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National Aeronautics and Space Administration (NASA): A Primer

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SUMMARY

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January 3, 2024

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National Aeronautics and Space Administration (NASA): A Primer

The National Aeronautics and Space Administration (NASA) was established in 1958 by the National Aeronautics and Space Act (P.L. 85-568) to conduct civilian space and aeronautics activities. According to its 2022 strategic plan, NASA's mission is to "explore the unknown in air and space, innovate for the benefit of humanity, and inspire the world through discovery." With a budget of $25.6 billion in FY2023, about 17,000 civil service employees, and about 35,000 contractors, NASA has programs in science, human spaceflight, space technology development, aeronautics research, and science, technology, engineering, and mathematics (STEM) education. The agency has nine NASA-operated centers, a tenth center operated under contract as a federally funded research and development center (FFRDC), and other facilities. It also provides funding to academia and industry to conduct research, develop systems such as new spacecraft, and provide services such as space launch.

Among the issues facing Congress—through the annual appropriations process and potentially in authorization legislation—are oversight and funding for the Artemis initiative to resume human exploration of the Moon for the first time since the Apollo program; the future of the International Space Station (ISS) and oversight of the commercial providers that transport crews and cargo to and from the ISS under NASA contract; research priorities in Earth science, planetary science, and other fields; and aeronautics initiatives such as the development of experimental demonstrator aircraft for supersonic passenger flight and electric propulsion.

The core capabilities for the Artemis program are a crew capsule, known as Orion, and a heavy-lift rocket to launch Orion into space, known as the Space Launch System (SLS). Orion and the SLS have been in development since a congressional mandate in the NASA Authorization Act of 2010 (P.L. 111-267). An uncrewed test flight of Orion and SLS, known as Artemis I, was completed successfully in 2022. A first crewed test, known as Artemis II, is anticipated in 2024. The crewed Artemis III mission, including the first human lunar landing since 1972, is anticipated in 2025. Subsequent Artemis missions are planned.

Between 2012 and 2019, ISS crews, including U.S. astronauts, were carried exclusively by Russian Soyuz spacecraft. NASA has crew transport contracts with two U.S. companies, SpaceX and Boeing. The first operational crewed flight by SpaceX was in 2020. Boeing plans a test flight in 2024. ISS operation is authorized through at least FY2030 by the NASA Authorization Act of 2022 (P.L. 117-167, Section 10815). At some point, even if operations are extended further, the ISS will reach the end of its useful life. After the ISS, NASA expects to rely on commercially operated space stations to provide services and facilities in low Earth orbit (LEO). NASA's Commercial LEO Development program is supporting several companies to develop such capabilities. NASA has acknowledged that there may be a gap between the end of ISS operations and the first availability of commercial alternatives.

NASA is led by an Administrator, who is subject to confirmation by the Senate. Five mission directorates manage most of the agency's programs: Exploration Systems Development, Space Operations, Science, Space Technology, and Aeronautics Research. Exploration Systems Development and Space Operations manage human spaceflight activities, while Science manages robotic spaceflight and other scientific research. In addition, the Office of STEM Engagement manages NASA education programs. The five mission directorates and the Office of STEM Engagement each have their own appropriations account and are each led by an Associate Administrator. Separate appropriations accounts fund Construction and Environmental Compliance and Remediation; Safety, Security, and Mission Services; and the NASA Inspector General.

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Introduction

The National Aeronautics and Space Administration (NASA) was established in 1958 by the National Aeronautics and Space Act (P.L. 85-568) to conduct civilian space and aeronautics activities. According to its 2022 strategic plan, NASA's mission is to "explore the unknown in air and space, innovate for the benefit of humanity, and inspire the world through discovery."[1] With a budget of $25.6 billion in FY2023, about 17,000 civil service employees, and about 35,000 contractors, NASA has programs in science, human spaceflight, space technology development, aeronautics research, and science, technology, engineering, and mathematics (STEM) education. The agency has nine NASA-operated centers, a tenth center operated under contract as a federally funded research and development center (FFRDC), and other facilities. It also provides funding to academia and industry to conduct research, develop systems such as new spacecraft, and provide services such as space launch.

Among the issues facing Congress—through the annual appropriations process and potentially in authorization legislation—are oversight and funding for the Artemis initiative to resume human exploration of the Moon for the first time since the Apollo program; the future of the International Space Station (ISS) and oversight of the commercial providers that transport crews and cargo to and from the ISS under NASA contract; research priorities in Earth science, planetary science, and other fields; and aeronautics initiatives such as the development of experimental demonstrator aircraft for supersonic passenger flight and electric propulsion.

This report describes the organization of NASA, its budget, and its major programs. It also provides brief discussions of selected other topics of frequent congressional interest. The intent is to provide an overview of NASA and its activities, along with references for further information.

Organization

NASA is led by an Administrator, who is "appointed from civilian life by the President by and with the advice and consent of the Senate."[2] The current Administrator is former Senator Bill Nelson. The NASA Administrator is not a member of the President's Cabinet. Three other NASA positions are also subject to Senate confirmation: the Deputy Administrator,[3] Chief Financial Officer,[4] and Inspector General.[5]

The organization of NASA is documented in NASA Policy Directive NPD 1000.3E.[6] Management of most of the agency's major programs is organized into five mission directorates: Exploration Systems Development, Space Operations, Science, Space Technology, and

[1] NASA, *NASA Strategic Plan 2022*, p. 3, https://www.nasa.gov/wp-content/uploads/2023/09/fy-22-strategic-plan-1.pdf.

[2] 51 U.S.C. §20111(a). The meaning of the phrase *civilian life* was much discussed in 2009 when President Obama nominated Charles F. Bolden, Jr., a Major General in the U.S. Marine Corps who had worked in the private sector since retiring from the military in 2003. For more details, see the record of his nomination hearing before the Senate Commerce Committee, July 8, 2009, https://www.govinfo.gov/content/pkg/CHRG-111shrg54285/pdf/CHRG-111shrg54285.pdf, including memoranda from the Department of Justice (p. 83) and from CRS (p. 89). General Bolden was confirmed as NASA Administrator on July 15, 2009.

[3] 51 U.S.C. §20111(b).

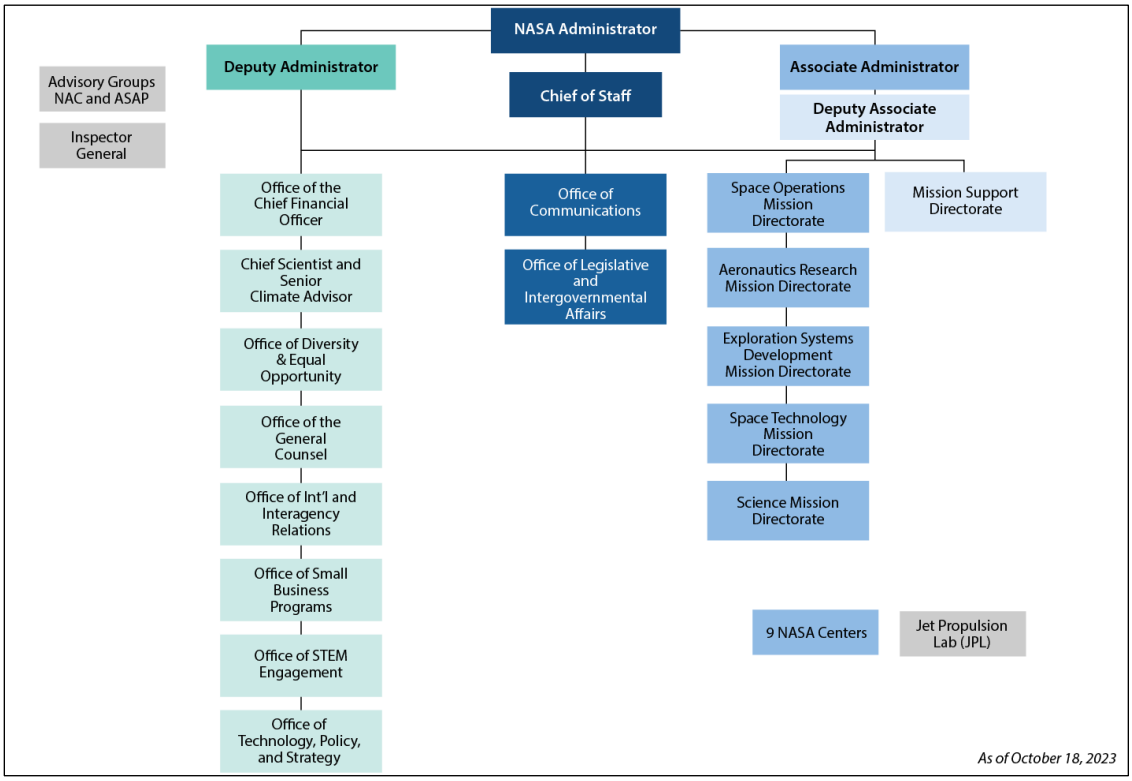
[4] 31 U.S.C. §901.

