March 30, 2017

The Honorable John Culberson  
2161 Rayburn House Office Building  
Washington, D.C. 20515

The Honorable Richard Shelby  
304 Russell Senate Office Building  
Washington, D.C. 20510

The Honorable José Serrano  
2354 Rayburn House Office Building  
Washington, D.C. 20515

The Honorable Jeanne Shaheen  
506 Hart Senate Office Building  
Washington, D.C. 20510

Dear Chairman Culberson, Ranking Member Serrano, Chairman Shelby and Ranking Member Shaheen:

The Coalition for Aerospace and Science (CAS) is an alliance of prominent industry, university, and science organizations united in our support for robust and sustained federal investments in the National Aeronautics and Space Administration (NASA). As a group, we believe that increasing federal support and maximizing the efficiency and effectiveness for this vital agency will help ensure our nation’s scientific, industrial, and academic leadership long into the future. **As you allocate funding for Fiscal Year (FY) 2018, we urge you to build on the strong bipartisan support established in FY 2016 by providing NASA with at least $20.48 billion for FY 2018 - a five percent increase above the amount provided by the House Appropriations Committee for FY2017.**

Strong funding, a balanced portfolio of missions and research, and policies that encourage innovative collaborations are essential to our nation’s leadership in space and Earth sciences, groundbreaking technology development, and expanding the frontiers of human exploration. NASA’s long history of transformative advances in science and technology have positioned the U.S. as a world leader across many fields, driving strong U.S. exports, supporting jobs, and drawing the best and brightest students to American universities. As the nation addresses new problems and challenges, robust support for NASA is critical to fostering a 21st century economy and restoring America’s global scientific and technological leadership.

Our recommendation echoes that of over 500 organizations from all fifty states representing American industry, higher education, science, and engineering recognized in the landmark statement **Innovation: An American Imperative** (attached). These principles urge Congress to enact policies and investment in areas that ensure the United States remains the global innovation leader.

Every member of CAS has unique concerns and requests. However, the entire coalition is united in our support and advocacy for the NASA’s critical research, missions, and programs. As NASA-wide stakeholders, we respectfully request that within the topline request, Congress take note of the following specific opportunities for progress:
HUMAN EXPLORATION AND SPACE OPERATIONS

The Coalition requests strong continued support for the Orion Multi-Purpose Crew Vehicle and Space Launch System (SLS) programs. For America to continue to make progress in human exploration, it is vital to ensure these programs have the resources needed to build upon the significant progress already achieved on both SLS and Orion. Consequently, for FY18, we request $2 billion for SLS including at least $300 million for the SLS Exploration Upper Stage, $1.35 billion for Orion, and $635 million for Exploration Ground Systems. These levels of funding will allow completion of these systems on a schedule that will enable the first crewed Orion mission no later than 2021. CAS recognizes that NASA is currently studying the feasibility of launching a crew around the moon on the first Orion/SLS launch, which could impact funding requirements if approved. Meeting these funding requirements is also essential to enable the type of international partnerships for human exploration that have made the International Space Station (ISS) such a success.

Additionally, CAS requests that Congress builds upon priorities outlined in the bipartisan NASA Transition Authorization Act of 2017 (P.L. 115-10) by providing competitive funding for human factors research. This includes priorities related to the interaction of autonomous systems anticipated in future long-duration crewed missions, updated mission control design, improving the behavioral health and performance of astronauts, and other research areas outlined and executed by the agency’s Human Systems Integration Division.

Regarding other parts of the Human Exploration and Operations Directorate, CAS recommends $1.56 billion for the ISS, including for commercial cargo resupply. For the Commercial Crew program, which is important both to restore independent US access to the ISS and to increase the amount of science performed on it, CAS recommends $1.74 billion. In addition, to support a new deep space habitat in preparation for future long duration missions, CAS requests $110 million.

SCIENCE

The Coalition requests at least $5.9 billion to fund NASA’s Science Mission Directorate. Maintaining a balance across this portfolio is necessary to ensure the U.S. remains globally competitive in all fields of science.

The Coalition requests Congress provide ample funding in order for the Planetary Science Division to adhere to the priorities set by the Planetary Science Decadal Survey. We applaud Congress’ past support for exploring Europa, which the scientific community has determined offers one of the most promising extraterrestrial habitable environments in the solar system. Sufficient funding is necessary to ensure the Europa Mission can meet its expected launch date in the early 2020’s. Beyond the Europa mission, the Coalition supports ongoing missions on Mars and elsewhere, as well as continued funding for future Discovery and New Frontiers missions in order to meet development milestones.
CAS requests robust funding for the **Earth Science Division** to ensure continued support for key missions and programs. Missions within this division improve our understanding of Earth’s complex and dynamic system. The Coalition supports the goals of Earth science missions, including: the Pre-Aerosol, Clouds, and Ocean Ecosystem (PACE); Surface Water and Ocean Topography (SWOT); Climate Absolute Radiance and Refractivity Observatory (CLARREO); Orbiting Carbon Observatory-3 (OCO-3), Deep Space Climate Observatory (DSCOVR); and a 2020 launch date for the NASA-ISRO Synthetic Aperture Radar (NISAR) missions. Among many outcomes, these missions will help us monitor oil spills, predict space weather events, and measure how bodies of water change over time.

