

NASA's Langley Research Center

HAMPTON, VIRGINIA



Hampton Roads AUVsi Expo
Langley Aeronautics Research

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Aeronautics

Fly Everywhere



IMPROVE



INVENT



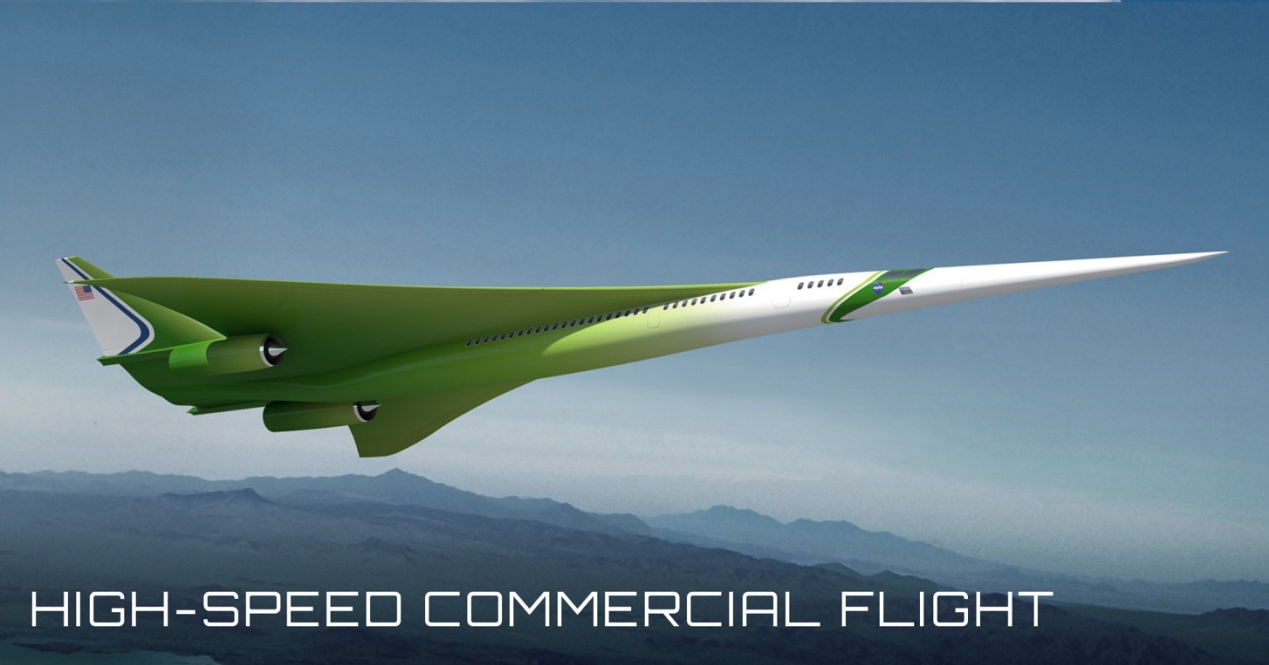
TRAILBLAZE



ULTRA-EFFICIENT TRANSPORT



FUTURE AIRSPACE



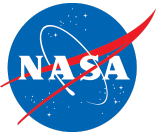
HIGH-SPEED COMMERCIAL FLIGHT



ADVANCED AIR MOBILITY

Langley Aeronautics Research Directorate

Portfolio Overview



LBFD



X-57 Maxwell



EPFD



RVLT



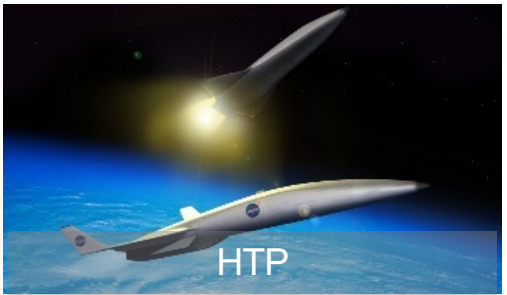
AATT



CST



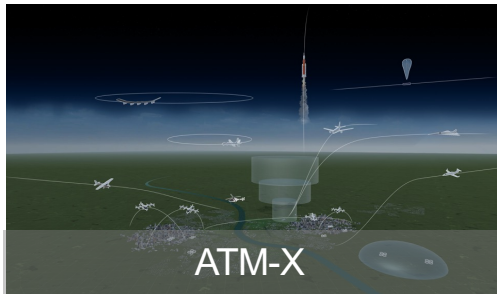
HiCAM



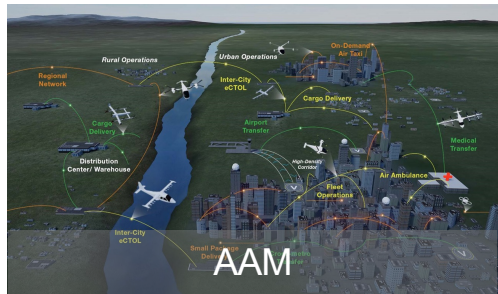
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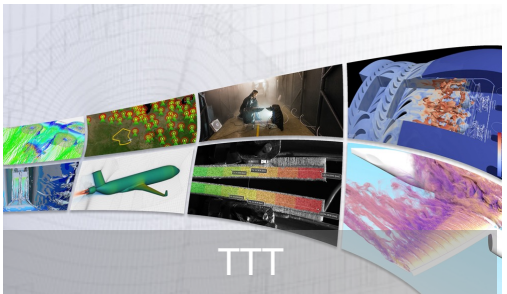
SWS



ATM-X



AAM



TTT

Langley aeronautics brings aviation solutions to solve society's biggest problems



Advanced Air Mobility Missions are Emerging



CARGO
TRANSPORT



PUBLIC GOOD



CONSUMER/
ENTERPRISE
GOODS AND
SERVICES



PASSENGER
TRANSPORT

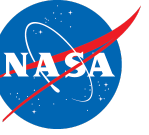


