
# Update on Aeronautics

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ASEB
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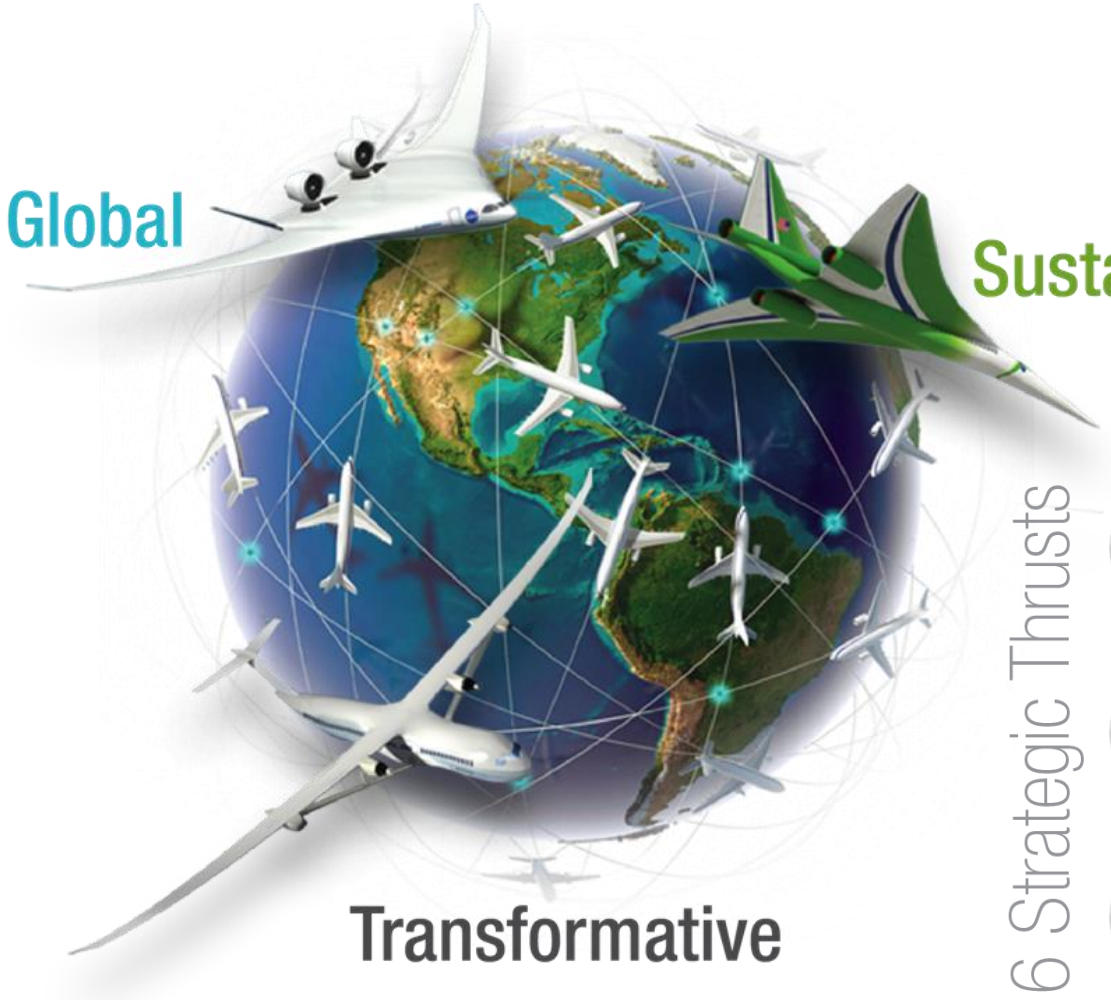
# NASA Aeronautics

NASA Aeronautics Vision for Aviation in the 21st Century




6 Strategic Thrusts

- Safe, Efficient Growth in Global Operations
- Transition to Alternative Propulsion and Energy
- Innovation in Commercial Supersonic Aircraft
- Real-Time System-Wide Safety Assurance
- Ultra-Efficient Commercial Vehicles
- Assured Autonomy for Aviation Transformation

