

## National Aeronautics and Space Administration - FY 2009 Budget

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### HIGHLIGHTS

- NASA's budget request for FY 2009 is for \$17.6 billion, an increase of approximately \$497 million or 2.9 percent above the FY 2008 NASA enacted budget (see Table II-12).
- On January 14, 2004, President George W. Bush issued a directive that ushered in a new era for the nation's space exploration program—*The Vision for Space Exploration*.<sup>1</sup> Known within industry simply as “The Vision,” the new directive received considerable congressional support through the NASA Authorization Act of 2005. Because the Vision for Space Exploration is now fully underway, the name of the NASA plan is now entitled *The United States Space Exploration Policy*.
- The 2009 budget reflects the President's commitment to the U.S. Space Exploration Policy that aims to complete assembly of the International Space Station utilizing the Space Shuttle by 2010; retire the Space Shuttle by 2010; return astronauts to the Moon by the end of the next decade; and to eventually send human explorers to Mars and beyond.
- The FY 2009 request reflects the agency's Space Exploration objectives and focuses substantial resources on developing the Orion Crew Exploration Vehicle (CEV) and the Ares I Crew Launch Vehicle and other exploration-related projects.
- This renewed concentration on exploration has raised and continues to raise considerable concerns from NASA's other constituent groups, such as those serving the aeronautics and science mission directorates. The

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<sup>1</sup> The Vision for Space Exploration can be found at [http://www.nasa.gov/pdf/55584main\\_vision\\_space\\_exploration-hi-res.pdf](http://www.nasa.gov/pdf/55584main_vision_space_exploration-hi-res.pdf)

*Morgan P. Muchnick*

President's Moon and Mars initiative is being planned without significant new funding for NASA. Thus, NASA resources are being redirected to strongly focus on these exploration initiatives.

- The 2008 Presidential election poses a significant open question with respect to the future direction of NASA as an agency. It is very much an unknown as to whether a new President will continue the ambitious legacy of President George W. Bush. At the time of this writing, Presidential candidate Senator Barack Obama (D-IL) has signaled a desire to cut NASA's Space Exploration funding for greater federal education spending, thus pushing development of the Constellation system out five years. Conversely, candidates Senator Hillary Clinton (D-NY) and Senator John McCain (R-AZ) have signaled the desire to continue a strong NASA exploration policy.

- In accordance with the FY 2008 NASA appropriations legislation, the NASA FY 2009 budget request reflects a new budgeting structure: Science; Aeronautics; Exploration; Space Operations; Education; Cross Agency Support; and Inspector General. Furthermore, the Act mandated NASA to list overhead expenses as a separate account. Thus, budget requests for individual programs may appear smaller because they are not full cost, as they were in 2008.

## **INTRODUCTION**

Congress established the National Aeronautics and Space Administration (NASA) through the National Aeronautics & Space Act of 1958 to provide for all civil aeronautical and space activities of the United States.<sup>2</sup> Nearly 50 years later, NASA continues to uphold its mission to "pioneer the future in space exploration, scientific discovery, and aeronautics research."<sup>3</sup>

In May 2005, Dr. Mike Griffin was installed as the eleventh administrator of NASA. Shortly thereafter, Dr. Griffin began an aggressive program to fulfill the key elements of the Vision, which include: completing assembly of the International Space Station, retiring the Space Shuttle by 2010, introducing and utilizing a new Crew Exploration Vehicle (CEV) no later than 2014, and returning astronauts to the Moon by the end of the next decade.

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<sup>2</sup> See <http://history.nasa.gov/spaceact.html>

<sup>3</sup> See [www.nasa.gov](http://www.nasa.gov)

## NASA – FY 2009 BUDGET

Proponents of a robust aeronautics program and scientific research capability at NASA have expressed concern at the recent shift in emphasis for the Agency. Congress heeded the concerns and directed the Bush Administration to develop a complementary *National Vision for Aeronautics Research Policy*. This policy document was released in December 2006 and serves as a roadmap for NASA's prioritization plans. Subsequently, NASA released the *National Plan for Aeronautics Research and Development and Related Infrastructure* in December 2007. This document offers specific strategies to address national aerospace challenges and capabilities. The National Science and Technology Council is chairing this process under the auspices of the White House Office of Science and Technology Policy (OSTP).

