



MIT

International Center for
Air Transportation

ATC Scalability as a Constraint for Urban Air Mobility Operations

Parker Vascik

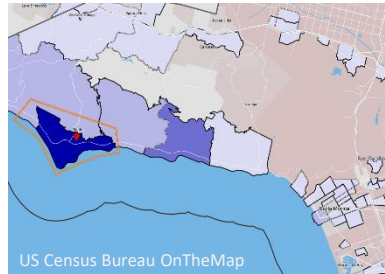
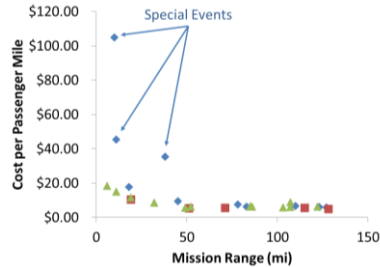
Challenges of Urban Air Mobility Airspace Panel

AHS Transformative Vertical Flight Workshop

1/19/2018

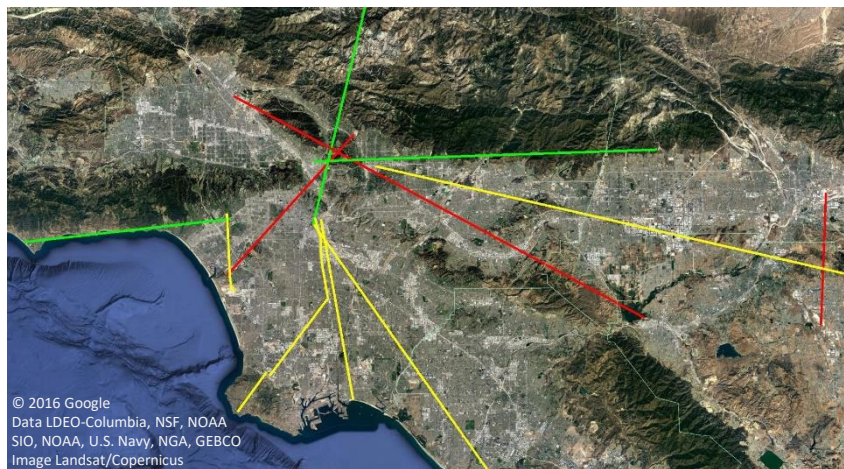
Case Study Approach to Identify Constraints in UAM System Operations (LAX, BOS, DFW)

1. Identified Promising Markets



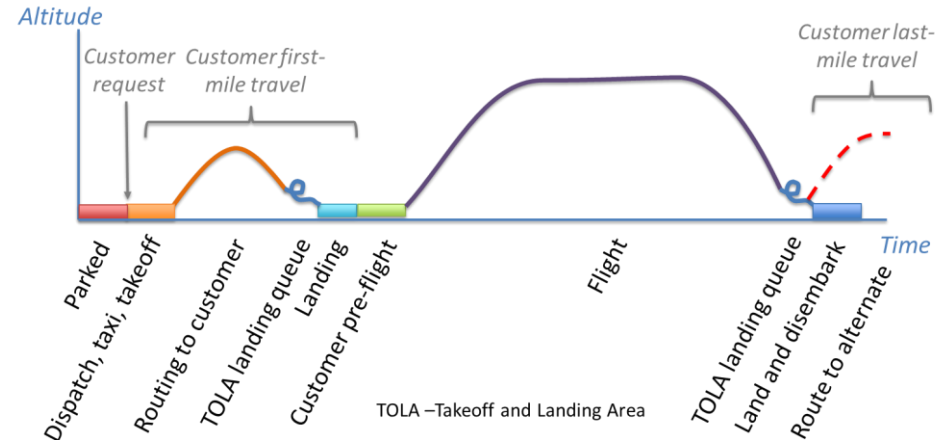
- Current helicopter charter services
- US census and commuting data
- Housing market data

