



The Aeronautics Research Mission Directorate - the First “A” in NASA

Jennifer Cole
NASA Armstrong Flight Research Center
Aeronautics Research Mission Directorate
June 10, 2016

NASA Mission Directorates



Aeronautics Research (ARMD)



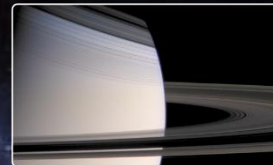
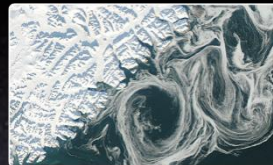
Human Exploration and Operations (HEOMD)



Space Technology (STMD)



Science (SMD)



Mission Support (MSD)



NASA Mission Directorates



Aeronautics Research (ARMD)



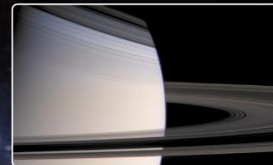
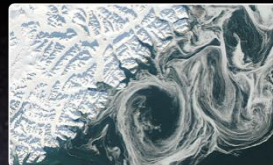
Human Exploration and Operations (HEOMD)



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NASA Aeronautics

NASA Aeronautics Vision for Aviation in the 21st Century



Safe, Efficient Growth
in Global Operations



Innovation in Commercial
Supersonic Aircraft



Ultra-Efficient
Commercial Vehicles



Transition to
Low-Carbon Propulsion



Real-Time System-Wide
Safety Assurance



Assured Autonomy for
Aviation Transformation

U.S. leadership for a new era of flight



NASA Aeronautics Research Six Strategic Thrusts



1.



Safe, Efficient Growth in Global Operations

- Enable full NextGen and develop technologies to substantially reduce aircraft safety risks

2.



Innovation in Commercial Supersonic Aircraft

- Achieve a low-boom standard

3.



Ultra-Efficient Commercial Vehicles

- Pioneer technologies for big leaps in efficiency and environmental performance

4.



Transition to Low-Carbon Propulsion

- Characterize drop-in alternative fuels and pioneer low-carbon propulsion technology

5.



Real-Time System-Wide Safety Assurance

- Develop an integrated prototype of a real-time safety monitoring and assurance system

6.



Assured Autonomy for Aviation Transformation

- Develop high impact aviation autonomy applications



ARMD - Programs





AOSP – Airspace Operations & Safety Program



ATD - Airspace Technology Demonstrations



SMART-NAS - Shadow Mode Assessment Using Realistic Technologies for the National Airspace System



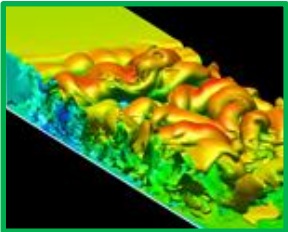
SASO – Safe Autonomous Systems Operations



TACP – Transformative Aeronautics Concepts Program



CAS - Convergent Aeronautics Solutions



TTT - Transformational Tools and Technologies



LEARN - Leading Edge Aero Research for NASA



IASP – Integrated Aviation Systems Program



ERA – Environmentally Responsible Aircraft



UAS in the NAS – Unmanned Aircraft Systems Integration in the National Airspace System



FDC – Flight Demonstrations and Capabilities



Coming in FY17 - New Aviation Horizons (NAH)