To this end, NASA continues to focus on cutting-edge fundamental aeronautical research in the following key areas: foundational and multidisciplinary research to enable air-breathing access to space and entry into planetary atmospheres; stewardship of NASA's aeronautics research and test facilities; and development of technologies that will enable the transition to the Next Generation Air Transportation System (NextGen).

NASA generally has enjoyed strong congressional support through recent appropriations cycles. However, it seems likely that budgetary pressures will force Congress to make tough decisions regarding the make-up of NASA's appropriations accounts. Pressure from stakeholders outside of the exploration portfolio is mounting and Congress must decide how each of NASA's mission directorates will be funded and at what level. Within that context, NASA has repeatedly asserted that it is implementing the priorities of the President and Congress within the resources provided. President Bush has requested an increase for the FY 2009 NASA budget allocation. It is an open question as to how the Democratic Congress will view the President's budget priorities.

### **BUDGET HIGHLIGHTS**

The FY 2009 NASA budget request is for \$17.6 billion, an increase of approximately \$500 million above the FY 2008 enacted level, or \$300 million excluding a nearly \$200 million 2008 rescission. Budgets include all direct costs required to execute the programs. Indirect costs are now budgeted within Cross-Agency Support Directorate. Thus, budget numbers for individual directorates may appear to have suffered a

*Morgan P. Muchnick*

reduction in total allocation, although the difference may merely reflect a change in accounting methods (see Table II-12 for funding details).

***Science Mission Directorate:*** The total budget request for the Science Mission Directorate (SMD) is \$4.4 billion. Within the SMD are four “themes”, which represent the key areas of research this directorate is most concerned with: Earth Science, Heliophysics, Planetary Science and Astrophysics. The SMD seeks to explore issues relating to these themes by engaging the science community, sponsoring scientific research, and through the use of satellites.

The Earth Science theme request is for \$1.4 billion, for the purpose of studying “Earth from space to advance scientific understanding and meet societal needs.” To this end, the Earth Science Research and Analysis program funds basic research and modeling efforts and includes Earth Science Research and Analysis in all six Earth Science focus areas: climate variability and change; atmospheric composition; carbon cycle, ecosystems, and biogeochemistry; water and energy cycles; weather; and earth surface and interior. The President has requested \$245.7 million for this research funding, a modest \$2.4 million increase from FY 2008 enacted budget of \$243.3 million.

In addition, *Earth Science and Applications From Space: National Imperatives for the Next Decade and Beyond*, released in January 2007, is the first Decadal Survey for NASA’s Earth Science. NASA will use it as the principal determinant of new Earth Science mission priorities. The President’s 2009 budget request for Earth Science includes a large funding increase to implement the Decadal Survey’s recommendations, with the expectation of initiating at least three new missions by 2013. The Earth Science theme also supports an array of other innovative research, including the Near Earth Object Observations, and supercomputing efforts that support a variety of agencies.

The Heliophysics theme would provide \$577 million for research and analysis, which aims to solicit basic and applied research. The Heliophysics Operating Missions consist of a fleet of satellites that are taking systematic measurements of the solar structure and phenomena, the solar wind and solar energetic particles, and the Sun’s extensive electromagnetic fields. Sounding rockets provide low-cost platforms that enable direct access to the Earth’s mesosphere and lower thermosphere, so that researchers can observe the Sun’s impact on those regions. This

## NASA – FY 2009 BUDGET

year's request reflects the transfer of \$256 million for Deep Space and Near Earth Networks from Heliophysics to Space Operations.

Heliophysics Research includes an increased budget request of \$184.8 million, up from \$181.2 million in FY 2008. Furthermore, the Solar Terrestrial Probes (STP) program would see growth, up from \$105.9 million in 2008 to \$123.1 million in FY 2009.