[5] 5 U.S.C. §403.

[6] NASA, *The NASA Organization*, NASA Policy Directive NPD 1000.3E, https://nodis3.gsfc.nasa.gov/npg_img/N_PD_1000_003E_/N_PD_1000_003E_.pdf. See also https://www.nasa.gov/organization/.

Aeronautics Research (see **Figure 1**).[7] In addition, the Office of STEM Engagement manages NASA education programs. The five mission directorates and the Office of STEM Engagement each have their own appropriations account and are each led by an Associate Administrator. The programs managed by these offices are discussed in more detail later in this report.

Figure 1. NASA Organization Chart



Source: CRS, adapted from https://www.nasa.gov/wp-content/uploads/2023/10/nasa-org-chart-oct-2023.pdf.

Notes: NAC = NASA Advisory Council. ASAP = Aerospace Safety Advisory Panel. STEM = Science, Technology, Engineering, and Mathematics.

Centers

NASA operates nine centers:

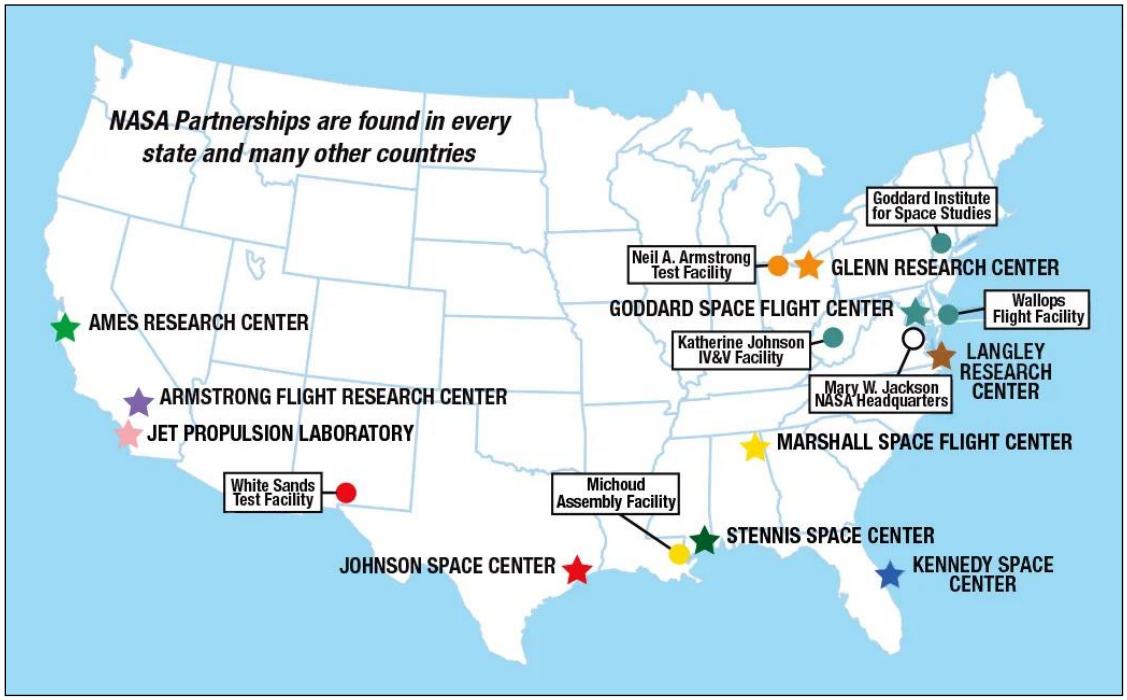
- Ames Research Center, Moffett Field, CA;
- Armstrong Flight Research Center, Edwards, CA;
- Glenn Research Center, Cleveland, OH;
- Goddard Space Flight Center, Greenbelt, MD;
- Johnson Space Center, Houston, TX;
- Kennedy Space Center, FL;
- Langley Research Center, Hampton, VA;
- Marshall Space Flight Center, Huntsville, AL; and

[7] Before September 21, 2021, the Exploration Systems Mission Directorate and the Space Operations Mission Directorate were combined as the Human Exploration and Operations Mission Directorate.

- Stennis Space Center, MS.

The Jet Propulsion Laboratory (JPL), in Pasadena, CA, is an FFRDC operated by the California Institute of Technology (Caltech) under a NASA contract; it is sometimes considered a tenth center.[8] Other NASA facilities are operated under the auspices of a center and do not themselves have center status. See **Figure 2**.

Figure 2. Map of NASA Centers and Major Facilities



Source: NASA, https://www.nasa.gov/partnerships/nasa-locations-capabilities-and-points-of-contact/.

Notes: Alaska and Hawaii not shown. Stars indicate centers and the Jet Propulsion Laboratory, a federally funded research and development center. Circles indicate other facilities, colored to indicate the center with which they are affiliated. For more information on NASA centers and facilities, see https://science.nasa.gov/about-us/nasa-centers/.

The Directors of the NASA centers report directly to the Office of the Administrator, not through the mission directorates. Congress does not appropriate funds directly to the centers, but some centers focus primarily on the programs of a particular mission directorate. For example, Goddard Space Flight Center is funded mostly by the Science Mission Directorate, while Marshall Space Flight Center is funded mostly by the Exploration Systems Development Mission Directorate. JPL reports programmatically to (and is mostly funded by) the Science Mission Directorate.

Deferred maintenance at NASA facilities is a perennial challenge.[9] As of March 2023, NASA reported a deferred maintenance backlog of $3 billion.[10]

[8] For more information on FFRDCs, see CRS Report R44629, *Federally Funded Research and Development Centers (FFRDCs): Background and Issues for Congress*, by Marcy E. Gallo.

[9] See, for example, House Committee on Science, Space, and Technology, Subcommittee on Space and Aeronautics, *Enabling Mission Success from the Ground Up: Addressing NASA's Urgent Infrastructure Needs*, hearing held July 29, 2021, https://www.govinfo.gov/content/pkg/CHRG-117hhrg45205/pdf/CHRG-117hhrg45205.pdf.

[10] FY2024 congressional budget justification, p. SSMS-35, https://www.nasa.gov/wp-content/uploads/2023/03/nasa-fy-2024-cj-v3.pdf.

Personnel

Between the centers, headquarters, and other agency facilities, NASA has about 17,000 civil service employees.[11] The aging of the NASA workforce, retirement trends, and the alignment of skills with needs are issues of frequent congressional interest. Statistical data on employee age, retirement eligibility, job category, and other demographic factors are available on the Workforce Information Cubes for NASA (WICN) website.[12]

The number of civil service employees significantly understates the total NASA workforce. On-site and near-site contractor employees outnumber civil servants by about 2 to 1.[13] Nearly all staff at JPL, for example, are employees of Caltech, not NASA.

