AAM Corridors, Airspace Markets, and Integration

MERCATUS CENTER
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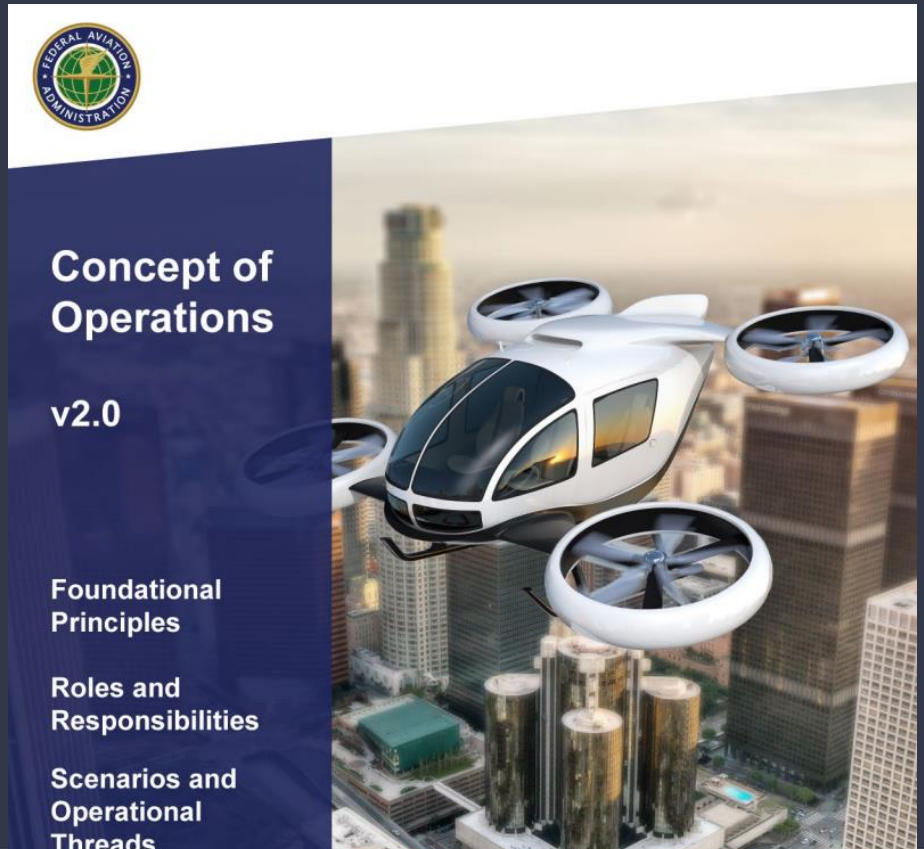
Outline

- AAM Corridors
- The Problem: Corridor Contests
- Proposal: Airspace Markets
- Precedents for Airspace Markets