2. Defined Reference Missions



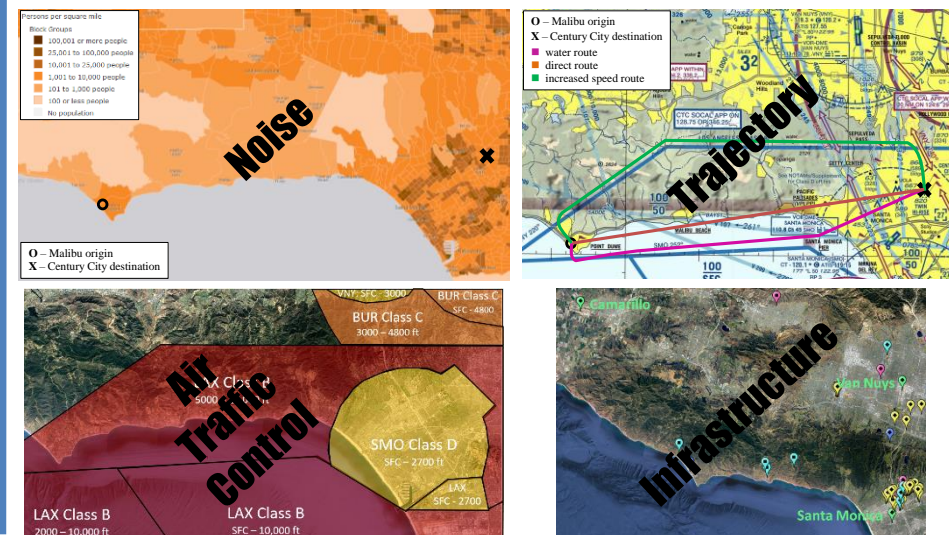
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Data LDEO-Columbia, NSF, NOAA
SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat/Copernicus

3. Applied Notional ConOps* to Each Mission

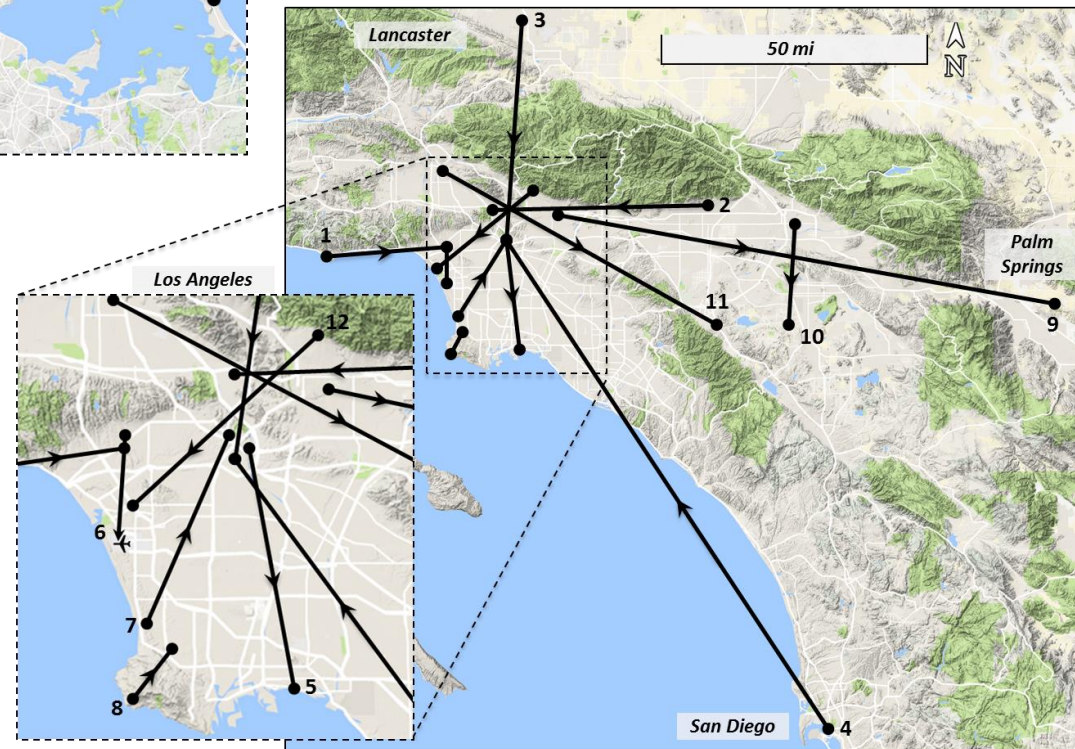
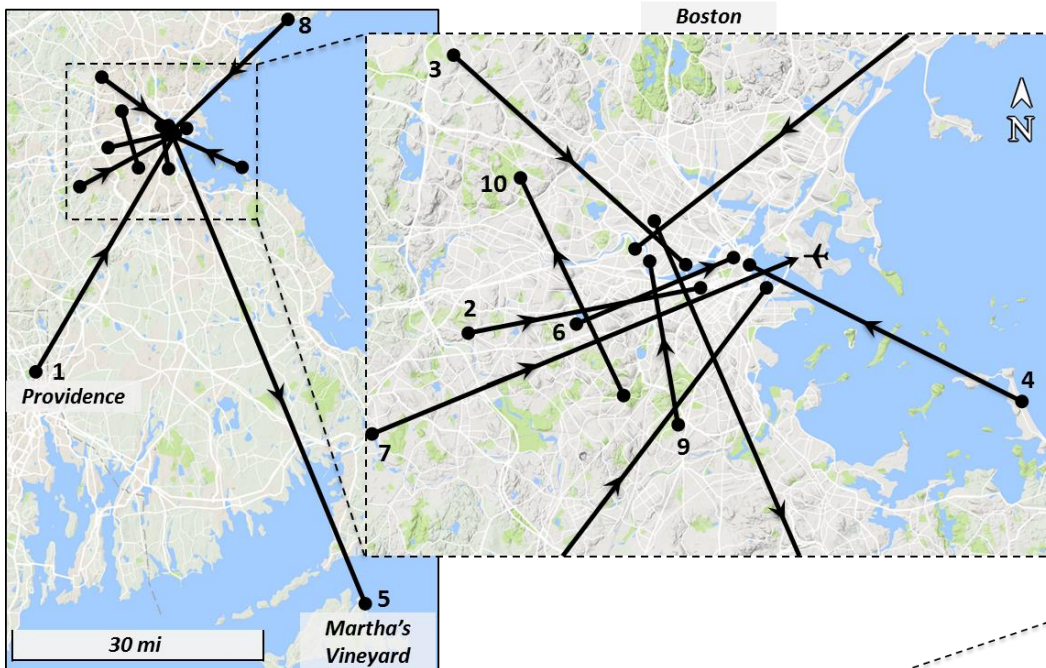


