

**COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES**

HEARING CHARTER

A Review of the President's Fiscal Year 2022 Budget Proposal for NASA

Wednesday, June 23, 2021
10:00 a.m.
Rayburn 2318/Zoom

PURPOSE

The purpose of the hearing is to review the Administration's Fiscal Year (FY) 2022 budget request for the National Aeronautics and Space Administration (NASA), and related issues.

WITNESSES

- **The Honorable Bill Nelson**, Administrator, National Aeronautics and Space Administration

OVERARCHING QUESTIONS

- *What new initiatives or terminations are proposed in the FY2022 budget request for NASA, and why?*
- *What is the relative balance, as proposed in the FY2022, budget request among human exploration, science, space technology, and aeronautics?*
- *What is the plan, including goals and objectives, for NASA's Moon to Mars campaign, and to what extent does the FY2022 budget proposal support implementation of the plan?*
- *What is the Administration's current understanding of the near- and long-term impacts of the COVID-19 pandemic on NASA's research and development projects and operations?*

BACKGROUND

The Administration has requested \$24.8 billion for NASA in its Fiscal Year (FY) 2022 budget request, an increase of approximately \$1.5 billion, or 6.6 over the FY2021 enacted appropriation.

As stated in the Congressional Justification document, the Administration's priorities for NASA's FY2022 proposal are: addressing climate change; a Moon to Mars human and robotic exploration plan; maintain and advance U.S. leadership in aviation and space; development of cutting-edge technologies and space science; and investing in science, technology, engineering and mathematics (STEM) engagement. Key initiatives proposed to support these priorities include the Earth System Observatory, the Sustainable Flight National Partnership, and keeping NASA on the path to landing the first woman and first person of color on the Moon under the Artemis program.

The FY2022 request notes that the long-term impacts of the COVID-19 pandemic on the agency’s programs and activities are difficult to project and a full accounting of those impacts will not be available until after NASA has returned to normal operations. While NASA has taken steps to mitigate some of COVID-19 impacts through the use of cost reserves and schedule margins, “there is increased overall risk to the Agency’s cost and schedule commitments for the foreseeable future.”¹

BUDGET ACCOUNTS

The programs in the Administration’s FY2022 NASA budget proposal are summarized below by major organization (directorate or office). All budget numbers provided here are based on the information in the NASA FY2022 Congressional Budget Justification document² and the legislative text and explanatory statement of the Consolidated Appropriations Act, 2021.³

Human Exploration and Operations Mission Directorate

The Human Exploration and Operations Mission Directorate (HEOMD) manages the agency’s activities related to human space exploration in and beyond low Earth orbit (LEO) in two accounts: Deep Space Exploration Systems and Space Operations. In FY2022, the administration is requesting \$10.9 billion for HEOMD overall, an increase of \$392.2 million (3.7%) from the FY2021 appropriation.

Table 1: NASA HEOMD Budget (\$ millions)

| | FY21 Enacted | FY22 Request | Change FY22 - FY21 | |
|---|------------------|-----------------|-----------------------|-------------|
| | | | Amount | Percent |
| NASA Total | 23,271.28 | 24,801.5 | 1,530.22 | 6.6% |
| Human Exploration and Operations Mission Directorate | 10,505.6 | 10,897.8 | 392.2 | 3.7% |
| Deep Space Exploration Systems | 6,517.4 | 6,880.4 | 363.0 | 5.6% |
| Exploration Systems Development | 4,544.6 | 4,483.7 | -60.9 | -1.3% |
| Exploration Research and Development | 1,972.8 | 2,396.7 | 423.9 | 21.5% |
| Space Operations | 3,988.2 | 4,017.4 | 29.2 | 0.7% |
| International Space Station | 1,321.6 | 1,327.6 | 6.0 | 0.5% |
| Space Transportation | 1,872.9 | 1,771.7 | -101.2 | -5.4% |
| Space and Flight Support | 776.6 | 817.0 | 40.4 | 5.2% |
| Commercial LEO Development | 17.0 | 101.1 | 84.1 | 494.7% |

Source: NASA, FY2022 Budget Request Congressional Justification

¹ In its March 2021 memorandum on “COVID-19 Impacts on NASA Major Programs and Projects,” the NASA Inspector General estimated that the total COVID impact to NASA would be approximately \$3 billion. As part of the CARES Act (P.L. 116-36), Congress appropriated \$60 million to NASA for mission delays and contractor costs (including back pay), enhanced information technology infrastructure, facility cleaning, and personal protective equipment. Available at: <https://oig.nasa.gov/docs/IG-21-016.pdf>.