Budget and Appropriations

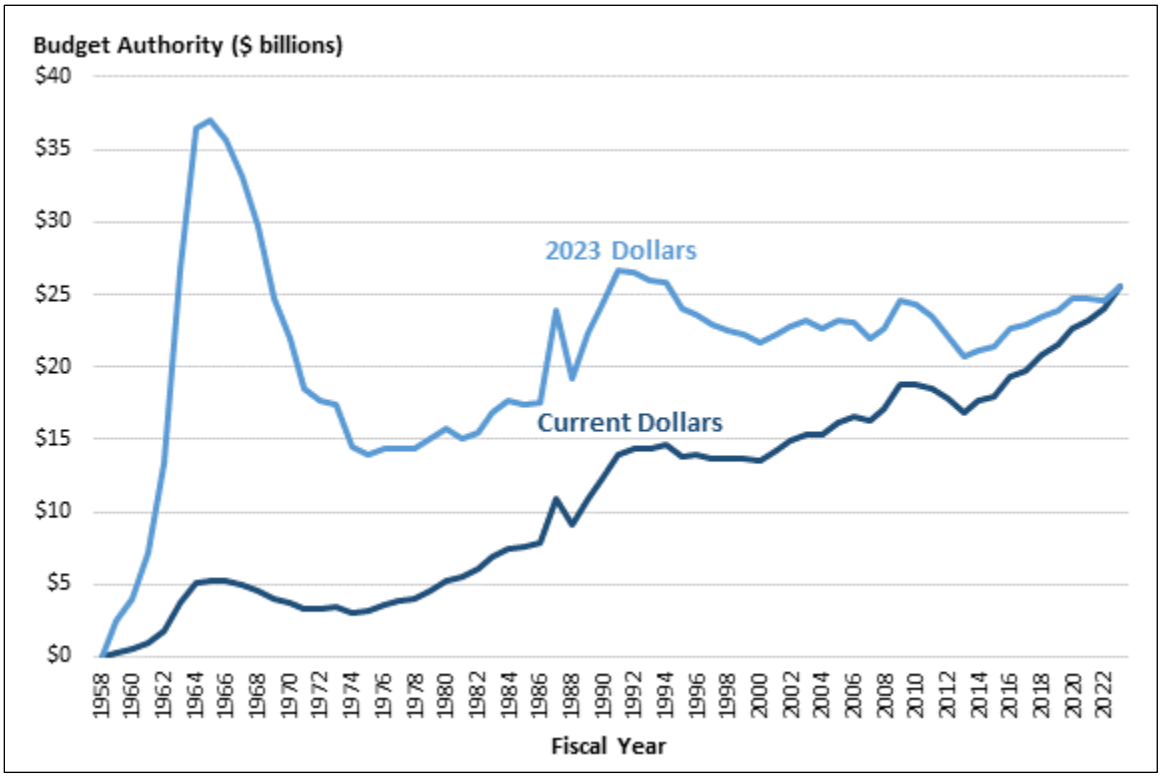
Figure 3 shows NASA's total budget since its establishment. The large peak in the 1960s funded the Apollo program. The smaller spike in FY1987 funded the construction of the space shuttle *Endeavour* to replace the shuttle *Challenger* after its loss in January 1986. Since that time, NASA funding has been relatively stable, after adjusting for inflation, with a gradual increasing trend over the past decade.

[11] Based on full-time equivalents (FTEs). For a breakdown by center and appropriations account, see NASA's FY2024 congressional budget justification, p. SD-7, https://www.nasa.gov/wp-content/uploads/2023/03/nasa-fy-2024-cj-v3.pdf.

[12] See NASA, Workforce Information Cubes for NASA (WICN), https://wicn.nssc.nasa.gov/wicn_cubes.html.

[13] In FY2022, on a work-year equivalent (WYE) basis, NASA had 35,473 on-site or near-site contractor personnel performing recurring work for non-prime contractors. (NASA Office of Legislative Affairs, email to CRS, December 13, 2023)

Figure 3. Total NASA Budget, FY1958-FY2023



Source: Compiled by CRS. FY1958-FY2008 from National Aeronautics and Space Administration, *Aeronautics and Space Report of the President: Fiscal Year 2008 Activities*, Table D-1A, http://history.nasa.gov/presrep2008.pdf. FY2009-FY2022 from NASA congressional budget justifications, FY2011-FY2024, adjusted for supplemental appropriations, rescissions, and sequestration not shown in the justifications. FY2023 from P.L. 117-328 and explanatory statement, *Congressional Record*, December 20, 2022, pp. S7945-S7950. Current dollars deflated to FY2023 dollars using GDP (chained) price index from President's budget for FY2023, Historical Table 10.1, https://www.whitehouse.gov/omb/historical-tables/.

Notes: Transition quarter between FY1976 and FY1977 not shown.

Proposed funding for NASA for the next fiscal year is included annually in the President's budget, released in early February (it is sometimes delayed).[14] NASA provides more detailed information, including program descriptions, status updates, and other data, in an annual congressional budget justification released with or shortly after the President's budget.[15] Congress acts on the Administration's request through the annual appropriations legislation developed by the House and Senate Appropriations Subcommittees on Commerce, Justice, Science, and Related Agencies (CJS). Bill language specifies appropriations for each NASA account and sometimes provides additional statutory direction, while language in accompanying committee reports and conference reports or explanatory statements typically provides extensive guidance about individual programs and projects. The CRS Appropriations Status Table tracks the progress of CJS appropriations legislation.[16] See also CRS Report R43419, *NASA Appropriations and Authorizations: A Fact Sheet*, by Daniel Morgan, which includes tables of NASA funding data for the year under current budget consideration as well as a few years of historical data.

[14] See Office of Management and Budget, "Budget," https://www.whitehouse.gov/omb/budget/.

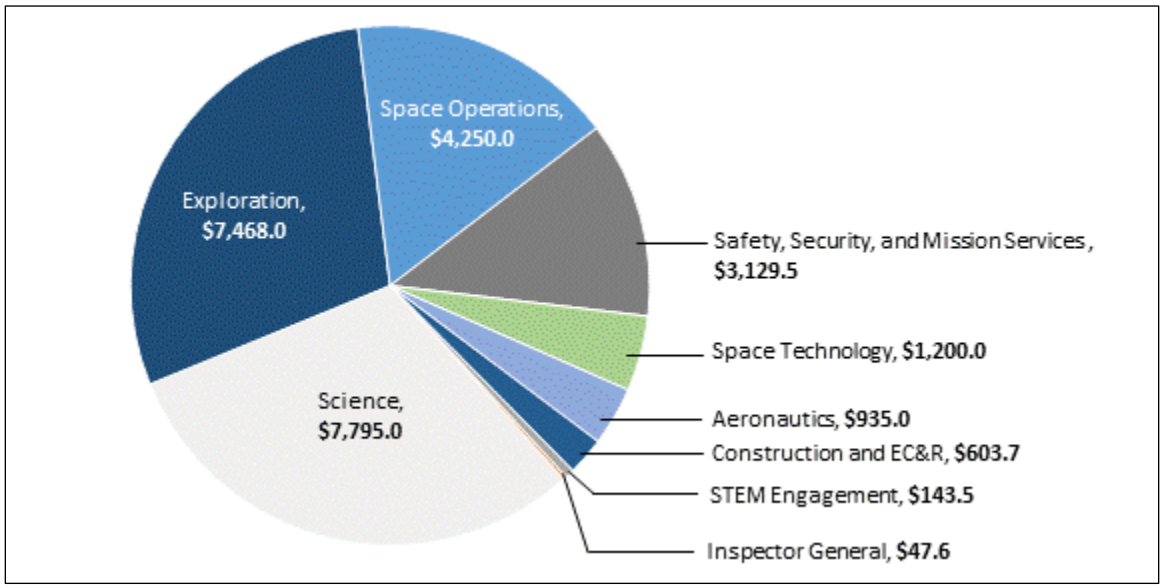
[15] See NASA, "Budgets and Reports," https://www.nasa.gov/budgets-plans-and-reports/.

[16] See CRS, Appropriations Status Table, https://www.crs.gov/AppropriationsStatusTable/.

