NASA Aeronautics Sustainable Aviation Overview

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NASA Aeronautics – Vision for Aviation in the 21st Century

ARMD continues to evolve and execute the Aeronautics Strategy *https://www.nasa.gov/aeroresearch/strategy*

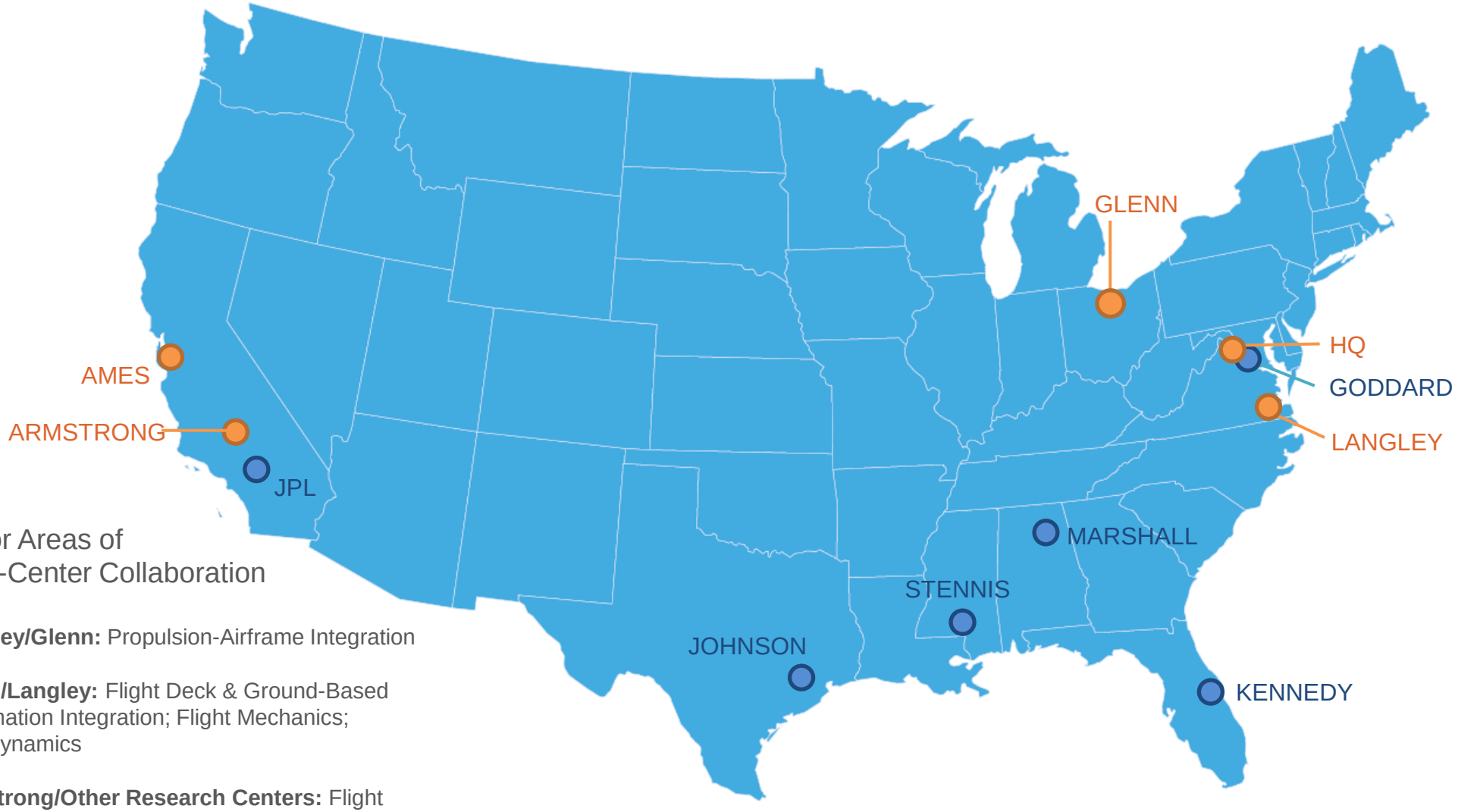
6 Strategic Thrusts

- Safe, Efficient Growth in Global Operations
- Safe, Quiet, and Affordable Vertical Lift Air Vehicles
- Innovation in Commercial Supersonic Aircraft
- In-Time System-Wide Safety Assurance
- Ultra-Efficient Subsonic Transports
- Assured Autonomy for Aviation Transformation

U.S. leadership for a new era of flight

Where Does NASA Aeronautics Research Happen?