AAM Corridors

FAA on Corridors, April 2023



FAA Illustrating UAM Corridors

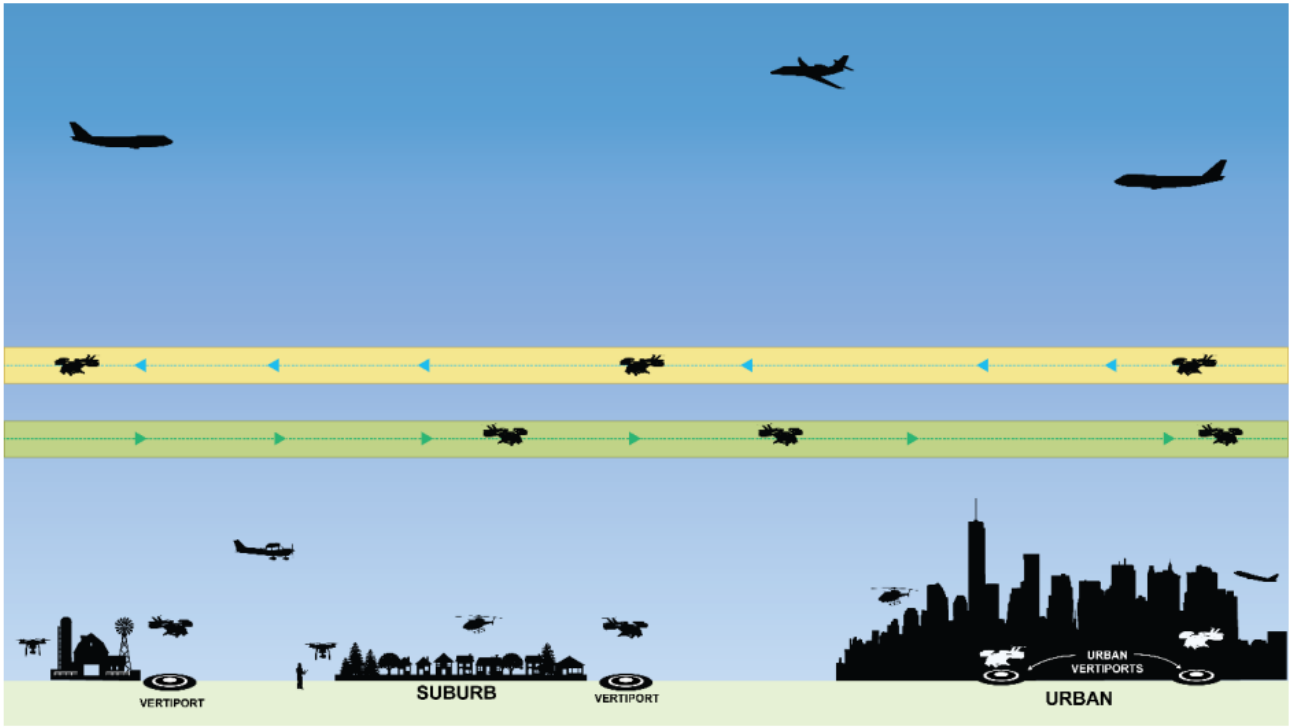


Figure 4: Early UAM Corridor Concept

FAA Illustrating UAM Corridors

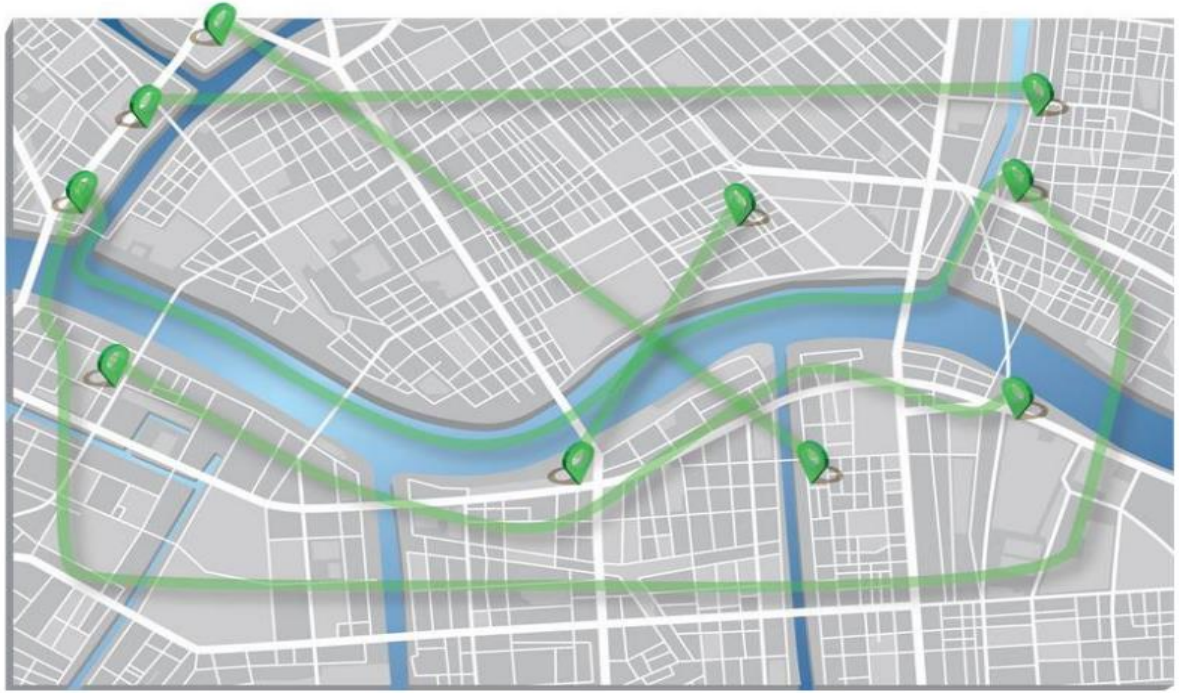


Figure 3: Notional Multiple UAM Corridors

FAA on UAM Corridors

Corridors are “an airspace volume within which cooperatively managed operations can occur.”

“ATC ensures separation of non-participating aircraft from the” corridors.

Corridor Traffic Management

FAA:

Within corridors, traffic management practices will be "collaboratively developed by relevant stakeholders and approved by the government."

Operators "cannot optimize their own operations at the expense of sub-optimizing the environment as a whole."

Corridor Allocation Mechanisms

Decker & Chiambaretto (2022):

Administrative allocation (no scarcity)
- First-come-first-serve, etc.

Multilateral Negotiations (during scarcity)

Auctions or Market Allocation (during scarcity)

Corridor Allocation Mechanisms

Decker & Chiambaretto (2022):

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The Problem: Corridor Contests

“How Much Airspace do You Need?”

Nathan J Robinson @NathanJRobinson · May 2

there's a very easy way to get information out of people's heads, it's called "asking them"

80 91 46 299K

John Brown stan account 🐿️ @thejb_stan · May 2