Figure 4 shows NASA's FY2023 appropriations by account. The accounts for Science, Exploration, Space Operations, Space Technology, Aeronautics, STEM Engagement, and Inspector General fund the corresponding mission directorates and offices. Construction and Environmental Compliance and Remediation funds construction and environmental activities at NASA facilities. Safety, Security, and Mission Services (SSMS) funds a wide range of other supporting services, including operations and maintenance at NASA facilities. The SSMS account is currently the only NASA account that includes funding designated by Congress for community projects (sometimes known as earmarks).[17]

Figure 4. NASA Appropriations by Account, FY2023

Budget authority in millions



Source: P.L. 117-328, Divisions B and N, and explanatory statement, *Congressional Record*, December 20, 2022, pp. S7945-S7950.

Notes: STEM = science, technology, engineering, and mathematics. EC&R = environmental compliance and remediation.

In both the President's budget request and congressional appropriations legislation, funds are allocated by program and topic, not by NASA center or facility, even for projects that are managed largely or entirely at a single center. Each annual congressional budget justification, however, includes a table showing the anticipated distribution of funds from each appropriations account to each center.[18]

Major Programs

NASA programs fall into five main categories: science, human spaceflight, crosscutting space technology development, aeronautics, and education. The two largest are science—conducted mostly with satellites and other uncrewed spacecraft—and human spaceflight. A separate program develops crosscutting space technologies to enable future missions. A program of aeronautics

[17] For more information, see CRS Report R46722, *Community Project Funding: House Rules and Committee Protocols*, by Megan S. Lynch.

[18] See, for example, NASA's FY2024 congressional budget justification, p. SD-2, https://www.nasa.gov/wp-content/uploads/2023/03/nasa-fy-2024-cj-v3.pdf.

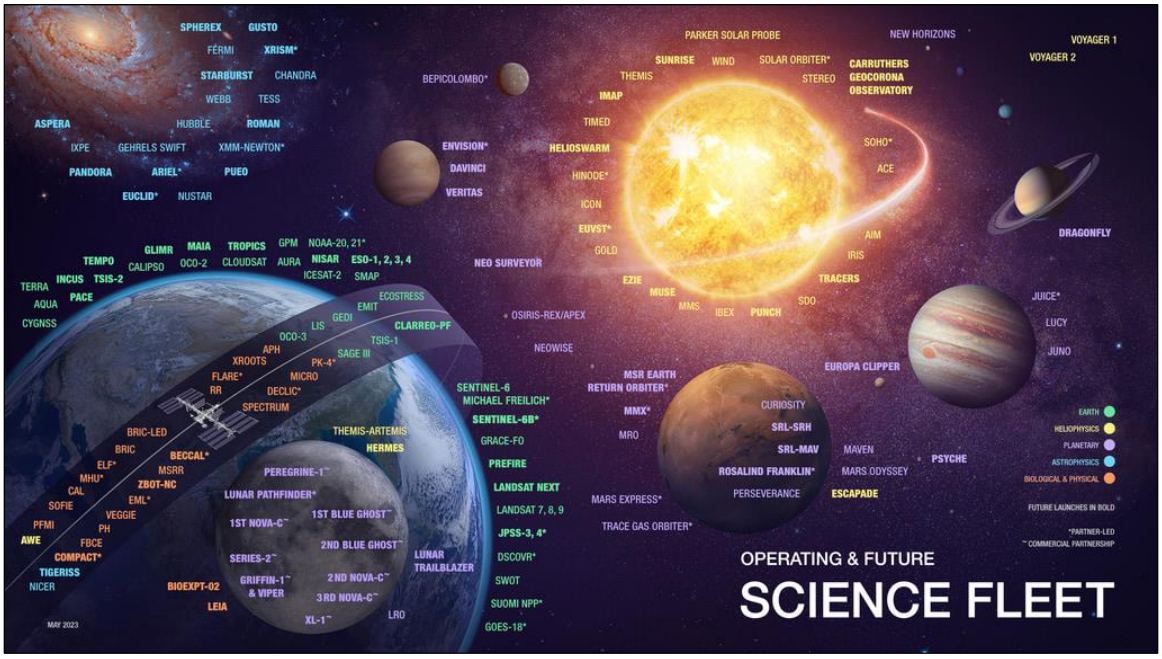
research seeks to advance flight within the atmosphere. An education program seeks to capitalize on NASA's scientific and technological capabilities to advance STEM education.

Science

NASA's Earth and space science activities are managed by the Science Mission Directorate (SMD) and funded though the Science appropriations account. They are organized into five programs: Earth Science, Planetary Science, Astrophysics, Heliophysics, and Biological and Physical Sciences. Each of these programs operates a fleet of satellites and other spacecraft, as shown in **Figure 5**.

Figure 5. NASA Operational and Planned Science Missions

(as of May 2023)



Source: NASA, Goddard Space Flight Center, https://svs.gsfc.nasa.gov/31162.

Earth Science

Earth Science conducts research on Earth's atmosphere, oceans, and land, as well as the biological and other processes that they undergo, primarily using observations from satellites in Earth orbit. The program also includes some aircraft-based projects. Climate science is a key motivator for this program, but the same satellites and sensors typically also provide data for research on a wide range of other topics, such as floods, droughts, wildfires, agriculture, and urban development.

The main focus of this program, like the other Science programs, is basic scientific research. The same imagery and other data, however, can sometimes also be useful for more applied purposes. Within Earth Science, the Applied Sciences subprogram facilitates the use of NASA satellite data,

collected for research purposes, for use in applications such as response to natural disasters, drought monitoring, and agriculture.[19]

In partnership with the U.S. Geological Survey (USGS), an agency of the Department of the Interior, the Earth Science program develops and launches the Earth-imaging satellites of the Landsat program. After launch, Landsat satellites are operated by USGS. For more information, see CRS Report R46560, *Landsat 9 and the Future of the Sustainable Land Imaging Program*, by Anna E. Normand.

Planetary Science

Planetary Science conducts research on the Solar System's other planets, as well their moons, Earth's own Moon, asteroids, and comets. This work is conducted using robotic spacecraft that orbit or fly past those bodies or land on them for closer inspection. A Planetary Science mission of recent congressional interest is Mars Sample Return, which is intended to retrieve geological and atmospheric samples from Mars and return them to Earth for scientific study. An independent review board for the Mars Sample Return mission concluded in September 2023 that "there is currently no credible, congruent technical, nor properly margined schedule, cost, and technical baseline that can be accomplished with the likely available funding."[20] The National Academies of Sciences, Engineering, and Medicine has recommended that the Mars Sample Return mission "is of fundamental strategic importance to NASA, U.S. leadership in planetary science, and international cooperation and should be completed as rapidly as possible. However, its cost should not be allowed to undermine the long-term programmatic balance of the planetary portfolio."[21]

Astrophysics

Astrophysics studies objects beyond the Solar System, such as galaxies, planets around other stars (known as exoplanets), and the history and evolution of the universe as a whole. This program includes familiar projects such as the Hubble Space Telescope, in Earth orbit, and the James Webb Space Telescope, in a distant orbit beyond the Moon. The James Webb Space Telescope encountered a series of high-profile budget and schedule challenges during development,[22] but was launched in December 2021 and is operational. Another Astrophysics mission, the Nancy Grace Roman Space Telescope (formerly the Wide-Field Infrared Survey Telescope, WFIRST), is scheduled for launch in 2027. An Inspector General report in 2021 found that its budget and schedule had been "significantly" affected (a $400 million increase and a six-month delay) by the COVID-19 pandemic.[23] In appropriations report language, Congress has expressed "the expectation that NASA will use a $3,500,000,000 development cost cap in execution of the mission."[24]

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[19] See NASA, Earth Science, Applied Sciences, https://appliedsciences.nasa.gov/.

[20] NASA, *Mars Sample Return (MSR): Independent Review Board-2 Final Report*, September 1, 2023, p.17, https://www.nasa.gov/wp-content/uploads/2023/09/mars-sample-return-independent-review-board-report.pdf.