² Available at:

https://www.nasa.gov/sites/default/files/atoms/files/fy2022_congressional_justification_nasa_budget_request.pdf.

³ P.L. 116-260. Available at: <https://www.congress.gov/bill/116th-congress/house-bill/133>.

Deep Space Exploration Systems

The Administration's FY2022 request proposes \$6.88 billion for Deep Space Exploration Systems, a \$363 million (5.6%) increase over the FY2021 enacted level. The entire Deep Space Exploration Systems account supports the Artemis Moon to Mars campaign with research and development of systems and capabilities for human exploration of deep space, defined as beyond LEO.

Exploration Systems Development (ESD). The FY2022 request for Exploration Systems Development is \$4.48 billion, a decrease of \$60.9 million (1.3%) from the FY2021 appropriation. Within ESD, the Administration is proposing: \$1.4 billion for the Orion crew vehicle program (\$3 million, or 0.2%, below the FY2021 enacted level); \$2.5 billion for the Space Launch System (SLS) launch vehicle program (\$74 million, or 3%, below the FY2021 enacted level); and \$590 million for the Exploration Ground Systems (EGS) program (\$10 million, or 1.7%, below the FY2021 enacted level).

The ESD systems—SLS, Orion, and EGS—will enable crew transportation for the Artemis missions to destinations in cislunar space and lunar orbit. The current launch readiness date (LRD) for Artemis I, the first uncrewed flight of the integrated SLS, Orion, and EGS systems, is no earlier than November 2021. The current launch readiness date (LRD) for Artemis II, the first crewed flight of the integrated SLS, Orion, and EGS systems, is no earlier than September 2023. According to the FY2022 budget request, NASA will update the Artemis I and II launch dates after the completion of a cost and schedule review, currently underway. The request proposes funding for development of the SLS Exploration Upper Stage and a second Mobile Launch Platform, both of which would enable a higher lift capability to low-Earth orbit and cislunar space in the SLS Block 1B configuration, for first flight on Artemis IV.

Exploration Research and Development. For FY2022, the Administration is requesting \$2.4 billion, an increase of \$424 million (21.5%) over the FY2021 appropriation, to develop the technologies and systems required for deep space, cislunar, and lunar surface activities under the Exploration Research and Development (ERD) theme. The proposed budget increase would continue the development of a Human Landing System (HLS) carried out as a public-private-partnership that would transport astronauts to and from the lunar surface in the Artemis III mission with a goal of 2024, as stated in the Congressional Justification document. NASA established HLS as a formal program in FY2021, and proposed \$1.2 billion for the program in FY2022, an increase of \$267 million (28.7%) over the FY2021 appropriation. In April 2021, NASA selected SpaceX to develop and demonstrate an HLS for the Artemis III mission, though work on that award is currently on hold pending review of bid protests filed with the Government Accountability Office (GAO). The total runout for HLS over the FY2021-FY2026 budget horizon would be \$8.7 billion.

The FY2022 request proposes \$91.5 million for Advanced Cislunar and Surface Capabilities to support formulation of lunar surface logistics systems, including surface mobility (rovers) and habitation systems; \$785 million for the Gateway, a human-rated outpost in lunar orbit; and funding for developing and testing high-priority exploration technologies and capabilities;

research and technology development toward protecting and understanding human health and performance in deep space exploration.

Spaceflight Operations

The request for Space Operations (called “LEO and Spaceflight Operations” in the FY2022 request) is \$4.02 billion, an increase of \$29.2 million (0.7%) above the FY2021 appropriation. The account funds human spaceflight operations in LEO, including activities associated with the International Space Station (ISS).