AAVP – Advanced Air Vehicles Program

AETC – Aeronautics Evaluation and Test Capabilities



AATT – Advanced Air Transport Technology



AC – Advanced Composites



CST – Commercial Supersonic Technology

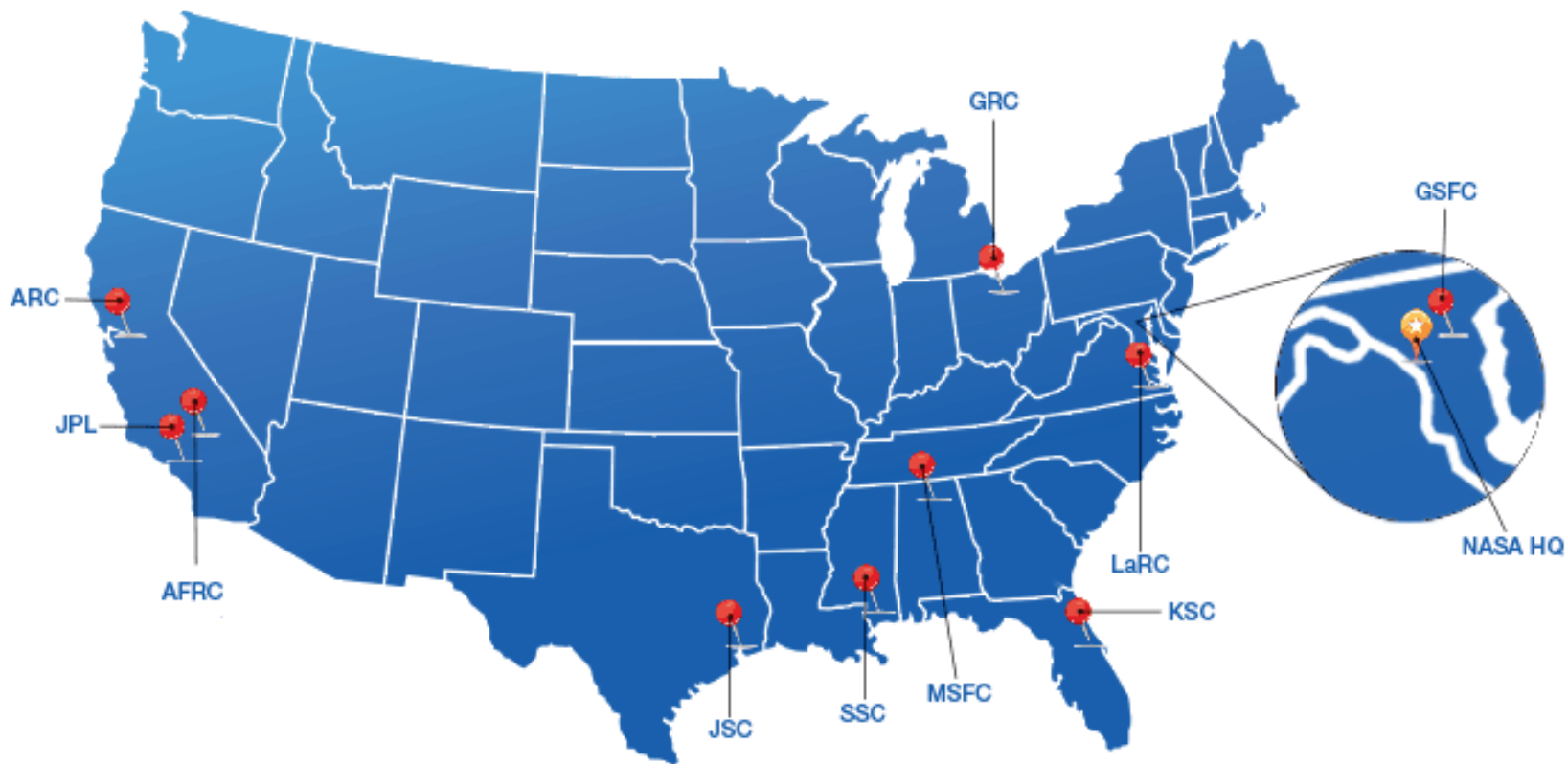