*ConOps assessed conventional technologies as well as electric propulsion and pilot automation

4. Identified Operational Challenges in Missions



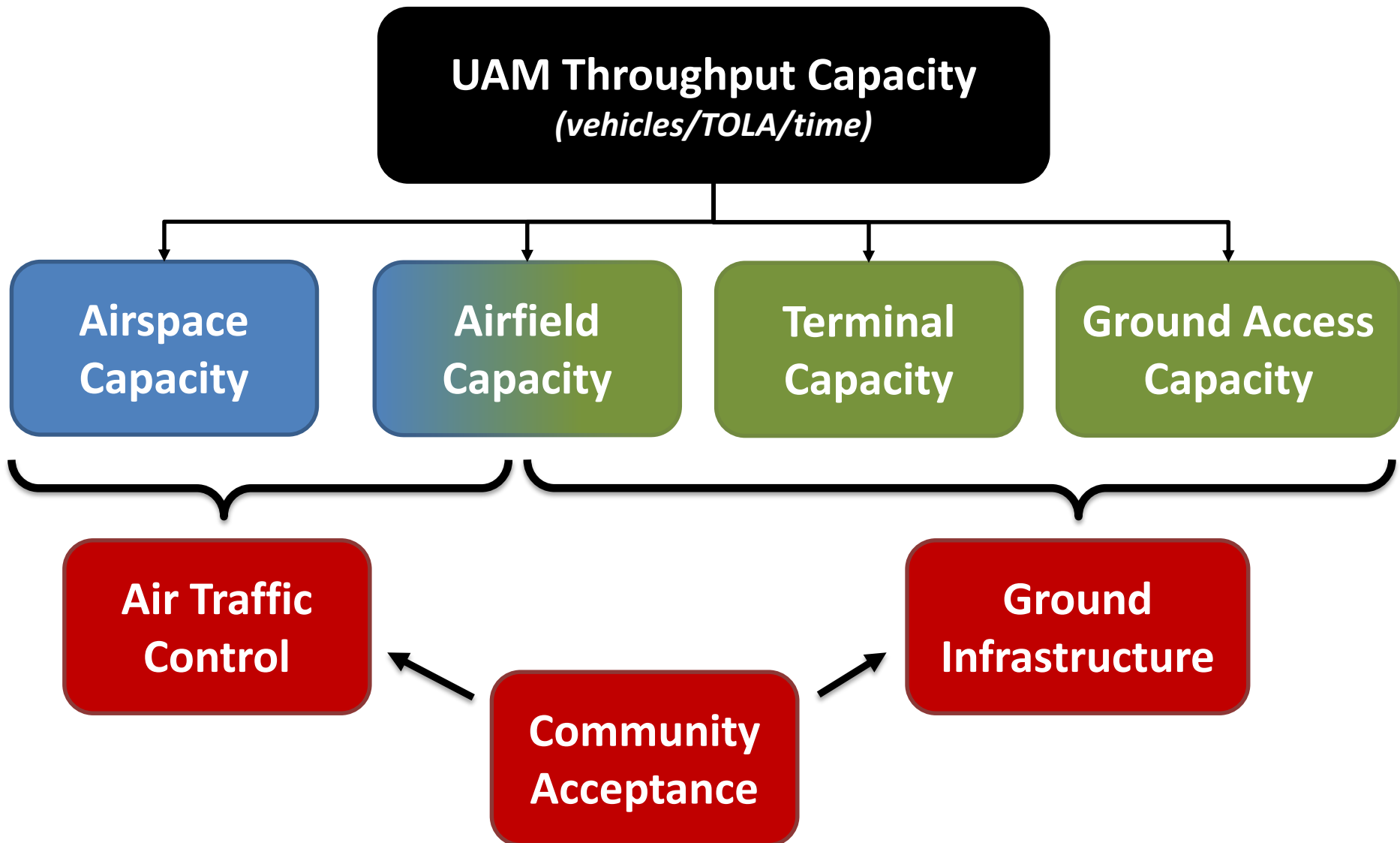
Boston and Los Angeles Reference Missions