Aeronautics research takes place at four of NASA's centers.



AMES

ATM Research and Technology & Integration

ARMSTRONG

Flight Research

GLENN

Propulsion Research and Technology

LANGLEY

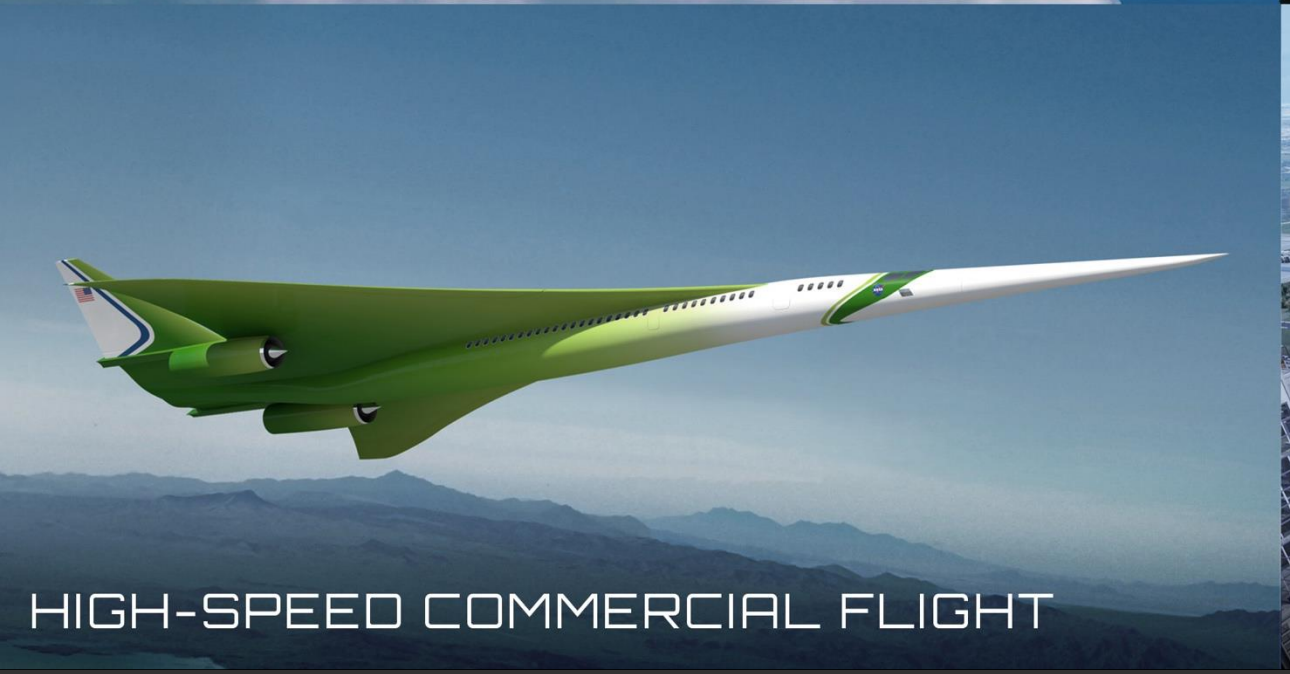
Vehicle Research and Technology

Major Areas of Inter-Center Collaboration

Langley/Glenn: Propulsion-Airframe Integration

Ames/Langley: Flight Deck & Ground-Based Automation Integration; Flight Mechanics; Aerodynamics

