On-Demand Mobility (ODM)
Emerging Technology Strategy

Convergence across several technology frontiers is providing the opportunity to achieve transformative small aircraft capabilities that could enable new aviation markets through rapid technology adoption while establishing early certification for application to widespread aviation market use.

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Overcome Feasibility Barriers with New Technologies

Feasibility Barrier Goals

- Ease of Certification
  - Metric
  - Time/Cost Required

- Affordability
  - Metric
  - Total Operating Cost/Pax Mile

- Safety
  - Metric
  - Fatal Accidents per Vehicle Mile

- Ease of Use
  - Metric
  - Required Operator Training Time & Cost

- Door to Door Trip Speed
  - Metric
  - mph

- Average Trip Delay
  - Metric
  - Time

- Community Noise
  - Metric
  - Perceived Relative Annoyance @ Community Stand-off Distance

- Ride Quality
  - Metric
  - Passenger Comfort Index

- Efficiency
  - Metric
  - Energy/Pax Mile

- Lifecycle Emissions
  - Metric
  - Total Emissions /Pax Mile

Research Objectives (Relative to Reference Baseline Aircraft)

- Decrease Operating Cost
  - Metric
  - % reduction

- Decrease Acquisition Cost
  - Metric
  - % reduction

- Reduce Infrastructure Integration Costs
  - Metric
  - % reduction

- Reduce Infrastructure Integration Costs
  - Metric
  - % reduction

Example Technologies

- Electric Propulsion
- Automotive and Additive Manufacturing
- Leverage Nextgen Capabilities
  - Solid Oxide Fuel Cells (hydrocarbon fuel infrastructure)
Technology Roadmaps with Early Certification/Adoption

**2015**
- SCEPTROR Flight Demo
- Thin-Haul Studies
- High Aspect Ratio Wings
- Fuselage BLI Propulsion

**2020**
- Distributed Electric Propulsion Certification Standards
- Thin-Haul Commuter Flight Demo
- High Voltage Power Systems
- Multi-functional Structural Batteries
- Redundant/Robust Electric Architectures
- Spread Frequency/Phasing DEP Acoustics

**2025**
- 3-5x Lower Energy Use
- -15 dB Community Noise
- Robust-Redundant Low Speed Control
- Airliner-like Ride Quality
- -25% DOC
- Simplified Vehicle Operation
- Regional Turbo Prop Hybrid-Electric Flight Demo
- Hybrid Range Extender APUs
- Cross-Disciplinary DEP Studies
Apply Technologies Across Diverse Aviation Markets

Reference CTOL Mission: Thin-Haul CTOL Commuters

Scale-down Mission: Advanced General Aviation CTOL Aircraft
Scale-up Mission: Regional Commercial Airliner

Reference VTOL Mission: Urban VTOL Air-Taxi’s

Scale-down Mission: Package Delivery VTOL sUAS
Scale-up Mission: Urban VTOL Buses
Emerging Technology Capabilities and Market Adoption Path

Simplified Vehicle Operations
- Instead of a user base of 40,000 or 600,000 pilots; 40 to 60 million potential users
- Safety equivalency to automobiles

Electric Propulsion and Configuration Integration
- High speed cruise efficiency in near-term with 200 to 400 mile range
- Operating costs 20%+ lower, carbon emissions 5x lower, highly redundant reliable propulsion

Airspace Integration
- Digital/voiceless navigation communications
- Connected aircraft with 4g omnipresent networks

Manufacturing, Integrated Structures and Community Impact
- Low cost, high quality products at low production volumes
- Ultra-low community noise at close proximity with failsafe recovery modes