Hey man, how much of this scarce resource do you need?

“All of it”

Damn... that’s what everyone else said too

5 31 649 12.4K

The Problem: Corridor Contests

Prediction: Multilateral negotiations over shared corridors and terminals will create intractable disputes.

Incompatibility

Incompatible en route operations

- Cruise: Joby (200 mph)+ v. EHang (90 mph) v. Vertical Aeroscope (150 mph)
- Different PSU and UTM technologies

Incompatible FBO practices

- Fueling (hydrogen, battery) and maintenance
- Turnaround times

Incompatible business operations

- Passenger v. Freight

Exclusion

“Race to the regulator”

“It is likely that first movers will have an advantage by securing the most attractive sites along high-traffic routes.”

- McKinsey & Co. analysts (2019)

Resistance to new entrants

Effects of Multilateral Negotiatons

Industry fights and delays regarding:

- Operational norms and standards
- Capital investments and system upgrades
- New entrants

Proposal: Airspace Markets

Corridor Allocation Mechanisms

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Proposal: Airspace Markets

Government sales of high-demand AAM corridors to firms.

- Secondary markets, including buyers' ability to sell, sublease, and borrow against corridor assets

NOT laissez faire

- Operators subject to generally-applicable rules (certification, separation, emergency requirements, etc.)