Armstrong/Other Research Centers: Flight Experiment Integration

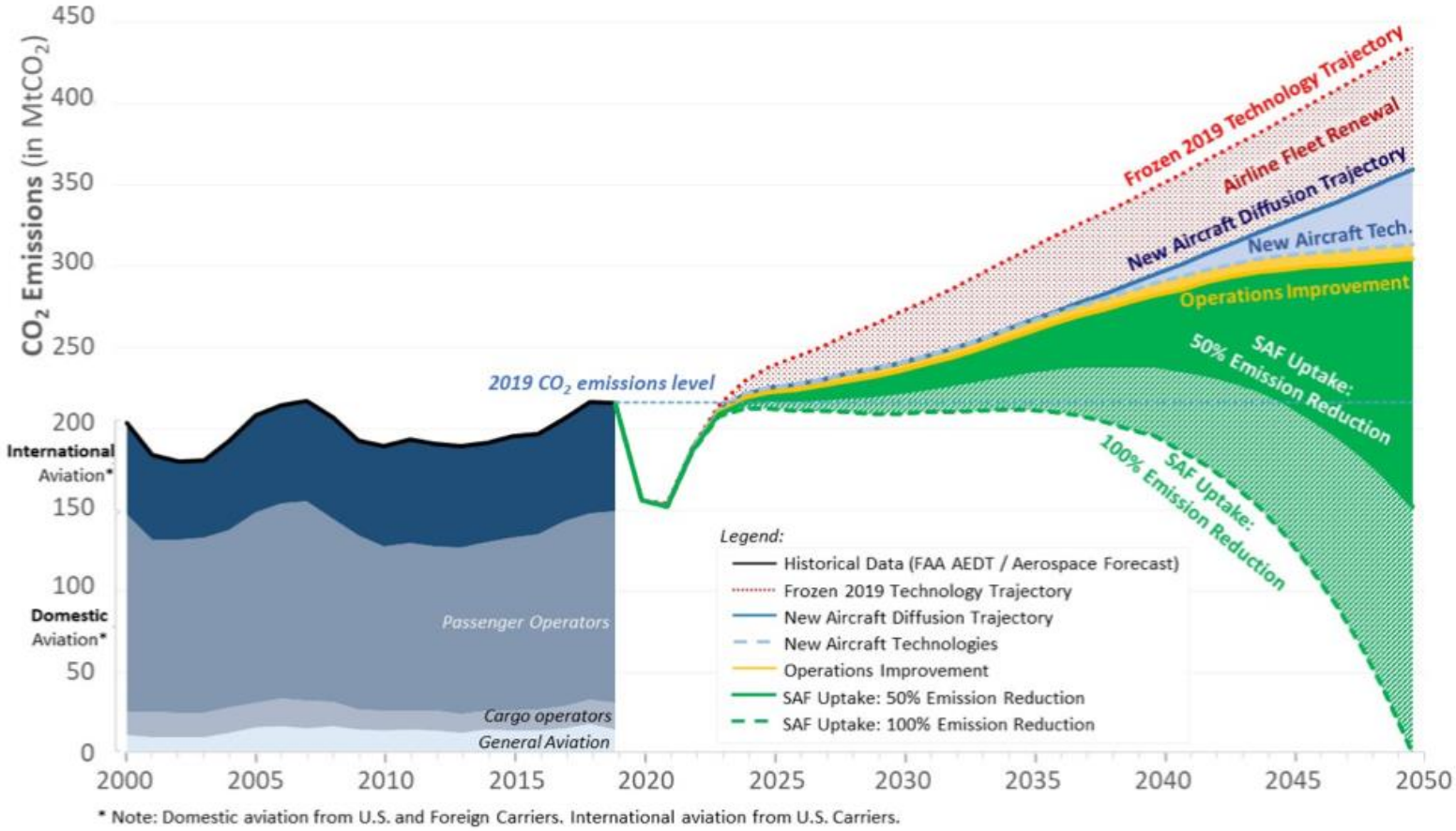


Four Transformations for Sustainability, Greater Mobility, and Economic Growth

Global Context for Sustainable Aviation

U.S. Government Aviation Climate Action Plan

To address the U.S. economy-wide goal of net-zero GHG emissions by 2050, the U.S. aviation-sector is pursuing a basket of measures



More than 97% of U.S. aviation CO_2 emissions is from the combustion of jet fuel. 80% of domestic aviation emissions and 94% of international aviation emissions come from en-route operations above 10k ft.

Sustainable Flight National Partnership

Next Generation Capability

Advance engine efficiency and emission reduction

Enable integrated trajectory optimization

Advance airframe efficiency

Enable use of 100% Sustainable Aviation Fuels

ENABLE 25 – 30% ENERGY EFFICIENCY IMPROVEMENTS in NEXT GENERATION TRANSPORTS with the CAPACITY TO UTILIZE 100% SAF and FLY OPTIMAL TRAJECTORIES

Long-Term Transport Technology & Innovation

Generational studies to define the path to net-zero emissions & inform future technology investments

2008-2019 | 2020-2029 | 2030 - 2039 | 2040 - 2050

Prior SFW

N+2 Studies, ERA for the 2020s Impact

N+3 Adv Concept Studies SFNP for 2030s Impact

Concept Studies and Technology Development Needed for 2040s Impact

Opportunities to Define Future Aviation Systems and Concepts

- Advanced Concept Studies for 2040+ EIS
- Net-Zero Emissions Concepts
- Promising Technology & Architectures
- Support Aviation Community with NASA-unique Contributions