International Space Station (ISS). The Administration is requesting \$1.3 billion for the operation, maintenance, and research conducted aboard the ISS of which \$1 billion is for Systems Operations and Maintenance an increase of \$34 million (3.4%) over the FY2021 appropriation and \$279.4 million is for technology development and basic and applied research, including the ISS National Lab. The FY2022 budget proposal also would transfer demand stimulation activities—those activities intended to develop and mature the demand side of the LEO economy—from the Commercial LEO Development program into the ISS Research account.

Space Transportation. The request includes nearly \$1.8 billion to support the safe transport of U.S. astronauts and cargo to and from the ISS under the Space Transportation account, a decrease of \$101.2 million (5.4%) from the FY2022 appropriation. Most of the budget, or \$1.6 billion (\$44.0 above the FY2021 enacted level, an increase of 2.8%), would go toward the Crew and Cargo Program Transportation account, which would fund operational cargo missions under the Commercial Resupply Services contract (CRS-2) (providers: Northrop Grumman, SpaceX, and Sierra Nevada) and commercial crew missions which have begun for SpaceX under the Commercial Crew transportation Capability (CCtCap) contracts. The second provider, Boeing, is scheduled to launch its second uncrewed Orbital Flight Test in July 2021 and the Crewed Flight Test no earlier than the first quarter of FY2022. Once Boeing’s vehicle is certified, NASA is planning for a total of at least two commercial crew missions per year.

Space and Flight Support. The Administration is requesting \$817.0 million for Space and Flight Support, which provides mission critical space communications, launch and test services, and astronaut training in service of NASA and other government and non-government customer missions using NASA infrastructure.

Commercial LEO Development. The Administration is requesting \$101.1 million for the Commercial LEO Development program, an increase of \$84.1 million (494.7%) over the FY2021 appropriation. NASA intends to use the Commercial LEO Development program to develop a robust commercial space economy in LEO. Activities supported under this account in 2022, NASA would continue to support the development of “free-flying”—that is, orbiting in LEO separately from the ISS—commercial LEO destinations that will lead to eventual demonstrations. NASA would also continue development of a new commercial segment for the ISS.

Space Technology Mission Directorate

The Administration is requesting \$1.43 billion for the Space Technology Mission Directorate (STMD) in FY2022, a \$325 million (29.5%) increase over the FY2021 appropriation.

Table 2: STMD Budget (\$ millions)

| | FY21 Enacted | FY22 Request | Change FY22 - FY21 | |
|---|------------------|-----------------|-----------------------|-------------|
| | | | Amount | Percent |
| NASA Total | 23,271.28 | 24,801.5 | 1,530.22 | 6.6% |
| Space Technology Mission Directorate | 1,100.0 | 1,425.0 | 325.0 | 29.5% |
| Early Stage Innovation and Partnerships | 117.5 | 145.0 | 27.5 | 23.4% |
| Technology Maturation | 227.1 | 491.2 | 264.1 | 116.3% |
| Technology Demonstration | 528.4 | 501.8 | -26.6 | -5.0% |
| SBIR and STTR | 227.0 | 287.0 | 60.0 | 26.4% |

Source: NASA, FY2022 Budget Request Congressional Justification

STMD funds critical technology development to support emerging, innovative technologies for exploration, science, and cross-cutting activities within five strategic thrust areas: Go (rapid, safe, and efficient space transportation), Land (expanded access to diverse surface destinations), Live (sustainable living and working farther from Earth), and Explore (transformative missions and discoveries), and Lead (ensuring American global leadership in space technology).

Early Stage Innovations and Partnerships. Within the Early Stage Innovations and Partnerships Program (ESIP), NASA funds concepts studies, applied research, and early technology development, with an emphasis on identifying emerging concepts and technologies that support NASA’s long-term objectives in robotic and human exploration of space. In FY2022, the administration is proposing \$145 million for ESIP, an increase of \$27.5 million, or 23.4%, over the FY2021 appropriation. Of that increase, NASA would spend at least \$10 million to support climate research and clean energy economy investments.