Advanced Air Mobility Mission



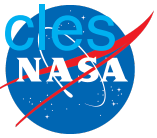
Safe, sustainable, affordable, and accessible aviation
for transformational local and intraregional missions

Enabling Technologies: Vehicles, Vertiports, Autonomy, and Airspace



NASA's RVLТ Project Provides Tools and Design Practices for AAM eVTOL Vehicles

Focus on Barriers of Noise and Safety to Enable New Markets

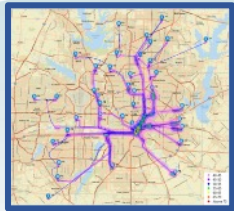


Noise Research

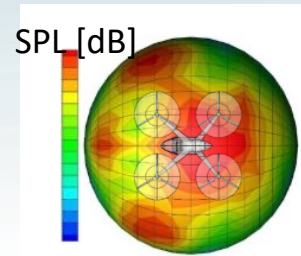
Safety Research



Human Response to AAM Noise



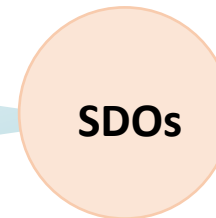
AAM Acoustic Impacts



Predictive Tools for AAM Noise



Share technical insights and lessons learned



Electric Powertrain Reliability



Handling Qualities



Crashworthiness & Occupant Protection

Inform eVTOL Systems Standards and Certification

High Density Vertiport AOA Simulation and Flight Testing



ROAM UAS Ops Center (LaRC)

- Primary control stations
- Shared SA
- Sim or Flight
- Data integration and distribution

CERTAIN (LaRC)

