Trends Driving Demand for ODM Air Mobility in Thin Haul and Intra-Urban Markets

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Topics

• Scope: Inter- and Intra-Urban Demand
• Definitions
• Strategic Trends Affecting Markets (The “Pull”)
• Emerging Technologies (The “push”)
• ODM / Thin Haul Strategic Innovation Premise

On-Demand Mobility (ODM) serves markets that are too thin for financially sustainable scheduled air service, and leverages technologies for sustainability, safety, affordability, and accessibility.
Distributions of Latent Demand for Intra- and Inter-Urban Air Mobility

Factors affecting Supply-Side Satisfaction of Latent Orig – Dest Demand
- Aircraft performance
- Fare (price)
- Geography
- Modal options
- Air- and Land-side Infrastructure adequacy
- Airspace services

Source: AirMarkets Simulation
Anonymous charter jet.
Proposed “Thin Haul” Definition

• Thin Haul demand side consists of latent demand markets of sufficient density for economic service by specified aircraft at specified fares.
• Thin Haul supply side consists of specified aircraft and fares that economically satisfy latent demand.
• Filling the gap requires a system innovation: Aircraft, Airspace, Business Models, Airport Systems.
"Thin-Haul" market vacuum provokes innovation in business models and aircraft.
As scheduled air carriers have consolidated to larger markets, larger aircraft, flying longer segments, the vacuum left behind in smaller markets frames and On-Demand opportunity.

Based on data from the US Department of Transportation, Bureau of Transportation Statistics.
Highways: Creating the Intra-Urban Opportunity

- In 2013, U.S. highway congestion cost the U.S. economy $124 Billion.
- Without significant action, this cost accumulates to $2.8 Trillion by 2030.
- EU faces similar congestion costs.
- ODM Intra-Urban opportunity.

Less than 20% of 52,000 U.S. city-pair markets have nonstop airline service. Thin Haul gains an advantage as airline non-stops decrease.
Generative methods for demand simulation are needed to capture these and other market dynamics.

- The over-55 market exhibits different consumption behaviors than younger consumers (time-rich, able to pay, hassle intolerant).

- The Millennials are creating the ”sharing economy” that re-shapes the ODM product design space (distributed costs, environmentally conscious).
Empirical Distribution of “Willingness to Pay”

Median Airline Price = $785

About 5% of Consumers Will Pay
~4.5 x Median Airline Price

This curve is representative of the fare distribution across over 18,000 global markets. About 5% of travelers will pay about 4.5 times the median price, or more. About 10% of travelers will pay about 2 times premium airline fares.
Disposable Income Trending

- A 40%+ rise in wealth translates into rise in demand for private aviation (in the context of worsening modal options)
- Much of this wealth will be in the hands of consumers with propensities to travel.
- Early adopters of ODM can fund the startup and evolution of the market.

**Chart 8: European wealth set to rise by 40% by 2019**

- **Source:** Eurostat, ECB, IMF, national statistical agencies, OECD, Julius Baer
Strategic Innovation Premise for ODM in Thin Haul and Intra-Urban Markets

• A large and growing underserved market opportunity exists for on-demand air mobility (ODM).
• These markets span demographics and trip distance market domains.
• ODM is “strategic” or “blue ocean” in the sense that it stimulates new, previously unreachable demand.
• Key enabling technologies:
  – Connected aircraft
  – Some autonomy and automation
  – Propulsion revolution
  – Ubiquity of airspace services
• The solutions generate significant value for our nation’s economy, environment, and quality of life.
Agent-Based Modeling (ABM) represents consumer behaviors for all travelers in all origins and destination for all modes of travel around the world.

An ABM produces probabilities of demand, market-by-market, mode-by-mode, with schedules and revenues, based on consumer behaviors and preferences.

The results support decisions by aircraft OEMs, fleet operators, airport authorities, and investors.
Enablers for Innovation in On-Demand Air Mobility Services

The “Right” Airplane
- Purpose-designed aircraft for on-demand air mobility

Real-time Logistics
- Per-Seat and Per-Plane management

Small World Networks
- Optimizing revenue management by designing the optimal networks

Airspace and Airports
- More autonomy in aircraft.
- More automation in airspace.

The technology push and the market pull are converging, for innovations in on-demand air mobility.
Factors Affecting Demand and Satisfaction for ODM Transportation

Demand-side (Consumer) Factors

- Value of Money and of Time
- Total Cost of Travel
- Preferred Journey Duration
- Age-Dependent Factors
- Schedule Inefficiency
- Perceived Comfort
- Privacy
- Consumer Awareness

Supply-side (Provider) Factors

- Price (Fare)
- Aircraft Performance
- Airport Accessibility
- Aircraft Availability
- Aircraft Acceptability
- Modal Options
- Cabin Comfort
- Booking Ease

These are key factors in forecasting demand!
Key Enabling Technology: Connected Aircraft

- Aircraft as nodes on the Internet.
- More efficient flight paths everywhere.
- Connected passengers.
- Connected Pilots

“Connected Aircraft” enable asset management efficiencies not previously possible.
Between 1990 and 2005, NASA, the FAA, industry and academia partnered to advance technologies for aviation system innovations.
The Settlers: U.S. On-Demand Business Model Innovators

Business Models (Parts 91K, 125, 121, 135)
- Branded Charter
- Brokered Charter
- Fractional
- Subscription Transport
- Jet Card
- Equity-building Jet Card
- Leasing
- Networked Air Taxi, per-seat
- Prop Card
- Pure Charter
- Corporate Shuttle
- Ride Sharing
The Natives: Our Legacy Airspace and Airport System

- Air Traffic Control manages airspace for safety, not for efficiency of time and cost.
- Current NextGen and SESAR beneficiaries are limited.
- New tools will give all airspace users more ways to improve performance.
- More widely distributed access and efficiency are needed.

Innovations in bandwidth-enabled apps for managing all aspects of flying will create new, previously unreachable benefits.
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