NASA Research for the Long Term Solution

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Global Challenges
Global Growth in Aviation
Opportunities and Challenges

2017
4 BILLION
PASSENGER TRIPS

Airbus / Europe

Bombardier / Canada

Embraer / Brazil

Global Competitors

41,030
New Aircraft Deliveries

$6.1 Trillion
Market Value

Asia-Pacific Market is Nearly
40% of New Aircraft Deliveries

2036
7.8 BILLION
PASSENGER TRIPS

78% of New Aircraft Deliveries are Single Aisle Class (including RJ)

Irkut / Russia

Comac / China

Global Competitors
Urban Air Mobility
Global Race to Achieve Leadership

These and many other U.S. and international competitors have the same vision and are capable of innovative vehicle design, development and flight demonstration.

Large projected market—McKinsey analysis of demand by 2030 in 15 major U.S. cities:
• 500 Million annual UAS package deliveries
• 750 Million annual passenger trips

Extrapolation to the global market would likely increase demand by 5 to 10x
Aeronautics Strategy and Program Structure
**Market: Large UAS & HALE**

- Supersonic Manned Aircraft
- Subsonic Fixed wing
- Large UAS
- Weather Tolerant Operations
- Droneport
- Distribution Center
- Vertiport at airport

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**Market: Thin/Short Haul**

- Large UAS
- Droneport
- Weather Tolerant Operations
- Vertiport at airport

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**Market: Small / Medium UAS**

- Weather Tolerant Operations
- Urban Vertiport

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**Market: Urban Air Mobility**

- Helicopter
ARMD continues to evolve and execute the Aeronautics Strategy [https://www.nasa.gov/aeroresearch/strategy](https://www.nasa.gov/aeroresearch/strategy)

NASA Aeronautics
NASA Aeronautics Vision for Aviation in the 21st Century

Global Sustainable
Transformative

U.S. leadership for a new era of flight
Research Programs Align with Strategic Thrusts

**Airspace Operations & Safety**
- **AOSP**
  - Safe, Efficient Growth in Global Operations
  - Real-Time System-Wide Safety Assurance

**Advanced Air Vehicles**
- **AAVP**
  - Ultra-Efficient Commercial Vehicles
  - Innovation in Commercial Supersonic Aircraft
  - Transition to Low-Carbon Propulsion

**Integrated Aviation Systems**
- **IASP**
  - Flight research-oriented, integrated, system-level R&T that supports all six thrusts
  - X-planes/test environment

**Transformative Aeronautical Concepts**
- **TACP**
  - High-risk, leap-frog ideas that support all six thrusts
  - Critical cross-cutting tool development
  - Assured Autonomy for Aviation Transformation
A New Era of Flight is Emerging

- NASA Aero’s vision and leadership has stimulated national and international aviation and non-aviation communities to pursue a new era of aviation:
  - UAS Integration into NAS
  - UTM
  - Electric aircraft
  - System wide safety
  - Supersonic aircraft