Focus on Constraints with Highest System Risk (Probability and Impact)

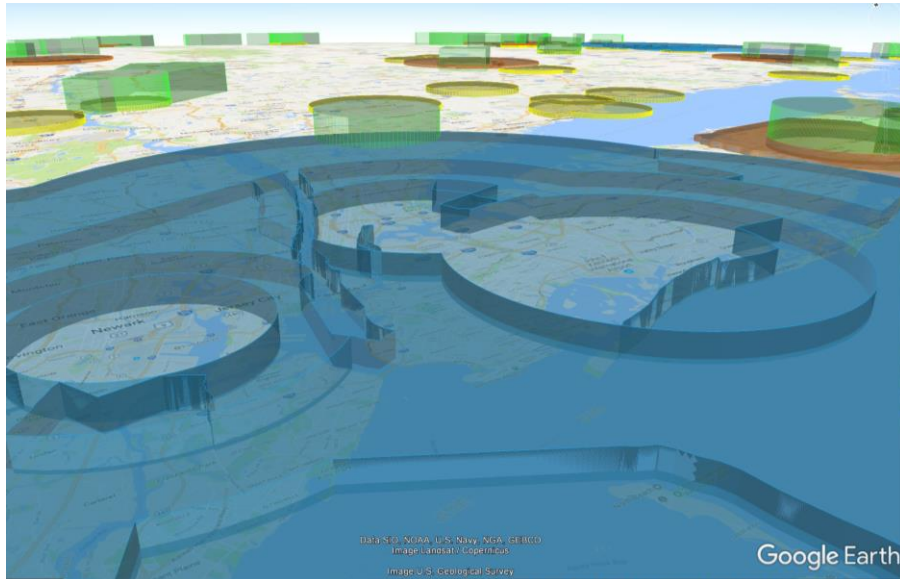
Constraints	
1	Aircraft Noise and Community Acceptance
2	Availability of Takeoff and Landing Areas (TOLAs)
3	Scalability of Air Traffic Control (ATC)
4	Safety and Certification of Electric Aircraft Operations
5	Logistics of Network Operations (deadhead, charging, etc.)
6	Pilot Availability
7	All-Weather Operation

High Level Interactions and Influence of UAM Operational Constraints

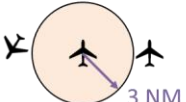




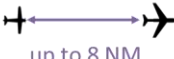
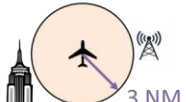