Technology Maturation. The STMD Technology Maturation program focuses on technologies beyond early stage research, but not yet at the level of flight demonstration, that fulfill the needs of multiple stakeholders, which include NASA’s mission directorates, commercial partners, and other government agencies. In FY2022, the administration is proposing \$264.1 million for Technology Maturation, an increase of \$264.1 million, or 116.3%, over the FY2021 enacted level. According to the Congressional Justification, in FY2022, NASA would introduce a new Industry and Commerce Innovation Opportunity to provide open topic calls for industry to identify and propose activities to further enable commercial development of key technologies.

Technology Demonstration. Under the Technology Demonstration program, STMD proposes to conduct ground-based and space-based testing and demonstrations to transition new technologies to NASA exploration missions, as well as potentially on to industry or other federal agencies. Major projects within Technology Demonstration portfolio include the Restore and SPIDER On-orbit Servicing, Assembling, and Manufacturing 1 (OSAM-1) mission, the Laser Communications Relay Demo, Solar Exploration Propulsion, the Flight Opportunities program,

and Small Spacecraft Technology. The FY2022 budget proposal does not support any nuclear propulsion technology demonstration activities; in FY2021, nuclear propulsion was appropriated \$110 million.

Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR). STMD manages the agency’s federal SBIR and STTR programs in support of NASA’s missions.

Science Mission Directorate

The Administration is requesting \$7.9 billion for the Science Mission Directorate (SMD), an increase of \$630.6 million (8.6%) from the FY2021 appropriation.

Table 3: NASA SMD Budget (\$ millions)

| | FY21 Enacted | FY22 Request | Change FY21 - FY20 | |
|----------------------------------|------------------|-----------------|-----------------------|-------------|
| | | | Amount | Percent |
| NASA Total | 23,271.28 | 24,801.5 | 1,530.22 | 6.6% |
| Science Mission Directorate | 7,300.8 | 7,931.4 | 630.6 | 8.6% |
| Earth Science | 2,000.0 | 2,250.0 | 250.0 | 12.5% |
| Planetary Science | 2,699.8 | 3,200.0 | 500.2 | 18.5% |
| Astrophysics | 1,356.2 | 1,400.2 | 44.0 | 3.2% |
| James Webb Space Telescope | 414.7 | 175.4 | -239.3 | -57.7% |
| Heliophysics | 751.0 | 796.7 | 45.7 | 6.1% |
| Biological and Physical Sciences | 79.1 | 109.1 | 30.0 | 37.9% |

Source: NASA, FY2022 Budget Request Congressional Justification

NASA SMD focuses on three overarching objectives: discovering the secrets of the Universe, searching for life in the Solar System and beyond, and protecting and improving life on Earth. SMD pursues its objectives within and across its five discipline divisions: Earth Science, Planetary Science, Astrophysics, Heliophysics, and Biological and Physical Sciences, and is guided by the current science plan⁴ and the priorities and recommendations of National Academies “decadal surveys”. Each Division funds research, development and operation of flight missions, data management systems, and technology development programs.

Earth Science. The Administration is requesting \$2.25 billion for Earth Science, an increase of \$250 million (12.5%) from the FY2021 enacted appropriation. The request supports initiating the next-generation Earth System Observatory by formally commencing development of all four large Designated Observable—top-recommended observation or measurement--missions, prioritized in the 2018 Decadal Survey, in FY2022 and establishing the Earth Science Explorer program for small- to mid-size missions led by principle investigators. In addition, The request supports continuing work on many missions already in development, including the Plankton, Aerosol, Cloud, Ocean Ecosystem (PACE) mission, the Climate Absolute Radiance and

⁴ NASA, “Science 2020-2024: A Vision for Science Excellence.” Available at: https://science.nasa.gov/science-public/s3fs-public/atoms/files/2020-2024_Science.pdf.

Refractivity Observatory (CLARREO) Pathfinder mission, Landsat-9, NASA-ISRO Synthetic Aperture Radar (NISAR), and the Surface Water and Ocean Topography (SWOT) mission.

The budget proposal also includes \$72.7 million for the Applied Sciences Program, an increase of \$9.8 million (15.6%) over the FY2021 enacted level. The Applied Science Program supports the use of scientific results and satellite observations for practical use by public and private sector organizations, and the increase in FY2022 would support a new Application and Research Team focused on science-informed solutions to addressing climate impacts, as well as new efforts to support climate and environmental resilience activities, including specific activities on wildfire forecasting, renewable energy, building energy efficiency, and agricultural needs.