Funding for this division supports the launch of Landsat 9 as early as 2021 and Landsat 10 in approximately 2029, as well as funding to increase the capabilities and uses of multi-spacecraft constellations of very small scientific satellites. Additionally, CAS requests Congress supports Venture Class missions and Earth Science Research and Analysis (R&A) - two key programs that fund research on universities across the United States - at $199.6 million and $322.6 million, respectively.

Finally, the National Academies is mid-way through the development of its second ESAS decadal survey, which will identify science priorities and the missions that will enable them through 2027. Like the Astronomy and Astrophysics Decadal Survey released in 2010, this report will be considered reflective of the scientific community’s assessment of the field of Earth science and the questions that will drive new discoveries. The Coalition requests continued, robust funding for the Division in FY2018 and beyond to meet the forthcoming consensus-based objectives.

The Coalition requests $720 million to support the **Heliophysics Division (HPD)**. This amount is vital to improve our understanding of the Sun-Earth relationship and mitigate the harmful impacts of a space weather incident. Such an event has the potential to impose catastrophic damage to the United States’ electric grid and poses a threat to America’s national security. For example, NASA’s Advanced Composition Explorer (ACE) mission monitors solar activity that may harm sensitive space- and ground-based assets.

This requested amount will implement key community priorities outlined in the Space Weather Action Plan and 2012 Decadal Strategy for Solar and Space Physics. This includes a two-year cadence of alternating Heliophysics Small Explorer (SMEX) and Mid-sized Explorer (MIDEX) missions. A solicitation for a MIDEX mission has not been issued since FY2011, and a subsequent one is not slated for release until FY2019. The Heliophysics community was encouraged by the release of a SMEX solicitation in July 2016, but is concerned that funding shortfalls resulting from further stagnation in the Division’s budget will hinder timely delivery of the mission and further jeopardize the prospects of implementing a higher cadence of these competitive missions. This amount is also needed to accommodate a necessary increase for the Solar Probe Plus mission as it enters its peak development phase without incurring a seven percent cut to other programs within the Heliophysics Division.

Robust support for the **Astrophysics Division (APD)** will allow for continued progress on the Astronomy and Astrophysics Decadal Survey priorities, which includes a launch of the Wide Field Infrared Survey Telescope (WFIRST) by 2024. This start date will allow for greater overlap with
James Webb Space Telescope, enable WFIRST to impact dark energy and exoplanet science sooner, and will save $300 million over the mission lifetime.

The Coalition also requests $76 million for APD’s R&A account. Typically, R&A is conducted on data from satellites, probes, and telescopes that NASA builds, launches, and operates, but can also include the massive amount of information that remains after a mission is over.

For example, R&A opportunities are used to analyze data from Kepler, a telescope that searched for planets orbiting other stars. While the mission ended almost four years ago, scientists today still sift through data and continue to make new discoveries. In this way, the initial taxpayer investment continues to provide the basis for discoveries years after the mission itself has ended. Nevertheless, while NASA’s overall budget has grown, APD’s R&A account has remained relatively flat, especially when taking inflation into account. This funding affects thousands of researchers, including many at universities and colleges with world-renowned astronomy programs working to increase our nation’s knowledge base in astronomy and astrophysics.

**EDUCATION**

The Coalition requests continued support for NASA education programs. NASA plays a pivotal role in encouraging young people to pursue science, technology, engineering and mathematics (STEM) disciplines. CAS requests $45 million for the *Space Grant College and Fellowship Program* and supports a statutory cap of five percent of the allocated funds designated as administrative fees assigned to NASA. This program funds nearly 4,000 fellowships and scholarships for students in all 50 states and the District of Columbia who are pursuing a STEM career, allowing them to participate in NASA aeronautics and space projects.

**TECHNOLOGY**

CAS requests at least $796 million for the *Space Technology Mission Directorate (STMD)*. Robust investments in this directorate are necessary to develop the technologies and capabilities needed to achieve current and future NASA missions.

STMD represents an important component of NASA-wide innovation and technology development, and is the primary vehicle for bringing new technologies to market. Such promising innovations include the Laser Communications Relay Demonstration program, scheduled for a test in 2020 and expected to break new ground in optical communication technology. This is NASA’s next premier optical communication demonstration, with the potential to revolutionize the way we send and receive data, video and other information. Other innovations with multi-directorate implications include the demonstrations of Solar Electric Propulsion technologies vital to future deep space human and robotic exploration missions.