RVLT – Revolutionary Vertical Lift Technology



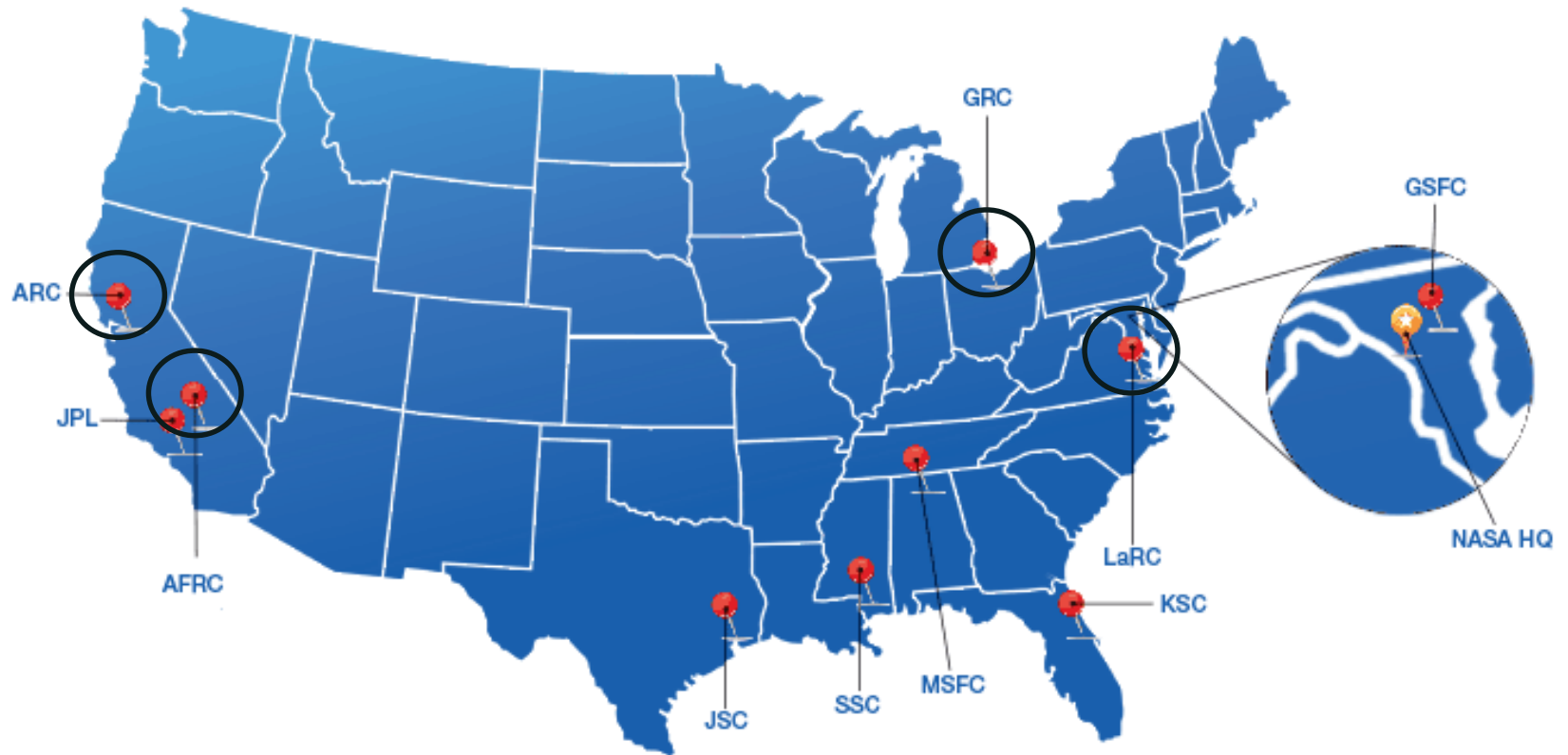


NASA Centers - ARMD