Planetary Science. The President's FY2022 budget requests \$3.2 billion for the Planetary Science Division, an increase of \$500 million (18.5%) from the FY2021 enacted level. The budget request supports the continued development of the Mars Sample Return mission, with a launch readiness date of no earlier than 2026. Planetary Science also funds missions and research related to planetary defense, the identification, characterization, and possible mitigation of asteroids and comets that are potentially hazardous to Earth.

Within the Planetary Science Division, the Lunar Discovery and Exploration Program (LDEP), which is part of the Agency's Artemis Moon to Mars exploration initiative, is proposed for \$451.5 million in FY2021, an increase of \$53.8 million (12.1%) over the FY2021 appropriation. The request includes Commercial Lunar Payload Delivery Service (CLPS) contracts—lander services to deliver NASA-funded science payloads to the lunar surface—and development of small satellites, instruments, and other activities and payloads that serve scientific, exploration, and resource utilization needs, including the Volatiles Investigating Polar Exploration Rover (VIPER).

Astrophysics. The Administration's FY2022 budget request for the Astrophysics Division is \$1.4 billion, a \$44 million (3.2%) increase from the FY2021 enacted level. The request would provide full funding for the development of the Nancy Grace Roman Space Telescope (formerly WFIRST) and a number of operating telescopes, including the Hubble Space Telescope, Chandra X-ray Observatory, and the Transiting Exoplanet Satellite Survey mission. The request proposes to terminate operations of the Stratospheric Observatory for Infrared Astronomy (SOFIA), which has been funded annually at \$85 million, due to its high cost relative to its scientific productivity.

James Webb Space Telescope (JWST). The Administration is requesting \$175.4 million for the development of JWST, which would continue to follow the rebaselined budget profile established in 2018. JWST's current development cap is \$8.8 billion and lifecycle cost of \$9.7 billion. The budget supports the October 2021 launch readiness date determined after a schedule risk assessment was conducted in June 2020 to evaluate the impacts of COVID-19 and technical challenges.⁵ JWST is managed as a separate program and budget line independent of the Astrophysics Division, which has been the case since FY2011 as a way to improve oversight and control of the project.

⁵ <https://www.nasa.gov/press-release/nasa-announces-new-james-webb-space-telescope-target-launch-date>.

Heliophysics. The Administration is requesting \$796.7 million for the Heliophysics Division, an increase of \$45.7 million (6.1%) from the FY2021 appropriation. The Heliophysics Division supports efforts to improve our understanding of the Sun, the Sun-Earth connection and its implication for life on Earth, and the Sun’s interaction with the rest of the Solar System and beyond. In FY2022, the proposed budget would support the development of the next Living with a Star mission, the Geospace Dynamics Constellation (GDC), a decadal survey priority. The Space Weather Science and Applications program, within the Heliophysics Division’s Living With a Star program, supports the transition of heliophysics results, technologies, and tools to the space user community to address the impacts of space weather, and the program is proposed for \$9.9 million in FY2022, a decrease of \$15.1 million (60%).

Biological and Physical Sciences. The Biological and Physical Sciences (BPS) Division supports the study of biological and physical systems under extreme environmental conditions found in space that was previously funded in HEOMD under the Space Life and Physical Sciences Research and Applications program. In FY2021, NASA moved that research to SMD and established the new BPS Division. The FY2022 request proposes \$109.1 million for BPS, an increase of \$30 million (37.9%). The request for BPS would support plans for a “major shift in research strategy from a broad to a focused portfolio” with a focus on investments in three research areas: Thriving In Deep Space (TIDES), Quantum Physics, and Soft Matter.

Aeronautics Research Mission Directorate

The Aeronautics Research Mission Directorate (ARMD) FY2022 budget request is \$914.8 million, an \$86.1 million (10.4%) increase over the FY2021 appropriation. According to the Congressional Justification document, the increase to ARMD’s budget would accelerate key components of the Sustainable Flight National Partnership (SFNP), which will demonstrate multiple technologies for the next-generation single-aisle aircraft, which is targeting deployment in the early 2030s with at least 25% better fuel efficiency than today. The SFNP will feature a full-scale sustainable flight demonstrator (X-plane) to validate an integrated system of advanced, more efficient power and propulsion technologies for the engine and aircraft design and manufacturing. In FY2022, the increased funding would accelerate the sustainable flight demonstrator, electrified powertrain flight demonstrations, subsonic technology research, aircraft operations, and university research into net-zero carbon emissions aviation technologies.

