



March 10, 2020

The Honorable Jerry Moran
Chairman
Subcommittee on Commerce, Justice,
Science and Related Agencies
Committee on Appropriations
Room S-128, The Capitol
Washington, D.C. 20510

The Honorable José Serrano
Chairman
Subcommittee on Commerce, Justice,
Science and Related Agencies
Committee on Appropriations
H-307, The Capitol
Washington, D.C. 20515

The Honorable Jeanne Shaheen
Ranking Member
Subcommittee on Commerce, Justice,
Science and Related Agencies
Committee on Appropriations
Room S-128, The Capitol
Washington, D.C. 20510

The Honorable Robert Aderholt
Ranking Member
Subcommittee on Commerce, Justice,
Science and Related Agencies
Committee on Appropriations
H-307, The Capitol
Washington, D.C. 20515

Dear Chairman Moran, Ranking Member Shaheen, Chairman Serrano, and Ranking Member Aderholt:

The Coalition for Aerospace and Science (CAS) is an alliance of prominent industry, university, and research organizations united in support for robust national investment in the National Aeronautics and Space Administration (NASA). A sustained federal commitment for NASA will ensure the United States remains the world leader in scientific and commercial space exploration and discovery.

We support an FY 2021 appropriations level for NASA that would balance the continuity of mission needs as well as investments in the new capabilities of NASA's Artemis program. Any stagnation or reduction in funding would be counterproductive and exacerbate delays in key programs. **To maintain the investment in NASA made by the *Consolidated Appropriations Act 2020* and to support the goals of the Artemis Program, we urge Congress to provide at least \$26.25 billion for Fiscal Year 2021. This amount represents a 16 percent increase over FY 2020 to NASA's overall budget.**

CAS applauds the Administration for steadily advancing plans to establish an enduring human presence on the Moon by 2024. We support the proposed budget increases designed to reach this ambitious goal, so long as they do not come at the expense of other programs and missions elsewhere in the agency. This includes priorities laid out in this letter and any negative impact on the overall status quo of NASA's directorates.

Each member of CAS works with NASA on critical research, missions, and programs throughout the agency. However, each member of the coalition also understands that healthy growth in funding and support for NASA overall has a positive impact on individual priorities. Within the topline request, CAS requests Congress give specific attention to the following programs:

SCIENCE

CAS requests at least \$7.25 billion for NASA's Science Mission Directorate (SMD). This will maintain the balance of the SMD portfolio, while accommodating the planned cost growth of missions in development and maintaining support for individual investigator grant programs and new competitive mission opportunities across all mission sizes. This funding plays a key role in progressing one of NASA's core capabilities—to conduct scientific exploration that is enabled by access to space.

CAS is united in its opposition to recurring proposals from the Administration that would cancel, de-scope, or needlessly slow development of major missions prioritized by National Academy of Sciences, Engineering, and Medicine's Decadal Surveys. For FY 2021, this would include the cancellation of WFIRST, PACE, and CLARREO-Pathfinder. The Coalition finds these proposals short-sighted for an agency founded on the value of exploring the frontiers of scientific discovery, and a waste of taxpayer dollars given the considerable investment already made on these missions.

Furthermore, the Coalition is disappointed that the Administration has rejected recommendations from the Academies' Earth Science and Applications from Space (ESAS) 2017 Decadal Survey regarding new mission classes. CAS urges Congress to explicitly direct NASA to adhere to recommendations from ESAS 2017 related to the establishment of competitive Explorer and Designated mission lines. The Coalition requests strong support for the Earth Science Division, recognizing that the space-based perspective of Earth and the insights provided by NASA missions, research, and applications are critical to the success and prosperity of our Nation. Investments in Earth Science at NASA, and the associated insights they produce, position the U.S. to thrive on our planet.

The Coalition appreciates Congress' continued support for the James Webb Space Telescope and welcomes congressional oversight of the project to ensure a successful 2021 launch. In addition to rejecting the proposed cancellation of WFIRST, we ask that Congress support the technically-paced funding profile for the mission. The Coalition also requests increased funding for the rest of the Astrophysics Division—research and analysis, competed missions, technology development, and currently operating missions—to ensure that the U.S. continues to lead the world in understanding how the universe works, how we got here, and whether we are alone.