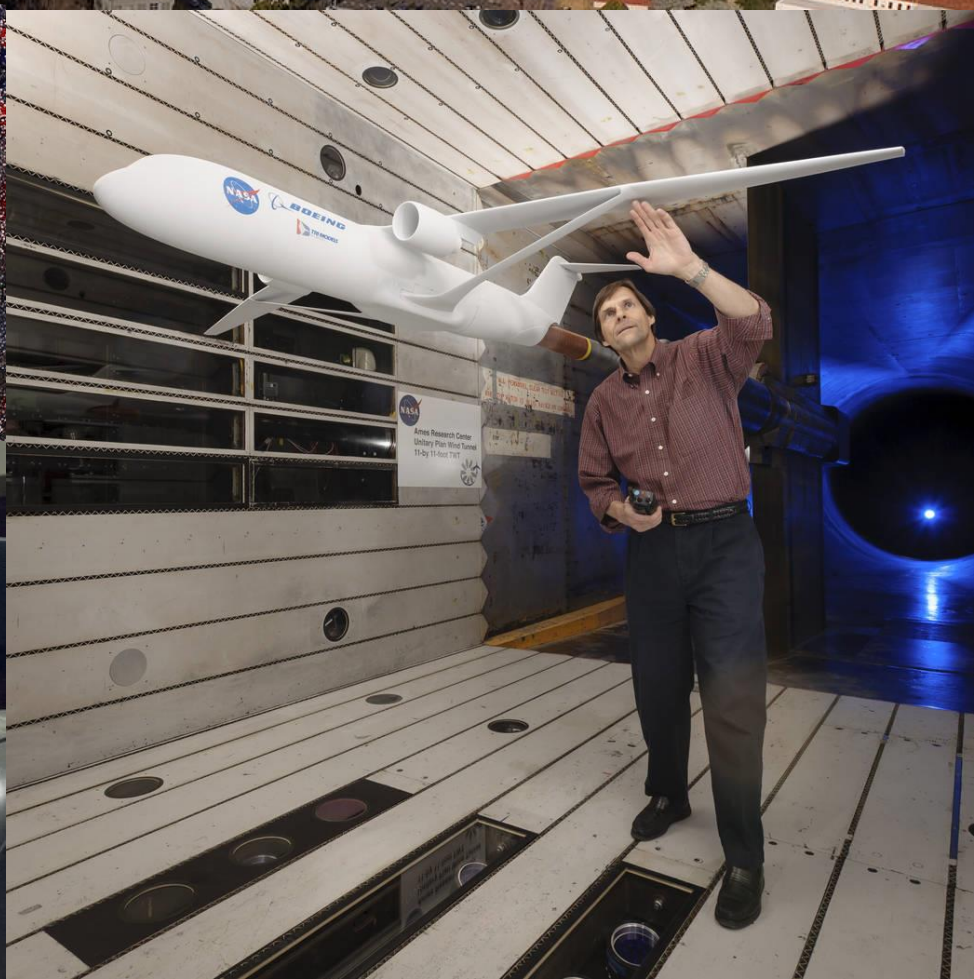
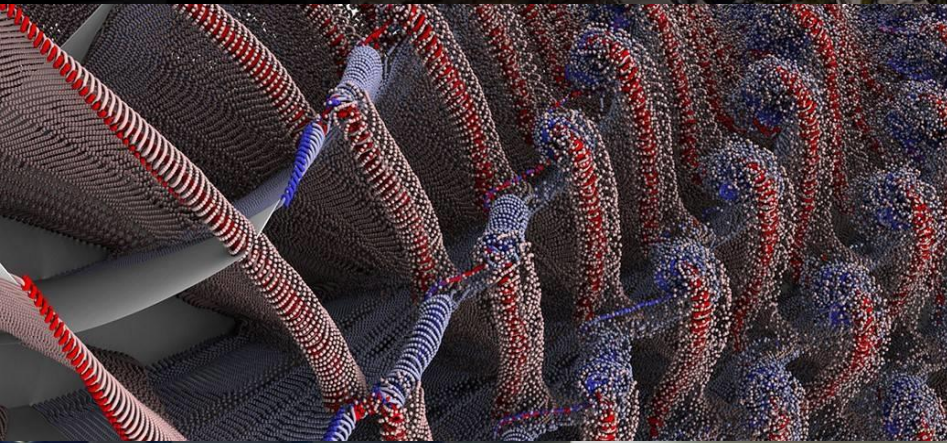
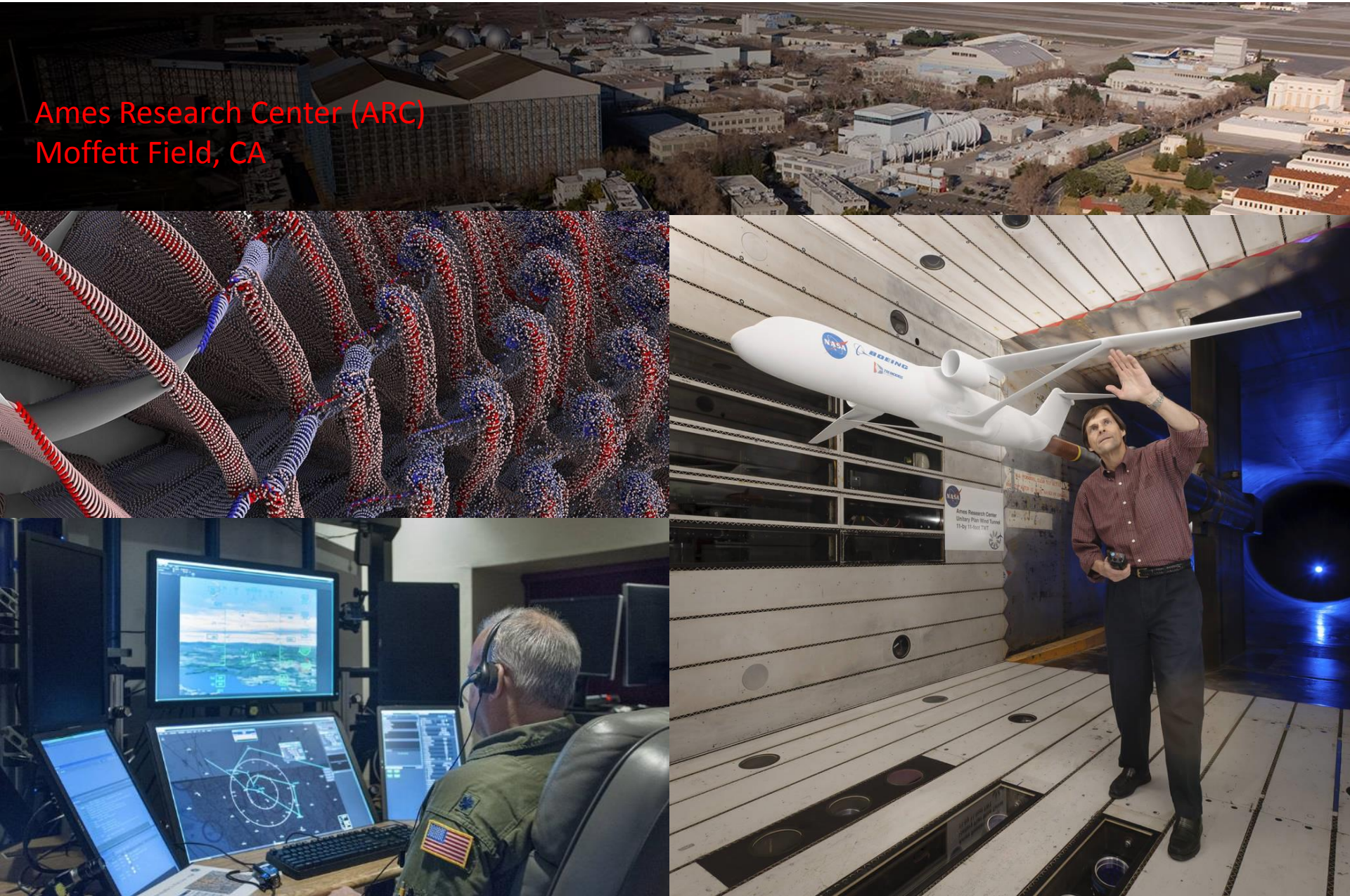
NASA Centers - ARMD