U.S. leadership for a new era of flight

# FY 2017 President Budget Request

| $ Millions | FY 2015 | Enacted FY 2016 | FY 2017 | FY 2018 | FY 2019 | FY 2020 | FY 2021 | FY 2022 | FY 2023 | FY 2024 | FY 2025 | FY 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Aeronautics** | **$642.0** | **$640.0** | **$790.4** | **$846.4** | **$1,060.1** | **$1,173.3** | **$1,286.9** | **$1,294.2** | **$1,307.6** | **$1,218.1** | **$829.7** | **$839.5** |
| Airspace Operations and Safety | 154.0 | | 159.4 | 159.2 | 176.2 | 189.1 | 221.5 | 198.7 | 200.9 | 193.2 | 175.5 | 167.8 |
| Advanced Air Vehicles | 240.6 | | 298.6 | 277.4 | 308.8 | 311.6 | 312.6 | 321.3 | 315.0 | 318.9 | 317.7 | 326.7 |
| Integrated Aviation Systems | 150.0 | | 210.0 | 255.4 | 381.4 | 493.0 | 556.7 | 591.5 | 612.2 | 525.0 | 203.8 | 210.6 |
| Transformative Aeronautics Concepts | 97.4 | | 122.3 | 154.4 | 193.8 | 179.7 | 196.2 | 182.8 | 179.4 | 181.0 | 132.7 | 134.4 |

Aeronautics budget includes paid-for 10-year mandatory funding from the Administration's 21st Century Clean Transportation Plan.

# FY 2018 Budget Blueprint Excerpts

## For NASA…

The National Aeronautics and Space Administration (NASA) is responsible for increasing understanding of the universe and our place in it, advancing America's world-leading aerospace technology, inspiring the Nation, and opening the space frontier. The Budget increases cooperation with industry through the use of public-private partnerships, focuses the Nation's efforts on deep space exploration rather than Earth-centric research, and develops technologies that would help achieve U.S. space goals and benefit the economy.

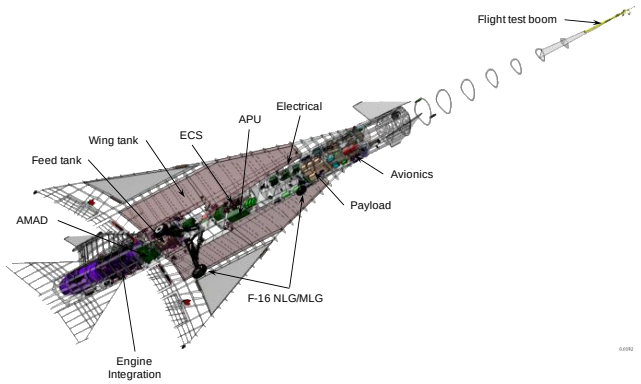
The President's 2018 Budget requests $19.1 billion for NASA, a 0.8 percent decrease from the 2017 annualized CR level, with targeted increases consistent with the President's priorities.

## For Aeronautics…

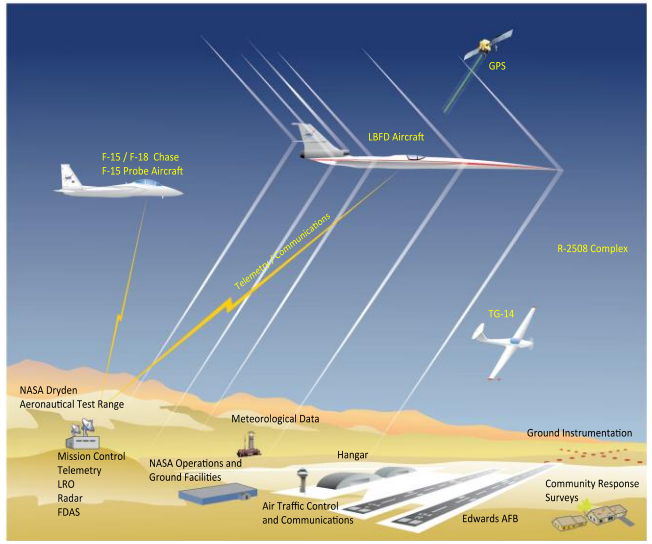
Paves the way for eventual over-land commercial supersonic flights and safer, more efficient air travel with a strong program of aeronautics research. The Budget provides $624 million for aeronautics research and development.