The Coalition requests Congress continue to provide ample funding for the Planetary Science Division to adhere to the priorities set by the Planetary Science Decadal Survey. Strong research and analysis funding for individual scientists is the top priority, followed by a steady cadence of future Discovery and New Frontiers missions within a balanced portfolio. 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 Clipper mission can meet target launch dates in 2023. The Coalition also supports ongoing Mars exploration—including the Mars 2020 rover and development of a sample return architecture. CAS also requests continued and robust support for programs outside Decadal Survey defined priorities to be added above and beyond full support of the rest of the work of the Division. These include the Lunar Discovery and Exploration and Planetary Defense programs, in particular the NEO Surveillance Mission is needed to meet the Near-Earth Object discovery mandate set by Congress.

The Coalition requests strong support for the Heliophysics Division. Heliophysics will lead to a greater understanding of our Sun and will help to mitigate the hazards that solar activity poses to the ground- and space-based platforms that strengthen our national security, economic competitiveness, and

scientific prowess. Robust support is needed to ensure that the Heliophysics Division can continue to execute on recommendations outlined in the decadal survey, including an accelerated cadence of competitively selected Explorer missions and implementation of the DRIVE initiative, while accommodating continued support for missions under formulation and development. Strong funding will also allow for implementation of key community priorities outlined in the Space Weather Action Plan.

SPACE TECHNOLOGY

CAS requests at least \$1.58 billion for the Space Technology Mission Directorate (STMD). Since its inception, STMD has focused on improving NASA's technological capabilities across a wide array of areas—from propulsion and power generation to materials science and high-performance computing—that help the agency achieve mission requirements across all its directorates.

The Coalition appreciates congressional support for maintaining the **independence of STMD** in FY 2020. CAS requests Congress oppose any current and future efforts to eliminate the Directorate or reorganize it in a way that reduces its independence or erodes its cross-agency mission. We ask that Congress explicitly requires STMD continue to fully fund its contribution to the WFIRST coronagraph technology demonstration project.

HUMAN EXPLORATION AND OPERATIONS

CAS requests Congress supports NASA's Artemis program – including the Gateway and a new Human Lander System – to put the first woman and next man on the lunar surface by 2024 and ensures that NASA leverage prior taxpayer investments in the agency's exploration architecture to the greatest extent possible. The Coalition requests an appropriation of **\$2.585 billion for the Space Launch System (of which no less than \$300 million is needed to continue Exploration Upper Stage development); \$1.45 billion for the Orion spacecraft; and \$590 million for Exploration Ground Systems.** These foundational systems have been built, are completing integrated testing, and will soon begin launching a series of exploration missions as part of NASA's Artemis program that will not only carry Americans to the Moon but will establish the critical infrastructure for humanity's first crewed missions to Mars. As we get closer to Artemis I and these programs transition from development to production, continued support from the Congress is more important now than ever.

The Coalition supports the FY21 budget request of **\$3.37 billion for Human Landing Systems and \$739.3 million for the Gateway** which is critical to sending Americans to the Moon and onto Mars. Supporting this budget request will allow NASA to demonstrate industry-led human lunar landing systems, establish a sustainable exploration infrastructure around the Moon with the Gateway, and enable key exploration technologies needed for Mars that also benefit humans back on Earth, such as in-situ resource utilization and sustainable power systems.

While CAS understands that NASA and support contractors will be required to accelerate the development of flight hardware and systems to send Americans forward to the Moon and onto Mars, we strongly encourage the Administration and Congress work to ensure that the safety of astronauts are not jeopardized by pressures on schedule and cost. The proper training of flight crews and mission support personnel in these new systems is paramount, as is the implementation of standards and practices informed by human factors research. This emphasis on the importance of human factors

research and the agency's Human Systems Integration Division in human spaceflight builds on congressional direction outlined in the bipartisan *NASA Transition Authorization Act of 2017*.