[21] National Academies of Sciences, Engineering, and Medicine, *Origins, Worlds, and Life: A Decadal Strategy for Planetary Science and Astrobiology 2023-2032* (2023), p. 3, https://nap.nationalacademies.org/catalog/26522/origins-worlds-and-life-a-decadal-strategy-for-planetary-science.

[22] See CRS In Focus IF10940, *The James Webb Space Telescope*, by Daniel Morgan.

[23] NASA, Office of Inspector General, *COVID-19 Impacts on NASA's Major Programs and Projects*, IG-21-016, p. 18, https://oig.nasa.gov/docs/IG-21-016.pdf.

[24] Explanatory statement accompanying the Consolidated Appropriations Act, 2023 (P.L. 117-328), *Congressional Record*, December 20, 2022, p. S7946.

Heliophysics

The Heliophysics program studies the Sun itself as well as its impact on space weather and other phenomena elsewhere in the Solar System. It uses satellites in orbit around the Earth and the Sun as well as other more distant locations. Research on space weather through the Heliophysics program is part of a broader emphasis on space weather across multiple agencies in recent years, including an executive order issued in 2016, an interagency strategy and action plan issued in 2019, enactment of the Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow (PROSWIFT) Act (P.L. 116-181) in 2020, and an interagency research and operations framework issued in 2022.[25]

Biological and Physical Sciences

The smallest SMD program, Biological and Physical Sciences, uses the unique characteristics of space, such as microgravity, to conduct fundamental research in the biological and physical sciences. This research is done mostly using experiments conducted on or attached to the International Space Station (ISS). Before FY2021, the program was managed and funded as an element of the ISS program rather than as a separate activity within the Science Mission Directorate.[26]

Research and Analysis

Each of the five Science programs has its own Research and Analysis (R&A) program, devoted to supporting research based on data from existing spacecraft. The satellites and other spacecraft used in these programs are multiyear, multimillion-dollar (or more) missions. The cost of such missions is not uniform over time. Typically, costs are modest as a mission is being planned and designed, then ramp up rapidly for the manufacturing and launch of the spacecraft, then drop again once the spacecraft is operational. Funding for long-term operations and scientific data analysis nevertheless looms large in ensuring the scientific value of NASA's spacecraft investments. The availability of resources for R&A is a perennial focus of congressional oversight.

National Academies of Sciences, Engineering, and Medicine Decadal Surveys

NASA's Science programs rely heavily on a regular sequence of advisory reports from the National Academies of Sciences, Engineering, and Medicine (NASEM). Conducted approximately every 10 years for each major program area, these reports are known as decadal surveys. They provide guidance about scientific priorities, program management, and other matters, and are generally seen as reflecting the consensus of the U.S. scientific community. As well as a source of input, they are often used by NASA to justify actions it proposes to Congress, or conversely by Congress to justify direction it gives to NASA. Since the NASA Authorization Act of 2008 (P.L. 110-422), NASA's continued use of NASEM decadal surveys has been mandated in statute.[27] As well as these regular decadal reports, NASEM frequently provides other

[25] For more information, see CRS Report R46049, *Space Weather: An Overview of Policy and Select U.S. Government Roles and Responsibilities*, by Eva Lipiec and Brian E. Humphreys.

[26] For more on the organizational history of this program, see Marcia Smith, "Congress Approves Move of Biological and Physical Sciences from HEOMD to SMD," *SpacePolicyOnline.com*, June 12, 2020, https://spacepolicyonline.com/news/congress-approves-move-of-biological-and-physical-sciences-from-heomd-to-smd/.

[27] 51 U.S.C. §20305.

advice to NASA on particular topics outside the decadal cycle, sometimes at NASA's request, sometimes based on congressional direction.[28]

The most recent decadal surveys for the five Science programs are as follows:

- Earth Science: *Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space* (2018)[29]
- Planetary Science: *Origins, Worlds, and Life: A Decadal Strategy for Planetary Science and Astrobiology 2023-2032* (2023)[30]
- Astrophysics: *Pathways to Discovery in Astronomy and Astrophysics for the 2020s* (2023)[31]
- Heliophysics: *Solar and Space Physics: A Science for a Technological Society* (2013)[32]
- Biological and Physical Sciences: *Thriving in Space: Ensuring the Future of Biological and Physical Sciences Research: A Decadal Survey for 2023-2032* (2023)[33]

Joint Agency Satellite Division

Also within the Science Mission Directorate is the Joint Agency Satellite Division,[34] which manages the development and launch of weather satellites and other space-based instruments for the National Oceanic and Atmospheric Administration (NOAA, an agency in the Department of Commerce). NOAA reimburses NASA for these activities, which therefore appear in NOAA's budget, not NASA's.[35] Once operational after launch, the satellites are operated by NOAA directly.

Human Spaceflight

NASA's human spaceflight programs are managed by the Exploration Systems Development Mission Directorate (ESDMD) and the Space Operations Mission Directorate (SOMD), which are

[28] For example, in 2020, the Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow (PROSWIFT) Act (P.L. 116-181) mandated a NASEM review of a strategy developed by NASA and other agencies for observation of space weather. (51 U.S.C. §60602(c))

[29] National Academies of Sciences, Engineering, and Medicine (NASEM), *Thriving on Our Changing Planet: A Decadal Strategy for Earth Observation from Space*, 2018, https://nap.nationalacademies.org/catalog/24938/thriving-on-our-changing-planet-a-decadal-strategy-for-earth.

[30] NASEM, *Origins, Worlds, and Life: A Decadal Strategy for Planetary Science and Astrobiology 2023-2032*, 2023, https://nap.nationalacademies.org/catalog/26522/origins-worlds-and-life-a-decadal-strategy-for-planetary-science.

[31] NASEM, *Pathways to Discovery in Astronomy and Astrophysics for the 2020s*, 2023, https://nap.nationalacademies.org/catalog/26141/pathways-to-discovery-in-astronomy-and-astrophysics-for-the-2020s.

[32] NASEM, *Solar and Space Physics: A Science for a Technological Society*, 2013, https://nap.nationalacademies.org/catalog/13060/solar-and-space-physics-a-science-for-a-technological-society. For the progress of the next decadal survey of heliophysics, see https://www.nationalacademies.org/our-work/decadal-survey-for-solar-and-space-physics-heliophysics-2024-2033.

[33] NASEM, *Thriving in Space: Ensuring the Future of Biological and Physical Sciences Research: A Decadal Survey for 2023-2032*, 2023, https://nap.nationalacademies.org/catalog/26750/thriving-in-space-ensuring-the-future-of-biological-and-physical-sciences-research-a-decadal-survey-for-2023-2032.

[34] See NASA, Science Mission Directorate, Joint Agency Satellite Division, https://science.nasa.gov/about-us/smd-programs/joint-agency-satellite-division/.

[35] See CRS In Focus IF12406, *National Oceanic and Atmospheric Administration (NOAA) FY2024 Budget Request and Appropriations*, by Eva Lipiec.

funded though the Exploration and Space Operations appropriations accounts, respectively. SOMD focuses on operational activities, particularly those associated with the International Space Station (ISS), while ESDMD focuses on the development of future capabilities, particularly those associated with the Artemis program to return humans to the Moon.

International Space Station

The ISS orbits at an altitude of about 240 miles and is composed of crew living space, laboratories, remote manipulator systems, solar arrays to generate electricity, and other elements. As well as providing facilities for research and technology development, it serves as a test bed for future human exploration missions to more distant destinations. Rotating crews from the United States, Russia, the European Union, and other countries have occupied it continuously since November 2000.

