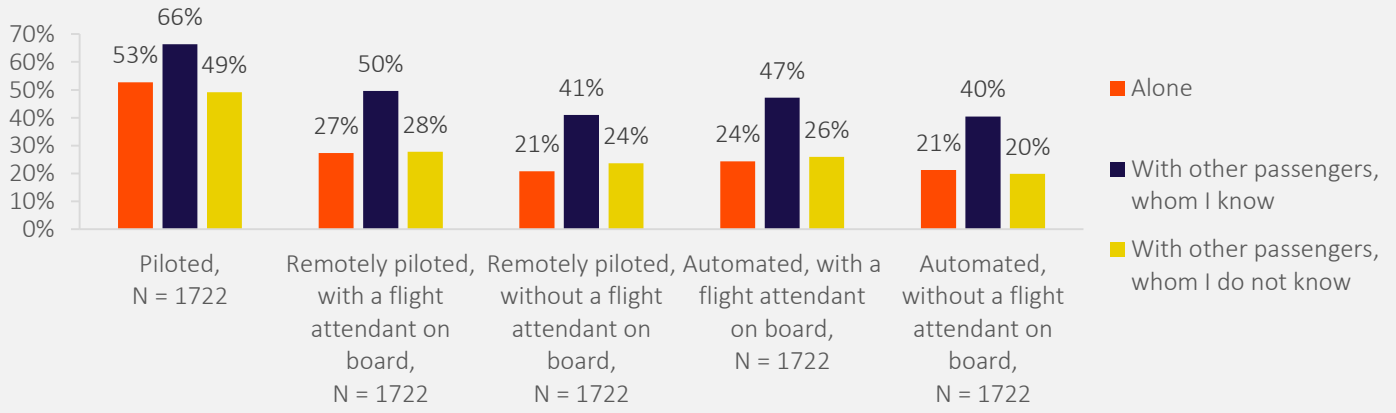
Willingness to Fly

- Respondents **most comfortable flying with passengers they know**; least comfortable flying with passengers they do not know
- **Some willingness and apprehension about flying alone** (particularly in an automated/remote piloted context)
- **Strong preference for piloted operations**; may need to offer mixed fleets and/or a discount for remote piloted/automated operations to gain mainstream societal acceptance
- Presence of **a flight attendant had minor impact willingness to fly** on **an automated or remote piloted** UAM aircraft.
- However, presence of **a flight attendant did increase confidence in automated and remote piloted operations from the non-user perspective**

Please select whether you would be **willing** to travel in an Urban Air Mobility aircraft in the following situations (i.e., piloted, remotely piloted, or automated) by yourself, and/or with other people on board.



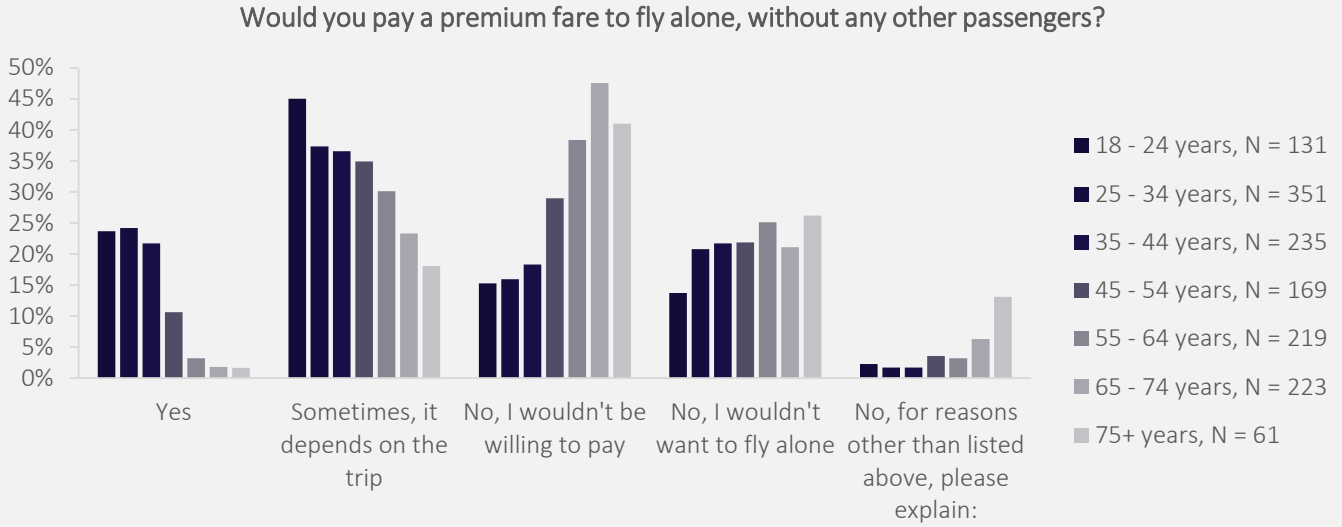
Please select whether you would be **comfortable** traveling in an Urban Air Mobility aircraft in the following situations (i.e., piloted, remotely piloted, or automated) by yourself, and/or with other people on board.
Please select all that apply.