The Planetary Science theme proposes a budget of \$1.3 billion. The purpose of this theme is to advance scientific knowledge of the origin and history of the solar system, including the history of life and whether it evolved beyond Earth.

The FY 2009 budget request includes increased grant sizes and the addition of \$344 million for three lunar science missions by 2014. Furthermore, the Planetary Data System (PDS) will ingest the large data volumes expected from the Lunar Reconnaissance Orbiter (LRO) mission developed by Exploration Sciences Mission Directorate and initiates approximately \$2 billion for outer planets flagship mission in FY 2009 for launch by 2017. Overall, Planetary Science Research would enjoy a large increase to \$271 million from \$242 million.

Finally, the Astrophysics theme proposes a budget of \$1.2 billion. This theme includes the following programs: Astrophysics research, Gamma-ray Large Space Telescope (GLAST), Discovery, James Webb Space Telescope, Hubble Space Telescope, Navigator, Stratospheric Observatory for Infrared Astronomy (SOFIA), Astrophysics Explorer, International Space Science Collaboration and Beyond Einstein.

The President's FY 2009 budget requests \$152.3 million for Astrophysics research, up from \$102.2 million. Exoplanet Exploration would fall from \$162.6 million to \$48.1 million in 2009. The Cosmic Origins program would also fall, from \$807.3 million to \$674.4 million.

***Aeronautics Research Mission Directorate:*** The Aeronautics Research Mission Directorate has only one theme, whose total budget request for FY 2009 is \$446.5 million, down from \$511.7 million in FY 2008. The Aeronautics theme is broken down into four integrated research areas: 1) fundamental aeronautics research, which includes subsonic, supersonic and hypersonic research; 2) airspace systems program (ASP), which will include, but not limited to, NASA's support for the Joint Planning and

*Morgan P. Muchnick*

Development Office (JPDO) as well as NextGen funding; 3) aviation safety programs; and 4) Aeronautics Test Program (ATP), which is dedicated to the mastery and intellectual stewardship of the core competencies of aeronautics testing, both on the ground and in the air. This program's purpose is to ensure the strategic availability of a minimum, critical suite of aeronautical test facilities, which are necessary to meet the long-term needs of the nation.

The President's request would fund Fundamental Aeronautics Research at \$235.4 million, Airspace Systems at \$74.6 million, Aviation Safety at \$62.6 million and the Aeronautics Test Program at \$73.9 million. The FY 2009 request includes \$72 million for research grants to be awarded beginning in 2009. The Aerospace Directorate at NASA is seeing smaller budget requests across the board. This is in part due to the new budgeting system at NASA. However, it is also true that NASA is using its limited resources for Space Exploration at a greater level than in the immediate past. In order to pursue a very ambitious exploration policy, such as a return of astronauts to the Moon and followed by reaching Mars, NASA must shift resources from disciplines such as Aeronautics.

***Exploration Systems Mission Directorate:*** The FY 2009 budget request for NASA includes \$3.5 billion for Exploration Systems, comprising Constellation Systems and Advanced Technology.

The Constellation Systems theme requests just over \$3 billion. Funds in this theme aim to provide for the Orion Crew Exploration Vehicle (CEV), the Ares I Crew Launch Vehicle (CLV), mission control and launch site infrastructure, communication and navigation systems, and crew services. The FY 2009 request keeps NASA on track for Orion/Ares I initial capability in March 2015 and full operational capability in FY 2016. NASA is requesting \$1.0 billion for the CLV program. This funding includes support for testing of the Ares I J-2X Upper Stage Engine. The President's request also keeps NASA on track for three Ares I flight tests prior to initial capability and two Orion/Ares I test flights with crew prior to full capability. The FY 2009 request also starts development of Ares V and Altair Lunar Lander in FY 2011 to return astronauts to the Moon by 2020. The CEV program would receive \$1.1 billion in FY 2009, a substantial increase from \$776 million.

The Commercial Crew and Cargo Capability program is being funded at \$173 million for FY 2009, an increase of \$43 million from FY 2008.