- sUAS multi-vehicle
- Extended Visual Line of Sight ops



LARC_V1_T1_STAR_0



C_V1_T1

V1_V1

1-SID

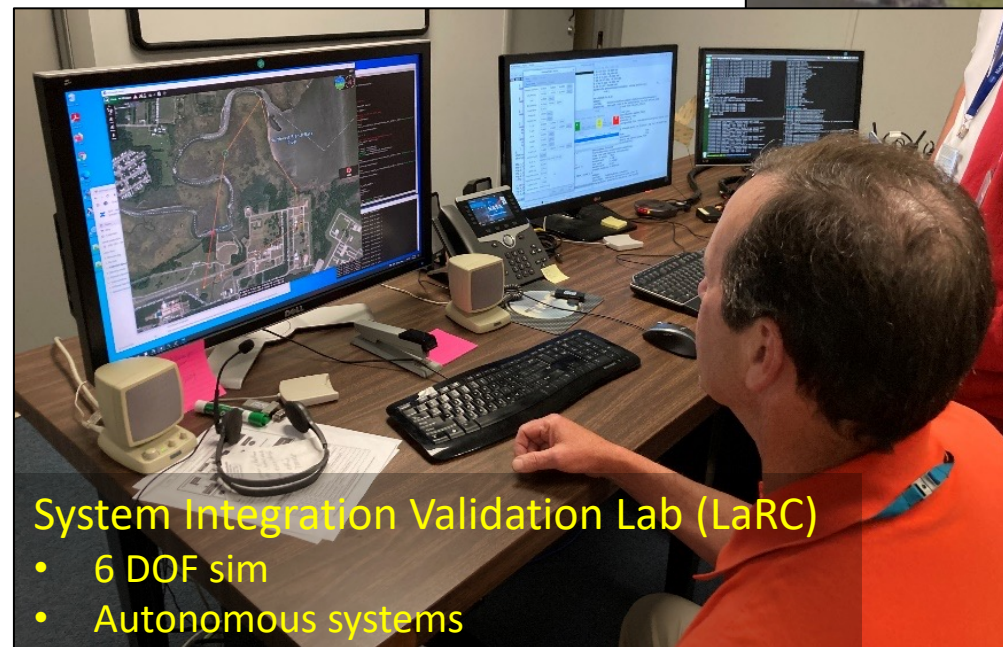
Hunsaker Loop

Image Landsat / Copernicus



AOL (ARC)

- Fleet manager
- ATM-X Provider of Services UAM interface
- Multi Aircraft Control System Sim



System Integration Validation Lab (LaRC)

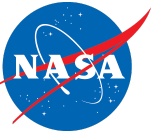
- 6 DOF sim
- Autonomous systems



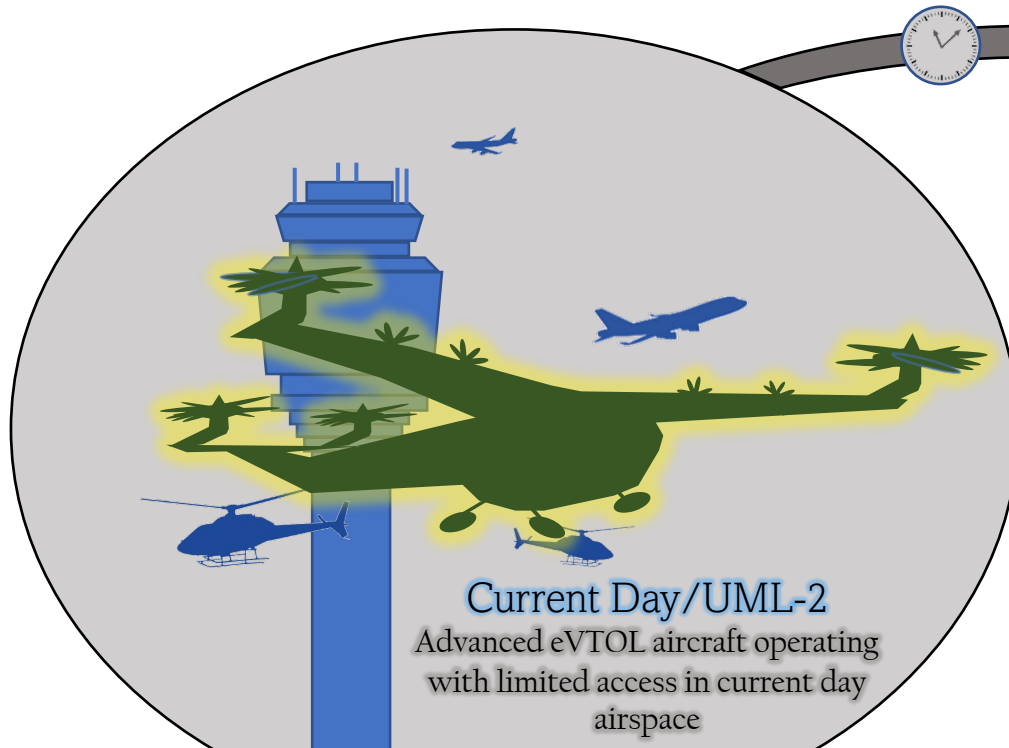
AVAL (ARC)