The requested amount will also enable the Directorate to expand the number of Space Technology Research Institutes (STRI). These institutes will complement STMD’s existing individual investigator-oriented programs with larger multidisciplinary research collaborations led by universities. STRIs strengthen NASA’s connection to the academic community and empower universities to advance fundamental research and technology development in areas of interest to NASA and the aerospace
community. In addition, STRIs will contribute to the nation’s future economic competitiveness by helping to develop the high-skilled workforce necessary for ensuring our continued leadership in research and development.

The Coalition remains concerned that the recent unfunded transfer of the RESTORE-L program threatens to impact the Directorate’s exciting technology development programs, including grants to engineers and researchers at many of our universities and small businesses. As such, CAS requests $796 million for the Directorate to ensure the Directorate remains a strong technological backbone for the Agency. Within that amount, CAS requests that Congress provide a $5 million increase to the Directorate’s Technology and Innovation Division for NASA’s successful Technology Transfer Program, which has seen a 76 percent reduction in its budget over the last ten years.

AERONAUTICS

The Coalition requests at least $712 million for the Aeronautics Research Mission Directorate. This directorate provides research that is vital to the well-being of our nation’s air transportation system and the aviation industry. Additionally, the Coalition supports NASA’s efforts to safely integrate Unmanned Aircraft Systems in the national airspace, allowing us to harness the potential of this technology.

Thank you for your consideration of our funding requests. We hope you will consider CAS as a resource as you work to craft FY2018 appropriations.

Member Organizations:

Aerospace Industries Association
American Astronautical Society
American Astronomical Society
American Geophysical Union
Association of American Universities
Association of Public and Land-grant Universities
American Society of Agronomy
Boston University
Consortium for Ocean Leadership
Crop Science Society of America
Geological Society of America
Human Factors and Ergonomics Society
Lockheed Martin Corporation
New Mexico State University
Northrop Grumman Corporation
The Planetary Society

Purdue University
Raytheon Company
Soil Science Society of America
SPIE – the international society for optics and photonics
Washington State University
Woods Hole Oceanographic Institution
University Corporation for Atmospheric Research
University of Arizona
University of Colorado – Boulder
University of Maryland – College Park
University of Maryland – Baltimore County
University of Michigan
University of New Hampshire
University of Washington
University of Wisconsin – Madison
**INNOVATION: AN AMERICAN IMPERATIVE**

A call to action by American industry, higher education, science, and engineering leaders urging Congress to enact policies and make investments that ensure the United States remains the global innovation leader.

Our nation knows what it takes to innovate: a sustained commitment to scientific research, a world-class workforce, and an economic climate that rewards entrepreneurship and innovation. As the most dynamic and prosperous nation in the world, the United States has long benefitted from policies and investments that have promoted innovation and in turn driven productivity and economic growth, bolstered American trade, ensured our health and national security, and safeguarded the American dream. Our leadership is now at risk because of years of underprioritizing federal scientific research investments and policies that promote innovation.

Now is not the time to rest on past success. As noted by the American Academy of Arts and Sciences in its 2014 Report *Restoring the Foundation: The Vital Role of Research in Preserving the American Dream*, "There is a deficit between what America is investing and what it should be investing to remain competitive, not only in research but in innovation and job creation." Competitor nations are challenging our leadership by copying our playbook for success. At the same time our nation’s support for scientific research and innovation is stagnating. If these trends continue, other countries will soon surpass the United States as the global innovation leader.

We must heed the warnings in the *Restoring the Foundation* report and other salient reports of the past decade and act decisively. In particular, Congress must:

**Renew the federal commitment to scientific discovery**
by ending sequestration's deep cuts to discretionary spending caps and providing steady and sustained real growth in funding of at least four percent for basic scientific research at: the National Science Foundation, the National Institutes of Health, the Department of Energy's Office of Science, the Department of Defense, NASA, the National Institute of Standards and Technology, USDA, and NOAA;

**Make permanent a strengthened federal R&D tax credit**
as a part of comprehensive tax reform to encourage more private-sector innovation investment here in America instead of in competitor countries;

**Improve student achievement in science, technology, engineering, mathematics (STEM)**
through increased funding of proven programs and incentives for science and math teacher recruitment and professional development;

**Reform U.S. visa policy**
to welcome and keep highly educated international professionals, particularly those holding STEM degrees from U.S. universities;

**Take steps to streamline or eliminate costly and inefficient regulations**
and practices governing federally funded research to help unburden researchers to focus more time on conducting research and training the next generation of scientists, engineers, health care professionals, and business leaders;

**Reaffirm merit-based peer review**
as the primary mechanism major federal agencies should employ in making competitive scientific research grants to ensure the most effective use of taxpayer dollars; and

**Stimulate further improvements in advanced manufacturing**
through support for programs aimed at accelerating manufacturing innovation and new federal-industry-academic partnerships.

We, the signatories, urge support for these actions to keep the United States the global innovation leader. We stand ready to do our part.
This document was issued on June 23, 2015. Additional endorsers continue to be added.
Related op-eds, resources and the most up to date list of endorsers may be found at innovationimperative.org

Last updated June 22, 2016