NASA Aeronautics Research – Embarking on the Next 100 Years of Excellence in Aeronautical Innovation

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Traditional measures of global demand for mobility - economic development and urbanization - are growing rapidly and creating transportation and competitive opportunities and challenges.

Revolutions in the integration of automation, information, communication, energy, materials and other technologies enable opportunity for transformative aviation systems.

Large and growing energy and environmental issues create enormous affordability and sustainability challenges.
Safe, Efficient Growth in Global Operations
  • Enable full NextGen and develop technologies to substantially reduce aircraft safety risks

Innovation in Commercial Supersonic Aircraft
  • Achieve a low-boom standard

Ultra-Efficient Commercial Vehicles
  • Pioneer technologies for big leaps in efficiency and environmental performance

Transition to Low-Carbon Propulsion
  • Characterize drop-in alternative fuels and pioneer low-carbon propulsion technology

Real-Time System-Wide Safety Assurance
  • Develop an integrated prototype of a real-time safety monitoring and assurance system

Assured Autonomy for Aviation Transformation
  • Develop high impact aviation autonomy applications
Reducing Environmental Impacts
ERA Large Scale Structural Test of a HWB Stitched Composite Fuselage Section

Hybrid Wing Body Aircraft

Test Article Installed in the LaRC COLTS Facility

Test Article Arriving at LaRC in the Super Guppy

Large Scale Test Article under Development

Small Scale Component Tests

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Enabling NextGen – Trajectory Based Operations
Transitioning Technologies from NASA to FAA

Tailored Arrival Concept

Utilizes NextGen Infrastructure & Capabilities:
- ADS-B Out/In
- RNAV arrivals
- Optimum profile descents (OPDs)

Tailored Arrival Concept

Controller-Managed Spacing

Traffic Management Advisor with Terminal Metering

Flight Deck Interval Management

Terminal Sequencing and Spacing Technology Transfer
NASA studies and industry roadmaps have identified hybrid electric propulsion systems as promising technologies that can help meet national environmental and energy efficiency goals for aviation.

**Potential Benefits**

- Energy usage reduced by more than 60%
- Harmful emissions reduced by more than 90%
- Objectionable noise reduced by more than 65%
Goals:
• Safely enable civilian low-altitude operations within 5 years in near-term, and
• Develop autonomous UAS Traffic Management (UTM) to accommodate massive scale

Partnerships
NASA will be UTM technology developer and conduct collaborative tests
Partnerships: FAA, NOAA, Vehicle manufacturers, test sites, DOI, insurance companies, academia, communication, surveillance, system integrators, etc.

Examples: Google, Amazon, Verizon, 3DRobotics, Airware
Summary

High Impact Results
• Economic Growth
• High Quality Jobs
• Revolutionary Mobility
• Long-Term Sustainability

Urgent Drivers

Innovative Solutions and High Payoff Technologies

Compelling Thrusts