# New Aviation Horizon Initiative

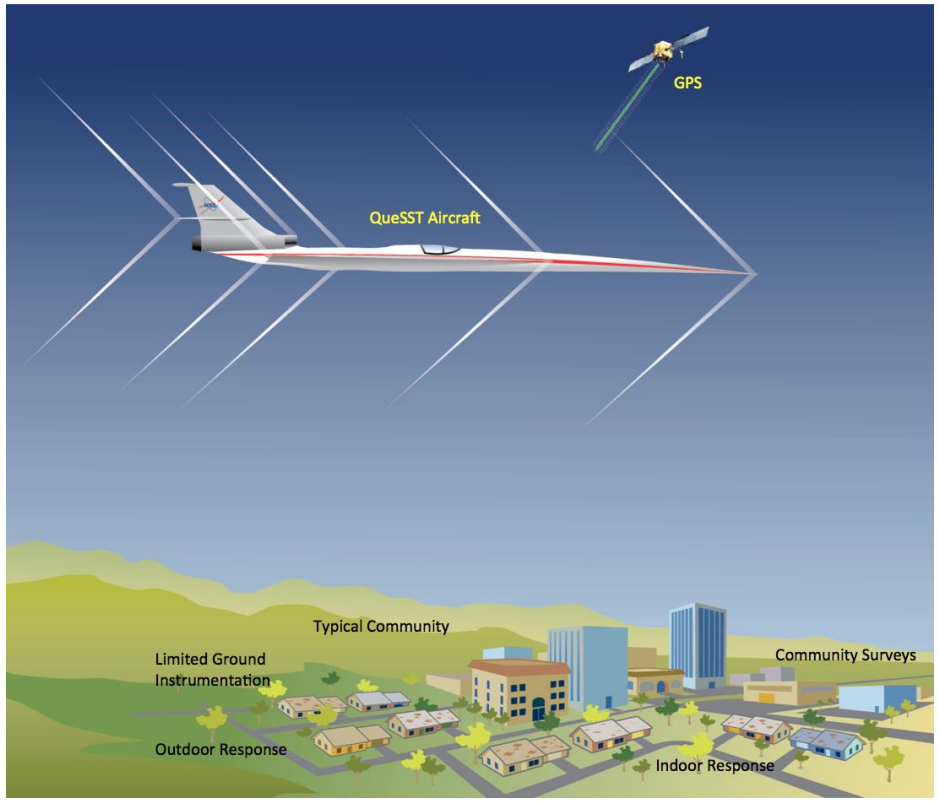
# LBFD Project Scope of Work




**Aircraft Development (FY18-FY21)**
- Detailed Design
- Fabrication, Integration, Ground Test
- Checkout Flights
- Subsonic Envelope Expansion
- Supersonic Envelope Expansion




**Acoustic Validation (FY21-FY22)**
- Near- and Far-field Measurements
- Ground Measurements (CST Project)
- Initial community response overflight study




Proposed Follow-on Project (CST)

**Community Response (FY22+)**
- Multiple campaigns (4 to 6) over representative communities and weather across the U.S.

**Systematic Approach Leading to Community Response Testing**

# University Leadership Initiative

**Universities taking a larger leadership role in advancing the revolutionary ideas needed to transform aviation and further advance U.S. global leadership**

***University of South Carolina*** Advanced, wireless communication networks to enhance the safety and efficiency of air traffic management with both piloted aircraft and drones

***Texas A&M*** Designing commercial supersonic aircraft that could modify their shape during a flight to help minimize noise from sonic booms

***University of Tennessee, Knoxville*** Designing ultra-efficient aerodynamic wing that could enable significant savings in fuel or energy consumption

***Ohio State University*** Electric propulsion including areas of battery and energy storage and thermal management among others

***Arizona State University*** Safely integrating the complex set of data sources that will drive future air traffic management systems

**Total value of the five awards over 5 years up to $50M**

# Vision for the NASA Hypersonic Technology Project

**Advance and Utilize analytical tools, test techniques, fundamental capabilities and critical technologies to ensure U.S. supremacy in hypersonics**