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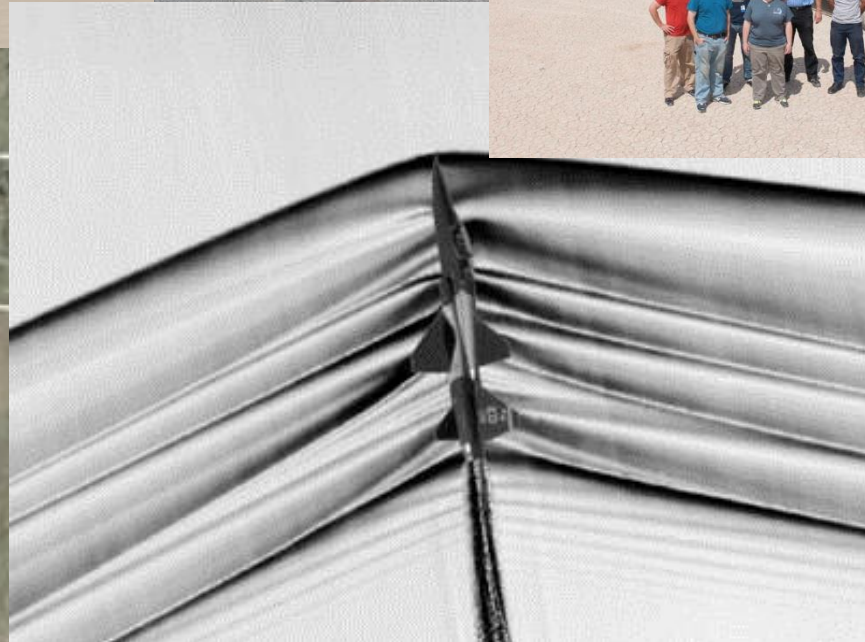
Ames Research Center (ARC)
Moffett Field, CA