Key Mechanisms Impacting Airspace Sector Capacity

Airspace and Route Design



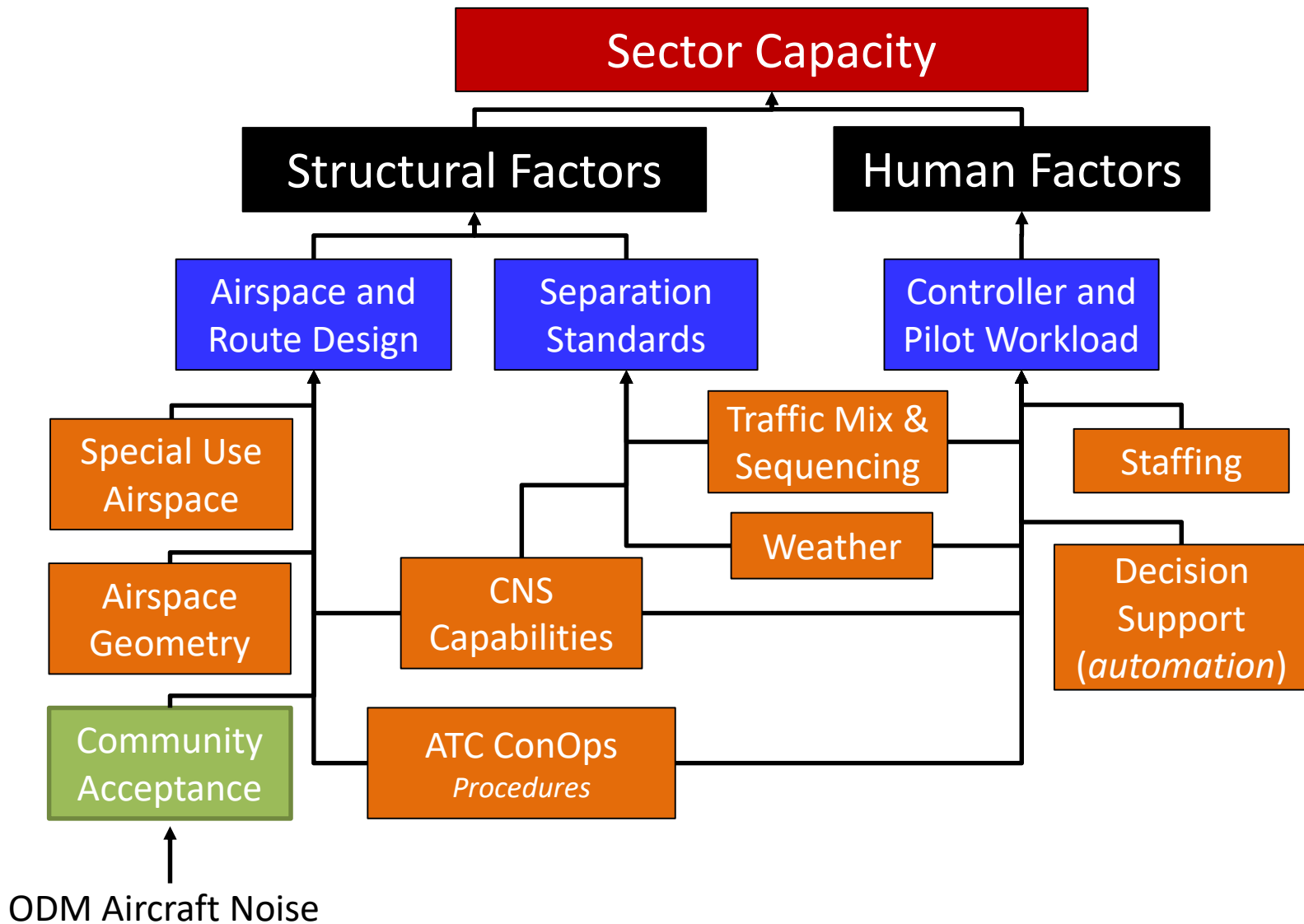
Separation Standards

Aircraft Involved	Lateral Separation Req.	Vertical Separation Req.	Longitudinal Separation Req.
IFR to IFR <i>All classes</i>	 3 NM	 1000 ft	 up to 8 NM
IFR to VFR <i>Class: B, C</i>	 Radar Target Resolution	 500 ft	 up to 8 NM
IFR to Obstruction	 3 NM	 1000 ft	-
IFR to Edge of Adjacent Airspace	 1.5 3 NM	-	-

Controller and Pilot Workload



ATC Scalability Influence Diagram



Thank You

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