In an effort to increase use of the ISS by other federal agencies and the private sector, the NASA Authorization Act of 2005 (P.L. 109-155, Sec. 507) designated the U.S. portion of the ISS as a national laboratory. The NASA Authorization Act of 2010 subsequently directed NASA to contract with a nonprofit organization to manage the ISS national laboratory (P.L. 111-267, Sec. 504). In 2011, NASA selected the Center for the Advancement of Science in Space (CASIS) as the ISS national laboratory managing organization.[36]

The framework for international cooperation on the ISS is the Intergovernmental Agreement on Space Station Cooperation, signed in 1998 by representatives of the United States, Russia, Japan, Canada, and 11 European countries.[37] The agreement is implemented through memoranda of understanding between NASA and its counterpart agencies in the other countries. Russia's participation at the operational level appears mostly unaffected by international tensions arising from Russia's 2022 invasion of Ukraine, despite some concerning statements from Russian officials in the early stages of the war.[38]

NASA used to rely on the space shuttle to carry U.S. cargo and crews to and from the ISS. The shuttle fleet was retired in 2011. Since 2012, two U.S. commercial providers—Space Exploration Technologies (SpaceX) and Northrop Grumman (formerly Orbital ATK)—have carried ISS cargo under NASA contracts. A third cargo provider, Sierra Nevada Corporation, also has a contract and is planning its first orbital launch and demonstration flight to the ISS in 2024. Between 2012 and 2019, ISS crews, including U.S. astronauts, were carried exclusively by Russian Soyuz spacecraft. NASA has crew transport contracts with two U.S. companies, SpaceX and Boeing. The first operational crewed flight by SpaceX was in 2020. Boeing plans a test flight in 2024. To ensure cross-training for safety purposes, some U.S. astronauts still fly on Soyuz, and some Russian cosmonauts fly on NASA-contracted SpaceX flights, on a no-exchange-of-funds basis.

ISS operations were originally scheduled to continue only through FY2016. Statutory authority for continued U.S. operation of the ISS was extended through at least FY2020 by the NASA Authorization Act of 2010 (P.L. 111-267, Section 503(a)); through at least FY2024 by the U.S. Commercial Space Launch Competitiveness Act (P.L. 114-90, Section 114(b)); and through at least FY2030 by the NASA Authorization Act of 2022 (P.L. 117-167, Section 10815). At some point, even if operations are extended further, the ISS will reach the end of its useful life. To

[36] See International Space Station National Laboratory, https://www.issnationallab.org/.

[37] See Intergovernmental Agreement on Space Station Cooperation, 1998, https://www.state.gov/wp-content/uploads/2019/02/12927-Multilateral-Space-Space-Station-1.29.1998.pdf.

[38] See, for example, Eric Berger, "The Western Space Community Should Put Dmitry Rogozin on 'Ignore,'" *Ars Technica,* May 2, 2022, https://arstechnica.com/science/2022/05/the-western-space-community-should-put-dmitry-rogozin-on-ignore/. At the time of the 2022 invasion, Rogozin was the head of Roscosmos, the Russian space agency.

mitigate the risk of creating hazardous orbital debris, NASA plans to deorbit the ISS in a controlled manner.[39] It has issued a request for proposals for a Deorbit Vehicle, with contract awards anticipated in 2024.[40]

After the ISS, NASA expects to rely on commercially operated space stations to provide services and facilities in low Earth orbit (LEO). NASA's Commercial LEO Development program is supporting several companies to develop such capabilities. NASA has acknowledged that there may be a gap between the end of ISS operations and the first availability of commercial alternatives.[41]

Artemis

The core capabilities for the Artemis program are a crew capsule, known as Orion, and a heavy-lift rocket to launch Orion into space, known as the Space Launch System (SLS). Orion and the SLS have been in development since a congressional mandate in the NASA Authorization Act of 2010 (P.L. 111-267). An uncrewed test flight of Orion and SLS, known as Artemis I, was completed successfully in 2022. A first crewed test, known as Artemis II, is anticipated in 2024. The crewed Artemis III mission, including the first human lunar landing since 1972, is anticipated in 2025.[42] Subsequent Artemis missions are planned.

Orion will not land directly on the Moon. Instead, a Human Landing System (HLS) is being developed to carry crews between lunar orbit and the lunar surface. NASA has contracted with two U.S. companies, SpaceX and Blue Origin, to provide HLS capabilities as a commercial service. NASA's decision to rely on commercial providers rather than NASA-owned spacecraft, and NASA's initial 2021 selection of SpaceX as the single provider, were both controversial in Congress. Since the award of a second contract to Blue Origin in 2023, congressional attention has focused on the progress of HLS development and whether the system will be available in time for Artemis III.

For missions after Artemis III, NASA is developing a modular platform, known as Gateway, to be placed in a permanent orbit around the Moon. The first two Gateway modules—the Power and Propulsion Element (PPE) and the Habitation and Logistics Outpost (HALO, a pressurized habitat for astronauts)—are currently in development, with launch anticipated in 2025. Several of the planned subsequent modules will be contributed in-kind by international partners.[43] Gateway is intended to serve as a depot for storing supplies, a platform for science experiments, a location where subsystems launched separately can be assembled and integrated, and a rendezvous point where astronauts can transfer between Orion and the HLS and potentially, at some point in the future, depart for other, more distant destinations, such as Mars.

Other elements of Artemis include space suits, a surface habitat, a lunar rover, surface power systems, and so on. All these are in various stages of design and development.

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[39] For more information, see NASA, "Frequently Asked Questions About the International Space Station Transition Plan," https://www.nasa.gov/faqs-the-international-space-station-transition-plan/.

[40] See NASA, "United States Deorbit Vehicle Contract," https://www.nasa.gov/johnson/jsc-procurement/usdv/.

[41] Jeff Foust, "NASA Acknowledges Possibility of Short-Term Post-ISS Gap," *Space News*, November 22, 2023, https://spacenews.com/nasa-acknowledges-possibility-of-short-term-post-iss-gap/.

[42] As of December 2023, NASA is reviewing this schedule. According to the Government Accountability Office, Artemis III is likely to be delayed to early 2027. (Government Accountability Office, *NASA Artemis Programs: Crewed Moon Landing Faces Multiple Challenges*, GAO-24-106256, November 30, 2023, https://www.gao.gov/products/gao-24-106256)

[43] For more details, see NASA, "NASA's Gateway Program," https://www.nasa.gov/reference/nasas-gateway-program.

The cost and schedule of the Artemis program overall, as well as of its individual elements, are a topic of continuing congressional scrutiny. At congressional direction,[44] the Government Accountability Office has issued a number of reports reviewing the progress of SLS and of Artemis in general.[45]

For more information, see CRS In Focus IF11643, *Artemis: NASA's Program to Return Humans to the Moon*, by Daniel Morgan.

Space Technology

NASA's activities in crosscutting space technology development are managed by the Space Technology Mission Directorate (STMD) and funded though the Space Technology appropriations account. The program was established to focus on technologies that can enable future space missions, rather than those needed for a specific mission currently under development. STMD has developed a strategic framework that organizes its investments and desired outcomes into categories such as advanced propulsion, in-situ resource utilization, and advanced avionics.[46] Technologies for space nuclear power and propulsion are a frequent focus of congressional interest.

STMD also manages the agency's Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs.[47] For more information on federal SBIR and STTR programs, see CRS Report R43695, *Small Business Research Programs: SBIR and STTR*, by Marcy E. Gallo.

Aeronautics

NASA's aeronautics activities are managed by the Aeronautics Research Mission Directorate (ARMD) and funded though the Aeronautics appropriations account. The program conducts research and development (R&D) on technologies for aviation, including aviation safety and environmental impact, as well as for air traffic management. Topics of frequent congressional interest include rotorcraft, hypersonic flight, electric propulsion and sustainable fuels, and the development of demonstrator aircraft, such as the X-59 Quiet Supersonic Technology (QueSST) experimental aircraft and the X-66A Sustainable Flight Demonstrator.[48]

The NASA Aeronautics Strategic Implementation Plan 2023 sets out ARMD's overall strategy, describes its role in six identified thrust areas, and discusses its needs for crosscutting research, workforce, and test capabilities.[49]

[44] For example, see H.Rept. 117-97, p. 134.

[45] For example, see Government Accountability Office, *Space Launch System: Cost Transparency Needed to Monitor Program Affordability*, GAO-23-105609, September 7, 2023, https://www.gao.gov/products/gao-23-105609; and *NASA Artemis Programs: Crewed Moon Landing Faces Multiple Challenges*, GAO-24-106256, November 30, 2023, https://www.gao.gov/products/gao-24-106256.