NASA Centers - ARMD

Armstrong Flight Research Center (AFRC)
Edwards, CA

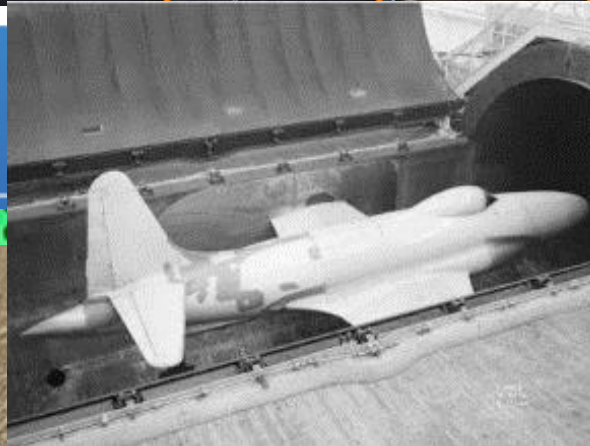


NASA HQ



NASA Centers - ARMD

Glenn Research Center (GRC)
Cleveland, OH





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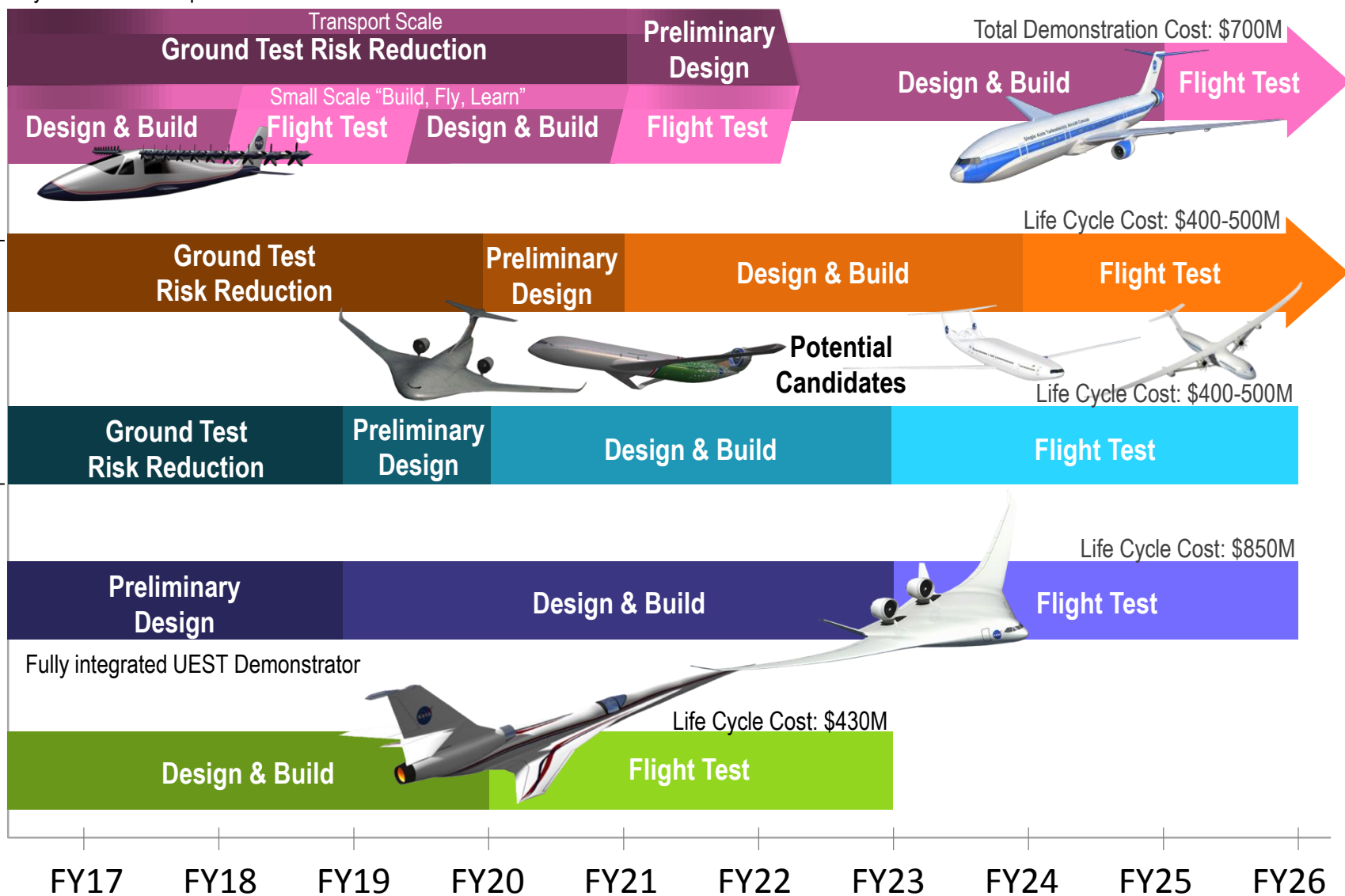
Langley Research Center (LaRC)
Hampton, VA



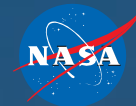


New Aviation Horizons - Flight Demo Plan

Hybrid Electric Propulsion Demonstrators



Ultra-Efficient Subsonic Demonstrators



D-8

Potential Purpose Built X-Plane



Propulsion-Airframe Integration enables reduced aircraft drag

HWB

Multiple Integrated Technologies

Non-circular composite fuselage



Aerodynamically efficient fuselage shape

Top mounted engines enable Ultra-High Bypass Engines

Truss-Braced Wing

Potential Purpose Built X-Plane



Very High Aspect Ratio wings substantially increases wing efficiency



Composite fuselage of conventional shape

More electric sub-systems

Very-High Bypass Engines, reaching physical installation limits

Highly-efficient wing of conventional aspect ratio



Closing Thoughts...

- Great deal of new work on the near horizon
- A Career at NASA...
- Questions?