NASA Aeronautics

NASA Aeronautics Vision for Aviation in the 21st Century

Global

Sustainable

Transformative

6 Strategic Thrusts

Safe, Efficient Growth in Global Operations
Innovation in Commercial Supersonic Aircraft
Ultra-Efficient Commercial Vehicles

Transition to Alternative Propulsion and Energy
Real-Time System-Wide Safety Assurance
Assured Autonomy for Aviation Transformation

U.S. leadership for a new era of flight
## FY 2017 President Budget Request

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aeronautics</strong></td>
<td>$642.0</td>
<td>$640.0</td>
<td>$790.4</td>
<td>$846.4</td>
<td>$1,060.1</td>
<td>$1,173.3</td>
<td>$1,286.9</td>
<td>$1,294.2</td>
<td>$1,307.6</td>
<td>$1,218.1</td>
<td>$829.7</td>
<td>$839.5</td>
</tr>
<tr>
<td>Airspace Operations and Safety</td>
<td>154.0</td>
<td></td>
<td>159.4</td>
<td>159.2</td>
<td>176.2</td>
<td>189.1</td>
<td>221.5</td>
<td>198.7</td>
<td>200.9</td>
<td>193.2</td>
<td>175.5</td>
<td>167.8</td>
</tr>
<tr>
<td>Advanced Air Vehicles</td>
<td>240.6</td>
<td></td>
<td>298.6</td>
<td>277.4</td>
<td>308.8</td>
<td>311.6</td>
<td>312.6</td>
<td>321.3</td>
<td>315.0</td>
<td>318.9</td>
<td>317.7</td>
<td>326.7</td>
</tr>
<tr>
<td>Integrated Aviation Systems</td>
<td>150.0</td>
<td></td>
<td>210.0</td>
<td>255.4</td>
<td>381.4</td>
<td>493.0</td>
<td>556.7</td>
<td>591.5</td>
<td>612.2</td>
<td>525.0</td>
<td>203.8</td>
<td>210.6</td>
</tr>
<tr>
<td>Transformative Aeronautics Concepts</td>
<td>97.4</td>
<td></td>
<td>122.3</td>
<td>154.4</td>
<td>193.8</td>
<td>179.7</td>
<td>196.2</td>
<td>182.8</td>
<td>179.4</td>
<td>181.0</td>
<td>132.7</td>
<td>134.4</td>
</tr>
</tbody>
</table>

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

THE FUTURE OF FLIGHT

CLEANER, FASTER, QUIETER
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.
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

**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

Advance and Utilize analytical tools, test techniques, fundamental capabilities and critical technologies to ensure U.S. supremacy in hypersonics
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.
NASA Aeronautics/DoD: Leveraging hypersonic capabilities

**Department of Defense**
- Focus on operational mission (especially in near-term)
- In-house expertise aligned with mission need
- Enhancing test capabilities
- Significant investment (especially in demonstrators)

**NASA**
- Focus on fundamental research (long term emphasis with near term impact)
- Fully utilizes data from demos to advance/validate fundamental capabilities
- Performs independent studies to assess Technology Readiness for advanced civil & military applications
- Maintains unique facilities & skills with unique expertise to benefit broad aerospace community

- Develop new military capability
- Developing future workforce
- Fundamental research base for country & future missions

Share valuable data with NASA enables DOD Mission
Provide subject matter experts and key facilities