[46] See NASA, TechPort, "Strategic Framework," https://techport.nasa.gov/framework.

[47] See NASA, Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Program, https://sbir.nasa.gov/.

[48] For more information on supersonic passenger aircraft, including NASA's role, see CRS Report R45404, *Supersonic Passenger Flights*, coordinated by Rachel Y. Tang.

[49] See NASA, *NASA Aeronautics Strategic Implementation Plan 2023*, https://www.nasa.gov/wp-content/uploads/2021/04/sip-2023-final-508.pdf.

STEM Education

NASA's STEM education activities are mostly managed by the Office of STEM Engagement and funded though the STEM Engagement appropriations account. The Office has three main programs: the National Space Grant College and Fellowship Program (Space Grant), the Minority University Research and Education Project (MUREP), and the Established Program to Stimulate Competitive Research (EPSCoR). In addition, the Next Gen STEM program supports K-12 education and informal education at institutions such as museums and science centers.[50] These programs are authorized by Section 10851 of the CHIPS and Science Act (P.L. 117-167). Other STEM education activities are embedded in some of the agency's research programs, such as the Global Learning and Observations to Benefit the Environment (GLOBE) program, in Earth Science, and the Science Activation project, in Astrophysics.[51]

Space Grant

Space Grant supports education and student research through grants to consortia of colleges and universities.[52] There are 52 Space Grant consortia, one in each of the 50 states and one each in the District of Columbia and Puerto Rico. Consortia are selected competitively, usually every five years. In report language accompanying annual appropriations legislation, Congress often specifies a floor for the annual amount to be provided to each consortium. The Space Grant program was established in 1987 by the National Space Grant College and Fellowship Act (P.L. 100-147, Title II).[53]

MUREP

MUREP supports education and research at Minority Serving Institutions (MSIs), including Historically Black Colleges and Universities, Hispanic Serving Institutions, and other MSIs.[54] Funds are awarded competitively.

EPSCoR

NASA's EPSCoR program supports R&D at colleges and universities in states that have historically been less successful at competing for federal R&D funding.[55] For more information on federal EPSCoR programs, see CRS Report R44689, *Established Program to Stimulate Competitive Research (EPSCoR): Background and Selected Issues*, by Laurie A. Harris.

Selected Other Topics

The remainder of this report consists of short sections addressing other focused topics of frequent congressional interest, including NASA's statutory authorities; where to find NASA policies and other Administration policies affecting NASA; space act agreements; where to find NASA

[50] See NASA, "Next Gen STEM for Educators," https://www.nasa.gov/learning-resources/for-educators/.

[51] See NASA, "GLOBE," https://www.nasa.gov/get-involved/globe/; and NASA, "Learn: Science Activation," https://science.nasa.gov/learn/.

[52] See NASA, National Space Grant College and Fellowship Project, https://www.nasa.gov/learning-resources/national-space-grant-college-and-fellowship-project/.

[53] For the act as amended, see 51 U.S.C. Chapter 403.

[54] See NASA, "MUREP," https://www.nasa.gov/learning-resources/minority-university-research-education-project/.

[55] See NASA, "Established Program to Stimulate Competitive Research," https://www.nasa.gov/learning-resources/established-program-to-stimulate-competitive-research/.

funding data by state or district; NASA's regulatory role; the Artemis Accords; the Wolf Amendment prohibiting NASA collaboration with China; and major sources of external advice and analysis regarding NASA policies and programs.

Statutory Authorities

Most laws focused on NASA are codified in U.S. Code Title 51, which was created in 2010 to consolidate space-related statutes that had previously been in various other titles. The main exception is provisions derived from the NASA Authorization Act of 2010 (P.L. 111-267), which appear in 42 U.S.C. Chapter 159. Other relevant statutes are codified in a variety of titles. For example, statutes giving NASA special authorities regarding hiring and employment are codified along with related authorities for other agencies at 5 U.S.C. Chapter 98.

The foundation for most of Title 51 is the National Aeronautics and Space Act of 1958 (P.L. 85-568), the act that established NASA. Congress has enacted many amendments and additions since then, both in periodic broader-ranging NASA authorization acts and in focused legislation (e.g., the One Small Step to Protect Human Heritage in Space Act [P.L. 116-275] and the NASA Enhanced Use Leasing Extension Act of 2018 [P.L. 115-403]). Although NASA authorization acts are typically introduced and considered during most Congresses, they are not necessarily enacted on a regular annual or multiyear schedule, unlike some other authorization bills (such as the defense authorization bill and the farm bill).[56] Two have been enacted in the past decade: the NASA Transition Authorization Act of 2017 (P.L. 115-10) and the NASA Authorization Act of 2022 (P.L. 117-167, Division B, Title VII).

Agency and Administration Policies

NASA has formal policies on a variety of topics, ranging from its own organization, management, and personnel to its procurement and the formulation and management of its programs. Current agency-wide policies are compiled and searchable at the NASA Online Directives Information System (NODIS).[57] They include high-level NASA Policy Directives (NPDs), more detailed NASA Procedural Requirements (NPRs), and guidebooks known as NASA Advisory Implementing Instructions (NAIIs), along with other less common categories.

Policies for NASA are also sometimes established at the Administration level through documents such as the National Space Policy, presidential Space Policy Directives, executive orders, and more focused national policies such as the Presidential Memorandum on Launch of Spacecraft Containing Space Nuclear Systems.[58] Such policies may be coordinated via the National Space Council, which consists of the NASA Administrator, the heads of other agencies with space activities, and other senior Administration officials, chaired by the Vice President.[59] They may also be issued by the Office of Science and Technology Policy (OSTP) in the Executive Office of

[56] For a historical perspective, see the section on NASA in CRS Report R43862, *Changes in the Purposes and Frequency of Authorizations of Appropriations*, by Jessica Tollestrup.

[57] See NASA, NODIS Library, https://nodis3.gsfc.nasa.gov/main_lib.cfm.

[58] For a compilation of such policies, see NOAA, Office of Space Commerce, "Space Policies," https://www.space.commerce.gov/policy/.

[59] See The White House, National Space Council, https://www.whitehouse.gov/spacecouncil/. For the council's statutory authorities, see Section 501 of the NASA Authorization Act, Fiscal Year 1989 (P.L. 100-685) and other provisions set out as notes under 51 U.S.C. §20111. See also Executive Order 14056, *The National Space Council*, December 1, 2021, https://www.federalregister.gov/documents/2021/12/03/2021-26459/the-national-space-council.

the President, or the National Science and Technology Council (NSTC).[60] Administration-level policies such as these are often high-level strategies or implementation plans with a focus on interagency coordination.

Space Act Agreements

At NASA's establishment, the National Aeronautics and Space Act of 1958 (P.L. 85-568), commonly known as the Space Act, authorized the new agency to "enter into and perform such contracts, leases, cooperative agreements, or other transactions as may be necessary in the conduct of its work and on such terms as it may deem appropriate."[61] The phrase "other transactions" allows NASA to craft agreements that are functionally contracts but are not subject to certain federal contracting requirements, such as the Federal Acquisition Regulation (FAR). Such agreements are known as space act agreements (SAAs). Guidelines for the use of SAAs are contained in NASA's *Space Act Agreements Guide*.[62] A number of other agencies have subsequently received "other transaction" authority (OTA), usually with more detailed statutory guidance. The intent is typically to give agencies and companies more flexibility to negotiate the terms of an agreement, often when a company is paying all or part of the cost of its share of the agreed work.[63]

NASA Funding by State and District

The NASA Procurement Data View (NPDV) website allows any user to search for NASA contracts and other awards by contractor name or geographically by state and district.[64] Searches can be filtered by the type of award recipient (e.g., small business, educational institution, or nonprofit organization) and results can be presented either as dollar totals for the selected fiscal year or as detailed information on individual awards.