FAA Illustrating UAM Corridors

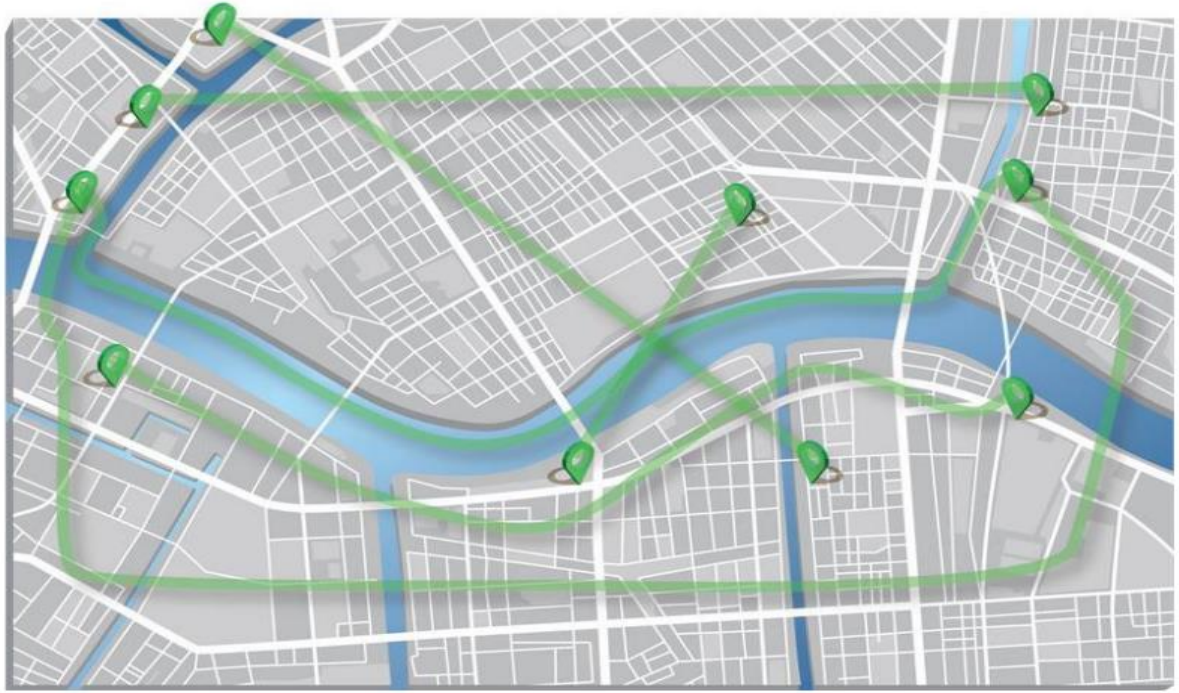

Figure 3: Notional Multiple UAM Corridors

Airspace Markets Papers

Brent Skorup, *Auctioning Airspace* (2018).

Christopher Decker & Paul Chiambaretto, *Economic policy choices and trade-offs for Unmanned aircraft systems Traffic Management* (2022).

Sven Seuken, Paul Friedrich, and Ludwig Dierks, *Market Design for Drone Traffic Management* (2022).

Hamsa Balakrishnan & Victor Qin, *Cost-Aware Congestion Management Protocols for Advanced Air Mobility* (2022).

MIT Airspace Markets Paper

Auctions offer an effective method of eliciting information useful for flight prioritization, while maintaining the privacy of aircraft operators and efficiently allocating resources.

Hamsa Balakrishnan & Victor Qin (MIT 2022).

Airspace Markets Benefits

No anticompetitive “route squatting” or exclusion

No politicized disposition of corridors

More FBO, aircraft, and systems investments since continued use is assured.

- Upgrade tech and performance without competitor permission
- Changes and upgrades internalized by corridor owner

New government revenues for a lease of a public asset

NASA Planned Research (2023)

NASA/TM–20230002647

UAM Airspace Research Roadmap Rev 2.0

Ian Levitt, Nipa Phojanamongkolkij, Adam Horn
Langley Research Center, Hampton, Virginia

Kevin Witzberger
Ames Research Center, Moffett Field, California

NASA Researching Airspace Markets

NASA:

> Mechanisms for ensuring equitable and efficient use of capacity-constrained resources, such as congestion pricing, airspace markets, multi-lateral negotiations, algorithm-based resource sharing, will be needed to be robust against strategic (gaming) behavior.

Concerns about Airspace Markets

Capital requirements and fairness

Monopoly and route hoarding

Novelty and complexity

Auctions (spectrum) v. Lease (offshore wind)

Precedents for Airspace Markets

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Airmail route markets (late 1920s)

Federal radio spectrum markets (present)

- Proposed in 1951, authorized by Congress in 1993

Federal offshore wind energy and oil sites (present)

NOT airport slots

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Thank you.

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