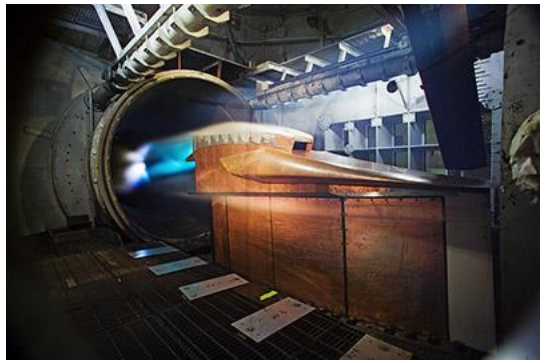
## Vision

- Conduct fundamental research to enable a broad spectrum of hypersonic systems and missions by advancing the core capabilities and critical technologies underpinning the mastery of hypersonic flight and bringing them to bare on National Programs

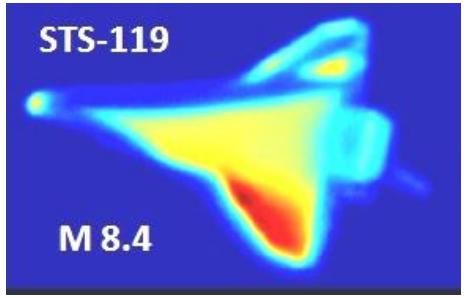
## Scope

- Fundamental research spanning technology readiness and system complexity levels
- Critical technologies enabling re-usable hypersonic systems
- System-level research, design, analysis, validation
- Engage, invigorate and train the next generation of engineers

# NASA Core Hypersonic Competencies



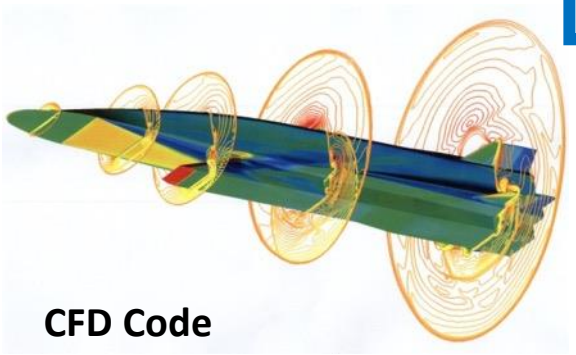
**Hypersonic Airbreathing Propulsion**



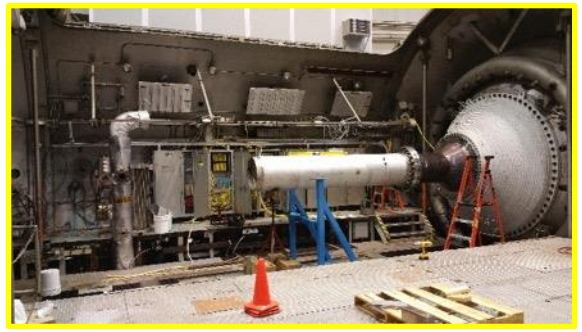

**Aerosciences**

**Vehicle Level Conceptual Design & Systems Analysis**

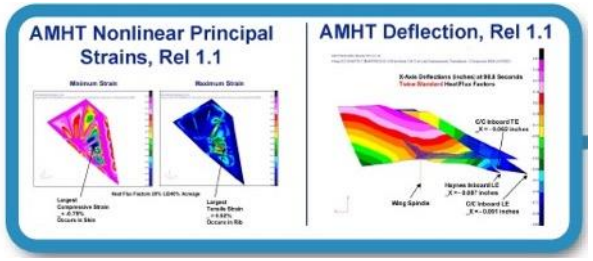
NASA has the knowledge to develop and apply our world class combination of computational expertise, experimental facilities and flight experience in propulsion, aerothermodynamics, materials, thermal structures, guidance & control and conceptual vehicle design to deliver mission success.



**CFD Code Development / Application**



**Ground Testing & Diagnostics**




**Structures & Materials**

# NASA Aeronautics/DoD: Leveraging hypersonic capabilities