Regulatory Role

NASA is generally not a regulatory agency, but it does issue regulations, such as 14 C.F.R. Chapter V (largely governing NASA's own operations and its interactions with other entities); 2 C.F.R., Subtitle B, Chapter XVIII (regarding requirements for NASA grants and other awards); and 48 C.F.R. Chapter 18 (the NASA supplement to the FAR).

The NASA Administrator serves on the FAR Council,[65] which was established by the Office of Federal Procurement Policy Act Amendments of 1988 (P.L. 100-679) to assist in the direction and coordination of procurement policy and procurement regulatory activities across the federal government. Under that authority, changes to the government-wide FAR (48 C.F.R. Chapter 1)

[60] See, for example, NSTC, *National Preparedness Strategy for Near-Earth Object Hazards and Planetary Defense*, April 2023, https://www.whitehouse.gov/wp-content/uploads/2023/04/2023-NSTC-National-Preparedness-Strategy-and-Action-Plan-for-Near-Earth-Object-Hazards-and-Planetary-Defense.pdf. For more information on OSTP and NSTC and their relationship, see CRS Report R47410, *The Office of Science and Technology Policy (OSTP): Overview and Issues for Congress*, by Emily G. Blevins.

[61] 51 U.S.C. §20113(e).

[62] NASA, *Space Act Agreements Guide*, NASA Advisory Implementing Instruction NAII 1050-1D, https://nodis3.gsfc.nasa.gov/OPD_docs/NAII_1050_1D_.pdf.

[63] For more information on OTs, see CRS Report R45521, *Department of Defense Use of Other Transaction Authority: Background, Analysis, and Issues for Congress*, by Heidi M. Peters.

[64] See NASA, NASA Procurement Data View (NPDV), https://prod.nais.nasa.gov/cgibin/npdv/npdv.cgi.

[65] See Acquisition.gov, Federal Acquisition Regulatory Council, https://www.acquisition.gov/far-council.

are issued jointly by NASA, the Department of Defense, and the General Services Administration. In practice, though, FAR changes are initiated and developed via the Civilian Agency Acquisition Council (CAAC) and the Defense Acquisition Regulations (DAR) Council, for review by the FAR Council.[66] The CAAC and the DAR Council both have a broader base of agency participation than the FAR Council itself.

Note that NASA does *not* regulate commercial space activities, which generally fall under the regulatory jurisdiction of the Federal Aviation Administration, the Department of Commerce, and the Federal Communications Commission. For more information, see CRS Report R45416, *Commercial Space: Federal Regulation, Oversight, and Utilization*, by Daniel Morgan.

Artemis Accords

The Artemis Accords are agreements between NASA and its counterpart agencies in other countries, establishing "principles for cooperation in the civil exploration and use of the Moon, Mars, comets, and asteroids."[67] NASA and seven other countries signed the Accords in October 2020. More than 20 additional countries have signed since then. Negotiations with the partner countries are co-led by NASA and the Department of State.[68] The Accords articulate principles, mostly based on the Outer Space Treaty of 1967,[69] rather than operational details.[70] NASA considers participation in the Accords a prerequisite for collaboration with NASA on the Artemis lunar exploration initiative, although the scope of the Accords is not limited to that. Note that the Artemis Accords are nonbinding agreements between NASA and other national space agencies; they do not have the status of a treaty.

Wolf Amendment (Prohibiting Cooperation with China)

The Wolf Amendment—named after its original author, former Representative Frank Wolf—is a provision in annual appropriations acts that prohibits most bilateral NASA cooperation with China. It was first enacted in 2011 as Section 539 of the Commerce, Justice, Science, and Related Agencies Appropriations Act, 2012 (P.L. 112-55, Division B). It has been repeated each year since then, with some variations from year to year. The FY2023 version prohibits bilateral NASA cooperation with China and the hosting of official Chinese visitors at NASA facilities, unless NASA certifies to Congress that an activity (1) poses no risk of technology or information transfer with national security or economic security implications and (2) will not involve knowing interactions with officials directly involved in human rights violations.[71]

[66] See 48 C.F.R. §1.201-1.

[67] See NASA, "Principles for a Safe, Peaceful, and Prosperous Future," https://www.nasa.gov/artemis-accords/.

[68] See Department of State, "Artemis Accords," https://www.state.gov/artemis-accords/.

[69] See United Nations, Office for Outer Space Affairs, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html.

[70] Some of the signatory countries also have more detailed operational agreements with NASA. See, for example, *Framework Agreement Between the National Aeronautics and Space Administration of the United States of America and the Israel Space Agency for Cooperation in Aeronautics and the Exploration and Use of Airspace and Outer Space for Peaceful Purposes* (2015), https://www.state.gov/wp-content/uploads/2019/02/15-1013-Israel-Space-Coop-Peaceful-Uses.pdf.

[71] See Section 526 of the Commerce, Justice, Science, and Related Agencies Appropriations Act, 2023 (P.L. 117-328, Division B).

The NASA Office of Inspector General issues an annual report on NASA's cooperation with China, listing any new or ongoing bilateral activities and confirming whether NASA made the required certifications to Congress for those activities.[72]

Major Sources of Assessment/Advice

As already mentioned, NASA makes extensive use of the National Academies of Sciences, Engineering, and Medicine for decadal surveys and other advisory studies (see "National Academies of Sciences, Engineering, and Medicine Decadal Surveys" above). These studies are mostly prepared under the auspices of NASEM's Space Studies Board and Aeronautics and Space Engineering Board.[73] It also receives external advice from the NASA Advisory Council (NAC) and the Aerospace Safety Advisory Panel (ASAP), both of which periodically issue recommendations and other reports and provide advice directly during regular open meetings.[74] The NAC and ASAP both operate under the requirements of the Federal Advisory Committee Act (FACA, 5 U.S.C. Chapter 10).[75] The NASA Office of Inspector General frequently reports on its audits and investigations, with recommendations for corrective actions.[76] The Government Accountability Office frequently publishes reports and testimonies on NASA, including a congressionally mandated annual report assessing major NASA projects,[77] other reports on individual NASA programs or topics,[78] and a searchable database of open recommendations.[79]

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[72] The 2023 report is NASA Office of Inspector General, *NASA's Compliance with Federal Export Control Laws*, IG-23-009, February 6, 2023, https://oig.nasa.gov/docs/IG-23-009.pdf. For the Wolf Amendment, see pp. 1-2.

[73] See National Academies of Sciences, Engineering, and Medicine, Space Studies Board, https://www.nationalacademies.org/ssb/space-studies-board; and National Academies of Sciences, Engineering, and Medicine, Aeronautics and Space Engineering Board, https://www.nationalacademies.org/aseb/aeronautics-and-space-engineering-board.

[74] Reports, meeting minutes, and other materials are available online at NASA Advisory Council, https://www.nasa.gov/nac/, and NASA Aerospace Safety Advisory Panel, https://oiir.hq.nasa.gov/asap/.

[75] For more information, see CRS In Focus IF12102, *Federal Advisory Committee Act (FACA): Committee Establishment and Termination*, by Meghan M. Stuessy; CRS In Focus IF12512, *Federal Advisory Committee Act (FACA): Membership*, by Meghan M. Stuessy and Jacob R. Straus; and CRS In Focus IF12252, *Federal Advisory Committee Act (FACA): Meeting Requirements*, by Meghan M. Stuessy.

[76] See NASA Office of Inspector General, https://oig.nasa.gov/.

[77] The 2023 report is Government Accountability Office, *NASA: Assessments of Major Projects*, GAO-23-106021, May 31, 2023, https://www.gao.gov/products/gao-23-106021. This annual report series was mandated in the explanatory statement accompanying the Omnibus Appropriations Act, 2009 (P.L. 111-8). See *Congressional Record*, February 23, 2009, p. H1825. GAO defines major projects as projects or programs with a lifecycle cost exceeding $250 million.

[78] See GAO, Reports and Testimonies, https://www.gao.gov/reports-testimonies.

[79] See GAO, Reports and Testimonies, Recommendations Database, https://www.gao.gov/reports-testimonies/recommendations-database.

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