Table 4: ARMD Budget (\$ millions)

| | FY21 Enacted | FY22 Request | Change FY21 - FY20 | |
|---|------------------|-----------------|-----------------------|-------------|
| | | | Amount | Percent |
| NASA Total | 23,271.28 | 24,801.5 | 1,530.22 | 6.6% |
| Aeronautics Research Mission Directorate | 828.7 | 914.8 | 86.1 | 10.4% |
| Airspace Operations and Safety Program | 92.0 | 104.5 | 12.5 | 13.6% |
| Advanced Air Vehicles Program | 211.4 | 243.7 | 32.3 | 15.3% |
| Integrated Aviation Systems Program | 278.7 | 301.5 | 22.8 | 8.2% |
| Transformative Aero Concepts Program | 129.7 | 148.0 | 18.3 | 14.1% |
| Aerosciences Evaluation and Test Capabilities | 116.9 | 117.0 | 0.1 | 0.1% |

Source: NASA, FY2022 Budget Request Congressional Justification

ARMD is guided by a Strategic Implementation Plan,⁶ which has identified six research thrusts for the program: Safe, Efficient Growth in Global Operations; Innovation in Commercial Supersonic Aircraft; Ultra-Efficient Subsonic Transports; Safe, Quiet, and Affordable Vertical Lift Air Vehicles; In-Time System-Wide Safety Assurance; and Assured Autonomy for Aviation Transformation. The FY2022 ARMD budget would support four programs: the Airspace Operations and Safety Program, which focuses research on the safe and efficient growth of global operations; the Advanced Air Vehicles Program, which conducts research on ultra-efficient vehicles, the Integrated Aviation Systems Program (IASP), which carries out integrated system-level research and technology, the Transformative Aero Concepts Program, which supports high-risk research across multiple strategic thrust areas for ARMD; and the Aerosciences Evaluation and Test Capabilities (AETC) account, which manages aerospace facilities, such as wind tunnels, for the entire agency.

Within IASP, NASA’s FY2022 budget request proposes \$91.2 million for the Electrified Powertrain Flight Demonstration (EPFD) to expand to two major awards, as well as the initiation of the sustainable flight demonstrator, targeting first flight in FY2026. The FY2022 request would support continuation of the Low Boom Flight Demonstrator (LBFD), which is an experimental aircraft (X-plane) development program managed under both AAVP (flight research) and IASP (development and operation of vehicle). As part of the LBFD program, the X-59 QueSST aircraft mission will provide data to federal and international regulators and standards-setting bodies to support quiet supersonic overland flight.

The FY2022 request would also support testing and integration of electric propulsion components and systems, fundamental research on hypersonics, the safe integration of the rapidly increasing number of autonomous aircraft into the National Airspace System, and the University Leadership Initiative.

Office of STEM Engagement

In the FY2022 budget proposal, the administration is proposing to fund the Office of STEM Engagement at \$147 million, an increase of \$20 million (15.7%) over the FY2021 appropriation.

Table 5: Office of STEM Engagement Budget (\$ millions)

| | FY21 Enacted | FY22 Request | Change FY22 - FY21 | |
|---|------------------|-----------------|-----------------------|-------------|
| | | | Amount | Percent |
| NASA Total | 23,271.28 | 24,801.5 | 1,530.22 | 6.6% |
| Office of STEM Engagement | 127.0 | 147.0 | 20.0 | 15.7% |
| National Space Grant College and Fellowship Program | 51.0 | 57.0 | 6.0 | 11.8% |
| Established Program to Stimulate Competitive Research | 26.0 | 26.0 | 0.0 | 0% |
| Minority University Research and Education Project | 38.0 | 48.0 | 10.0 | 26.3% |
| Next Gen STEM | 12.0 | 16.0 | 4.0 | 33.3% |

Source: NASA, FY2022 Budget Request Congressional Justification

⁶ Available at: <https://www.nasa.gov/aeroresearch/strategy>.

