Motivation

Where can a vertiport be placed near Downtown Los Angeles?
Motivation

Can we assess the suitability of a vertiport near Los Angeles Mayor’s Office?
Advanced Air Mobility

- Research - safety and convenience, viability, infrastructure, scalability, traffic management, and public acceptance

- Benefits - mobility, commutes and deliveries, and decreased emissions and noise, and perhaps congestion

NASA

- ATM-X and AAM Project, AMIO*

- ConOps, Technical Challenges, Reference Implementations, Interoperability

- Series of simulations for UAM airspace management, high-tempo information exchange, connecting partners, and preparation for flight tests

*ATM=Air Traffic Management, AAM=Advanced Air Mobility, AMIO=AAM Mission Integration Office
Current Interest

• Three types of motivated entities
  – Regional
  – Vertiport developers
  – Vehicle manufacturers

• Researchers
  – Noise modeling
  – Surface mobility data
  – Ground congestion information
  – Vehicle flight route structure
Regional Modeling Tool
Vertiport Suitability

- Region/city parameters
- Zoning, environmental impact, intermodal systems, etc.
- Importance of attributes (rewards and penalties)
- Algorithmic aggregation and thresholding
- Location suggestions and vertiport selection
- Open architecture
Los Angeles Region
Zoning Attribute
Intermodal Systems

Grid (7x7 miles), each cell (~55 meters or ~185 ft)
Train Station Criterion ($A_i$)

Importance of attribute as a function of distance (or as a function of time)
Intermodal Systems
Composite Suitability

Los Angeles, CA
Composite Suitability

Columbus, Ohio
Final Result

Seven locations sent to City of Columbus Planning Department all considered acceptable. “Pleasantly surprised!”
Regional Simulation Tool

Vertiport Assessment and Mobility Operations System (VAMOS!)
Flight of UAM Vehicles

• Selected vertiport locations

• Route structure between locations

• Simulation of vehicle flight (models, winds, etc.)

• Impact on environment (noise, etc.)

• Assess frequency and density

• Reiterate, as necessary!
Final Result

Multiple Vertiport Locations and Vehicle Flight in Los Angeles

Modeling with WorldWind; Simulation can connect to TestBed
Additional Data Displays

3D Buildings

3D Airspace

Approach/Departure Surfaces
Ongoing work…

• CONUS-based experience
  - Go anywhere within the US
  - On-Demand data availability

• Temporal data handling
  - Specific data sets: congestion, demand, etc.
  - Display and compute capability

• Iterative intelligence
  - Integration of modeling and simulation tools
  - User in the loop

• Patent pending…
It is undesirable to place a vertiport between N. Spring St. and N. Broadway, downtown LA
Solution

It is NOT a good location for a vertiport
Bibliography

• Underlying map data © OpenStreetMap contributors www.openstreetmap.org/copyright and EOX.at https://maps.eox.at/#about / https://s2maps.eu/#license

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Questions?

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