SPACE OPERATIONS

The Coalition requests that NASA maintain its support for the International Space Station and Commercial Crew and Cargo programs at the amount requested in the FY 2021 budget request level of **\$1.4 billion and \$1.78 billion, respectively**. Additionally, CAS requests Congress mandate NASA only consider launch proposals for domestic cargo and science payloads from domestic launch providers. NASA should be utilizing and benefiting from a competitive U.S. launch landscape and avoid placing any taxpayer funded cargo or exploration missions on foreign launch vehicles.

AERONAUTICS

CAS requests at least \$819 million for the Aeronautics Research Mission Directorate (ARMD). This would provide the much-needed increase in funding for subsonic, supersonic, and hypersonic flight technologies and flight demonstrations. Research from this directorate develops technologies that transform the way we fly by lowering operating costs, increasing flight efficiency, and reducing aviation related environmental impacts. ARMD is critical to the United States' leadership in hypersonic technologies and systems while also advancing research on Unmanned Aircraft Systems for safe integration into the national airspace system.

Today, civil aviation contributes more than 5 percent of our nation's GDP and supports more than ten million jobs. Air travel remains the safest and most efficient mode of transportation, with more than 2.6 million people flying in and out of U. S. airports each day, and 43 billion pounds of freight transported each year. U. S. manufacturers of aircraft, engines, avionics, and supporting systems maintain a global advantage in an increasingly competitive global marketplace. This advantage is the main contributor to the aerospace and defense industries' positive U.S. trade balance of \$85.9 billion in 2017.

This global manufacturing leadership would not be possible without a vital and sustained federal commitment to aeronautics research. Although comprising only 3 percent of the agency's budget, ARMD is a cornerstone of America's aviation competitiveness. Maintaining strong increases for NASA's aeronautics research is vital for the Nation to maintain its advantage in developing aviation technologies in rapidly evolving global markets. These include the emerging sectors for unmanned and autonomous aircraft, supersonic aircraft, urban air mobility, hypersonic vehicles, and the new air traffic management systems needed to incorporate next-generation technologies.

STEM ENGAGEMENT

The Coalition opposes the Administration's proposed elimination of NASA's Office of STEM Engagement. CAS instead requests **\$122 million for NASA's Office of STEM Engagement**, which will support NASA's efforts to increase K-12 involvement in NASA projects, support underrepresented communities, strengthen online education, and boost NASA's contribution to informal education. The Office of STEM Engagement serves a vital role for NASA's vision to discover and expand knowledge for the benefit of humanity. By creating unique opportunities for students and the public to contribute to NASA's work in

exploration and discovery through authentic learning experiences with NASA personnel, content, and facilities, NASA helps to build a diverse future STEM workforce.

Within the Office of STEM Engagement appropriations, CAS requests **at least \$52 million for the National Space Grant Fellowship program**. The Space Grant program funds nearly 4,000 fellowships and scholarships for students in all 50 states and the District of Columbia pursuing STEM careers. This program allows students to participate in aeronautics and space projects by integrating classroom learning with on-the-job training.

MEMBER ORGANIZATIONS

Aerospace Industries Association	Purdue University
American Association of Physics Teachers	Raytheon Company
American Astronautical Society	Rolls-Royce North America
American Astronomical Society	Soil Science Society of America
American Geophysical Union	SPIE – the international society for optics and photonics
American Society of Agronomy	Texas A&M University
Association of American Universities	The Ohio State University
Association of Public and Land-grant Universities	The Planetary Society
Association of Universities for Research in Astronomy	United Launch Alliance
Ball Aerospace	University Corporation for Atmospheric Research
Boston University	University of Arizona
Consortium for Ocean Leadership	University of Colorado – Boulder
Crop Science Society of America	University of California – San Diego
Geological Society of America	University of Florida
Human Factors and Ergonomics Society	University of Iowa
Institute of Electrical and Electronics Engineers	University of Maryland – Baltimore County
Lockheed Martin Corporation	University of Maryland – College Park
Massachusetts Institute of Technology	University of Michigan
New Mexico State University	University of New Hampshire
Northrop Grumman Corporation	University of Texas at Austin
Notre Dame University	University of Washington
The Optical Society	University of Wisconsin – Madison
Planet	Vanderbilt University
Princeton University	Washington State University
	Woods Hole Oceanographic Institution