As noted in the table above, the request proposes increases for the Next Gen STEM project to support K-12 formal and informal learner engagement; for Space Grant, to increase partnerships with NASA’s mission directorates; and for the Minority University Research and Education Project (MUREP), to enable greater connections with Minority Serving Institutions and to establish new high school bridge programs and fellowships.

Mission Support Directorate

The Administration is requesting \$3.5 billion for the accounts managed by the Mission Support Directorate (MSD) to provide the support, infrastructure, and capabilities to enable the agency’s portfolio of missions.

Table 6: MSD Budget (\$ millions)

| | FY21 Enacted | FY22 Request | Change FY22 - FY21 | |
|---|------------------|-----------------|-----------------------|-------------|
| | | | Amount | Percent |
| NASA Total | 23,271.28 | 24,801.5 | 1,530.22 | 6.6% |
| Mission Support Directorate | 3,365.0 | 3,439.5 | 74.5 | 2.2% |
| Safety, Security, and Mission Services | 2,936.5 | 3,049.2 | 112.7 | 3.8% |
| Mission Services and Capabilities | 1,918.3 | 2,028.80 | 110.5 | 5.8% |
| Engineering, Safety, and Operations | 1,018.2 | 1,020.40 | 2.2 | 0.2% |
| Construction & Environmental Compliance & Restoration | 428.5 | 390.3 | -38.2 | -8.9% |
| Construction of Facilities | 370.4 | 315.6 | -54.8 | -14.8% |
| Environmental Compliance and Restoration | 58.1 | 74.7 | 16.6 | 28.6% |

Source: NASA, FY2022 Budget Request Congressional Justification

Safety, Security, and Mission Services

The Administration is requesting \$3 billion for Safety, Security, and Mission Services (SSMS) in FY2022, an increase of \$75 million (2.2%) over the FY2021 appropriation. SSMS supports capabilities, workforce, and facilities to enable NASA operations and missions. The SSMS budget was reorganized in FY2021 into two new themes, Mission Services and Capabilities (MSaC) and Engineering, Safety, and Operations (ESO). Under the MSaC theme, NASA manages three enterprise service programs: Information Technology, Mission Enabling Services (agency-wide business operations and mission support), and Infrastructure and Technical Capabilities (facilities sustainment, operations, and maintenance and technical capabilities).

Construction and Environmental Compliance and Restoration

The Administration is requesting \$390 million for Construction and Environmental Compliance and Restoration (CECR) in FY2022, a decrease of \$166 million (44%) over the FY2020 appropriation.

Construction of Facilities (CoF). CoF is a capital fund for repairs and improvements to NASA infrastructure and facilities. More than 83% of NASA’s constructed infrastructure is beyond its design life.

Environmental Compliance and Restoration (ECR). NASA is proposing \$74.7 million for ECR in FY2022, an increase of approximately \$17 million (28.6%) over the FY2021 appropriation to continue to meet all legal obligations associated with hazardous material and waste products released to the surface or groundwater at NASA installations, NASA-owned industrial plants supporting NASA activities, current or former sites where NASA operations have contributed to environmental problems, and other sites. The largest project in the ECR portfolio continues to be the remediation and cleanup activities at the Santa Susana Field Laboratory site in California.

Inspector General

The Administration has requested \$46.0 million in FY2022 for the Office of the Inspector General (OIG). The FY2022 request is \$1.8 million (4.1%) above the FY2021 appropriation, to support expanded activities related to the agency’s Artemis effort. The Administration is also requesting that the entire OIG budget be in the form of two-year funding.

Table 7: OIG Budget (\$ millions)

| | FY21 Enacted | FY22 Request | Change FY22 - FY21 | |
|-------------------|------------------|-----------------|-----------------------|-------------|
| | | | Amount | Percent |
| NASA Total | 23,271.28 | 24,801.5 | 1,530.22 | 6.6% |
| Inspector General | 44.2 | 46.0 | 1.8 | 4.1% |

Source: NASA, FY2022 Budget Request Congressional Justification