INNOVATIONS FOR 2040s AND BEYOND

Key Challenges for NASA Aeronautics

NASA's International Collaborations

Common areas for collaboration:

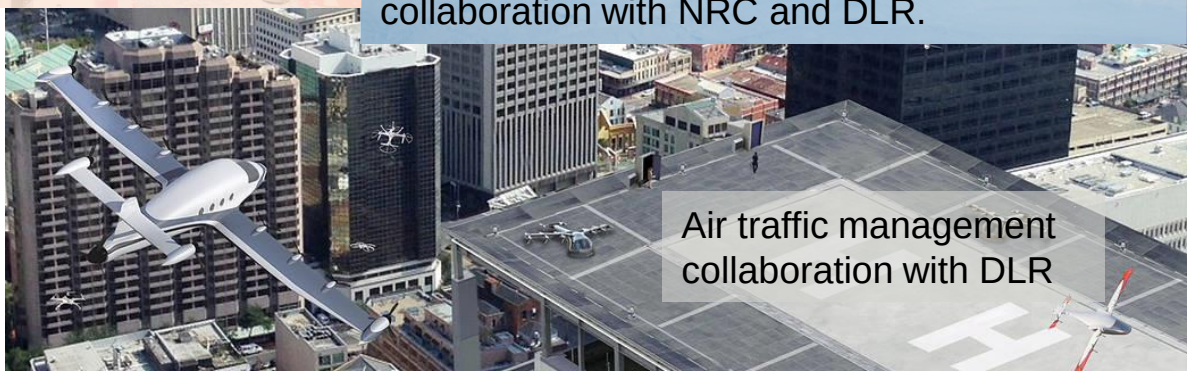
- Aviation safety
- Icing
- Noise
- Wind tunnel testing

NASA collaborates to implement emission reduction commitments by governments around the world.

Icing collaboration with NRC in NASA GRC's Icing Research Tunnel

The NASA Falcon aircraft studying the contrails produced by the NASA DC-8 burning biofuel, in collaboration with NRC and DLR.

NASA and counterpart government research organizations work together to coordinate global issues in the **International Forum for Aviation Research**, including work on sustainable aviation, advanced air mobility, and supersonics.



Air traffic management collaboration with DLR

NASA PARTNERS WITH COUNTERPART GOVERNMENT RESEARCH ORGANIZATIONS AROUND THE WORLD IN NON-COMPETITIVE AREAS THAT MUTUALLY ADVANCE OUR STRATEGIC OBJECTIVES

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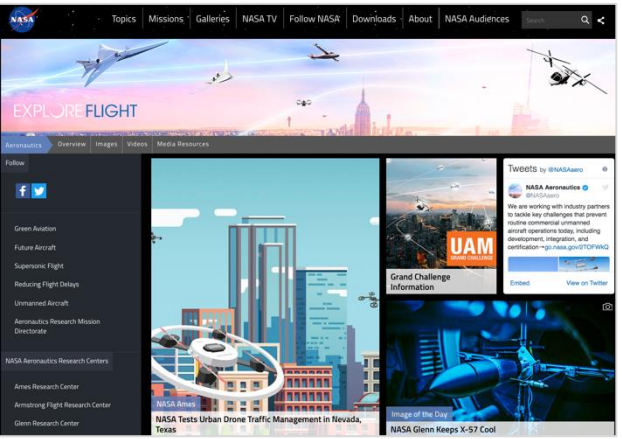

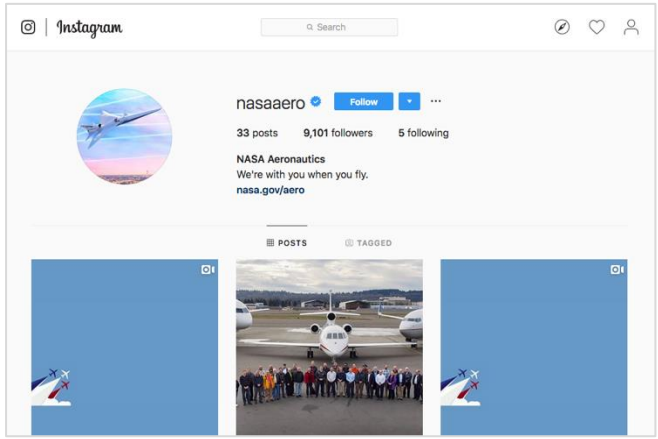

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