## NASA – FY 2009 BUDGET

The Advanced Capabilities theme of the Exploration Systems Mission Directorate would receive \$452.3 million. The Lunar Precursor Robotic Program (LPRP) is being funded at \$56.3 million for the FY 2009 request. Within this program is the Lunar Reconnaissance Orbiter Program, which is requesting \$40 million for FY 2009. This represents a sharp decline from the FY 2008 enacted budget total of \$147.4 million.

Also included in the Advanced Capabilities theme is the Exploration Technology Development program, which requests \$244.1 million for FY 2009, and the Human Research Program, which explores the risks to human health and mitigation options during space travel. Within the Human Research Program are the International Space Station (ISS) Medical Project, which is being funded at \$19.9 million, and Research Infusion Projects at \$131.9 million.

***Space Operations Mission Directorate:*** This category is new to the NASA budgeting structure for 2009. The Space Operations Mission Directorate (SOMD) is responsible for flying the Space Shuttle to assemble the International Space Station, ensuring safe and reliable access to space, maintaining secure and dependable communications between platforms across the solar system, and ensuring the health and safety of U.S. astronauts. SOMD is requesting \$5.8 billion for FY 2009.

Included in the SOMD is the Space Shuttle program. This program is being funded at \$3.0 billion. NASA is planning on 11 Shuttle launches through FY 2010. This includes 10 ISS assembly flights plus one Hubble servicing mission. NASA is also budgeting for two additional ISS contingency flights if they can be safely flown before 2010. Also included in this part of the budget request are personnel severance and retention costs through the Shuttle's last flight. The Space Shuttle's retirement is scheduled for 2010, to be replaced by the CLV and CEV.

The International Space Station program is requesting \$2.1 billion and includes costs related to ISS operations and ISS Cargo Crew Services. The U.S. segment of the ISS is essentially complete, although European and Japanese labs are being added in 2008. NASA has planned to expand the ISS crew to six astronauts/cosmonauts beginning in 2009, allowing NASA to fully use the ISS both as a National Laboratory and a test bed for future exploration.

*Morgan P. Muchnick*

The remainder of funds being allocated to the Space Operations Directorate falls under the Space and Flight Support program. An interesting budget highlight for FY 2009 in this area is NASA's consolidation of Deep Space, Near-Earth and Space Communications networks into a centrally managed space communications and navigation architecture within a Space Communications and Navigation program, a sub-theme within Space Operations. This will also include NASA awarding a contract for two new TDRS satellites for delivery in 2012 and 2013, as well as ongoing upgrades for NASA's integrated communications network. The Space Communications and Navigation program would receive \$582.9 million, substantially increased from \$303.9 million.

***Education Programs.*** This program was previously funded through NASA's Cross-Agency Support Programs. However, NASA has decided to categorize Education as a stand-alone program for FY 2009. The Education theme focuses on achieving NASA's vision through the development of a qualified workforce of the future. Therefore, NASA will continue to encourage students to pursue the STEM (science, technology, engineering, and mathematics) disciplines. These programs will provide opportunities for students to be involved in NASA research efforts and focus on motivating students through certain NASA programs. The request for Education is \$115.6 million, a \$31.2 million reduction from FY 2008. (For more on Education, see Chapter 4.)

***Cross-Agency Support Programs:*** Cross-Agency Support provides a focus for managing technical capability and agency mission support functions. This budget area consists of three themes: Center Management and Operations (CM&O), Agency Management and Operations, and Institutional Investments (II). Cross-Agency Support is not directly identified or aligned to a specific program or project requirement but is necessary to ensure the efficient and effective operation and administration of NASA. The FY 2009 request is \$3.3 billion.

***Office of Inspector General (OIG):*** The NASA OIG budget for FY 2009 is \$35.5 million. The NASA OIG consists of 203 auditors, analysts, specialists, investigators, and support staff at NASA Headquarters in Washington, DC, and NASA Centers throughout the United States. The request supports the OIG mission to prevent and detect crime, fraud, waste, abuse, and mismanagement while promoting economy, effectiveness, and efficiency within the Agency.