- Vertiport Manager

Automated Flight & Contingency Management (AFCM)



Informing safety and regulatory requirements for increasingly automated advanced aircraft through data-driven research and analysis



Pilot-Assistive Automation

Airworthiness
Requirements

Pilot
Awareness

Compliance
Demonstration

Conflict Detect & Avoid



Safe Responsible Automation

Strategic Path
Management

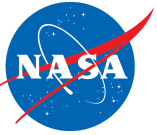
Integrated
Displays

Automated Tactical
Conflict Management

Support Data Requirements

Planning to Achieve a Sky for All

Imagining tomorrow's aviation system today



Sustainable Solutions

Seamless Skies



Ubiquitous and Resilient Operations

Operator Optimization

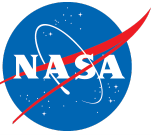


Learning-Based Systems and Communities

- NASA-led effort to gather inputs from the aerospace community and FAA
- Co-developed vision of a mid-21st century shared airspace that is agile, scalable, optimizable, increasingly diverse, and equitable
- Evolution from trajectory-based operations to collaborative and highly automated operations
- Sky for All results will inform ARMD research and development portfolio and collaboration with FAA

SKY^{for}ALL

City Environment Range Testing for Autonomous Integrated Navigation (CERTAIN) Capabilities



Airspace

- 800 Acres of **Urban** and **Rural** Airspace
- FAA COA and LAFB Letter of Procedure
- 400' altitude, 125 lbs vehicle weight
- Class D airspace, reverting to Class G

Technology

- NextNav Local Positioning System
- Safeguard Range Containment System
- ClearCom voice communication system
- Radar and RF detection systems installed
- GPS Predictive Quality Services
- UAS Mission Assessment Tool (UMAT)



Data Collection

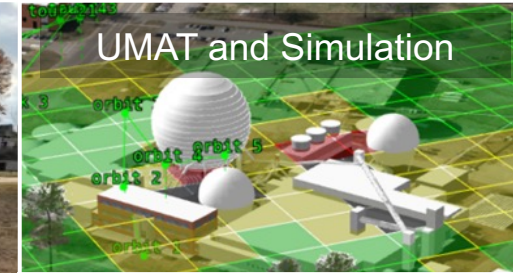
- Telemetry
- Local Weather Stations
- Data networking

Infrastructure

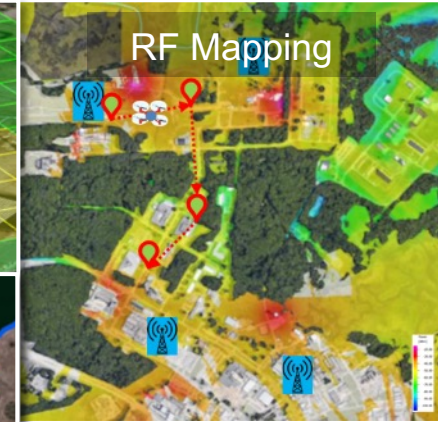
- Spectrum Management Office
- Rooftop Access and Operations
- Indoor flight/testing capability
- Improved surface for fixed wing operations
- UAV test vehicles
- Safety Process and Procedures
- Simulation capabilities
- Mobile Operations Trailer



Center Wide Operations



UMAT and Simulation



RF Mapping



Drone Cages



RF Detection



Rooftop Ops



Vertiport 1



LSTAR Radar