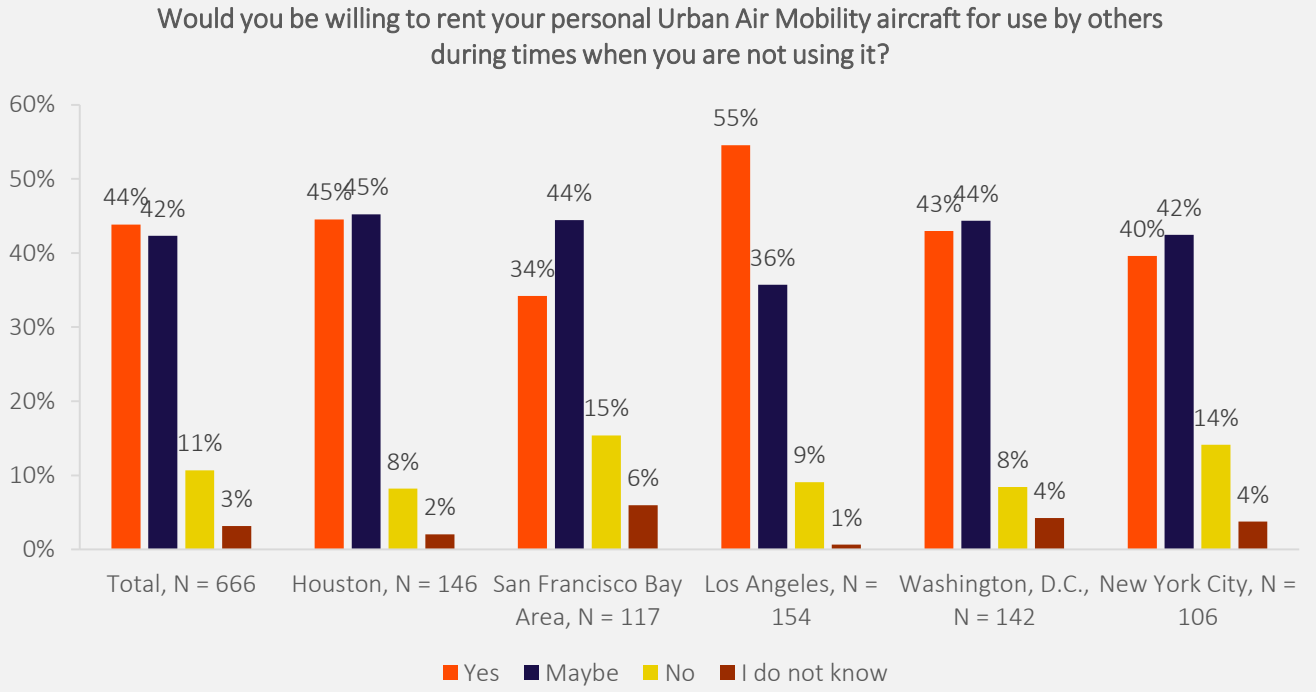


Survey Key Findings

Market Preferences and P2P Market

- **Preference for longer inter-city flights** (e.g., DC to Baltimore; LA to San Diego)
- **Some resistance to very short trips due to cost and potential inconvenience** (e.g., modal transfers, competitive travel times and price of other modes)
- **Some desire to pay a premium to fly alone** among younger and male respondents
- There could be a market for **peer-to-peer operations** that could help provide additional supply to scale the market (similar to Lyft and Uber)
- **Existing noise concerns focus on traffic noise during the night and early morning**; noise from UAM could pose a more notable barrier in future as electric vehicles become more mainstream (potentially causing a reduction in overall ambient noise, making UAM more noticeable)





Acknowledgements

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Study available at:
https://escholarship.org/uc/item/7p69d2bg

More research available at:
www.innovativemobility.org