

FY 2010 Appropriations for the National Aeronautics & Space Administration (NASA)

NASA FY 2010 Request

(numbers are in millions)

| NASA | FY 2009 Estimate | FY 2010 Request | % Change FY09 vs. FY10 Req. | House | % Change House vs. FY09 | Senate | % Change Senate vs. FY09 | Final | % Change FY09 vs. FY10 |
|--|------------------|-----------------|-----------------------------|----------------|-------------------------|----------------|--------------------------|----------------|------------------------|
| Science | 4,503.0 | 4,477.2 | -0.6% | 4,496.0 | -0.1% | 4,517.0 | 0.3% | 4,469.0 | -0.7% |
| Earth Science | 1,379.6 | 1,405.0 | 1.8% | 1,443.0 | 4.6% | 1,405.0 | 1.8% | 1,450.3 | 5.1% |
| Earth Science Research | 437.4 | 397.5 | -9.1% | | | 392.5 | -10.3% | 400.8 | -8.4% |
| Earth Systematic Missions | 898.9 | 715.5 | -20.4% | | | 720.5 | -19.8% | 735.5 | -18.1% |
| Decadal Survey Mission SMAP | 104.3 | 70.0 | -32.9% | | | 70.0 | -32.9% | 70.0 | -32.9% |
| Decadal Survey Mission ICESat-II | 38.8 | 39.2 | 1.0% | | | 39.2 | 1.0% | 39.2 | 1.0% |
| Earth System Science Pathfinder | 118.3 | 63.9 | -46.0% | | | 64.0 | -46.0% | 86.0 | -27.3% |
| Earth Science Multi-Mission Operations | 148.1 | 149.9 | 1.2% | | | 149.9 | 1.2% | 149.9 | 1.2% |
| Earth Science Technology | 54.1 | 45.9 | -15.1% | | | 45.9 | -15.1% | 45.9 | -15.1% |
| Applied Sciences | 47.8 | 32.2 | -32.6% | | | 32.2 | -32.6% | 32.2 | -32.6% |
| Heliophysics | 591.6 | 605.0 | 2.3% | 605.0 | 2.3% | 646.6 | 9.3% | 636.6 | 7.6% |
| Heliophysics Research | 195.9 | 178.6 | -8.8% | | | 174.2 | -11.1% | 174.2 | -11.1% |
| Living with a Star | 238.6 | 212.2 | -11.1% | | | 258.2 | 8.2% | 248.2 | 4.0% |
| Solar Terrestrial Probes | 123.1 | 143.0 | 16.2% | | | 143.0 | 16.2% | 143.0 | 16.2% |
| Heliophysics Explorer Program | 31.4 | 69.4 | 121.0% | | | 69.4 | 121.0% | 69.4 | 121.0% |
| New Millennium | 2.7 | 1.8 | -33.3% | | | 1.8 | -33.3% | 1.8 | -33.3% |
| Planetary Science | 1,325.6 | 1,346.2 | 1.5% | 1,348.3 | 1.7% | 1,354.8 | 2.2% | 1,359.5 | 2.5% |
| Astrophysics | 1,206.2 | 1,120.9 | -7.0% | 1,170.9 | -2.9% | 1,169.8 | -3.0% | 1,119.8 | -7.1% |

| NASA | FY 2009 Estimate | FY 2010 Request | % Change FY09 vs. FY10 Req. | House | % Change House vs. FY09 | Senate | % Change Senate vs. FY09 | Final | % Change FY09 vs. FY10 |
|--------------------|------------------|-----------------|-----------------------------|-----------------|-------------------------|-----------------|--------------------------|-----------------|------------------------|
| Aeronautics | 500.0 | 507.0 | 1.4% | 501.0 | 0.2% | 507.0 | 1.4% | 501.0 | 0.2% |
| Exploration | 3,505.5 | 3,963.1 | 13.0% | 3,293.2 | -6.1% | 3,940.4 | 12.4% | 3,746.3 | 6.9% |
| Space Operations | 5,764.7 | 6,175.6 | 7.1% | 6,097.3 | 5.8% | 6,161.6 | 6.9% | 6,146.8 | 6.6% |
| Education | 169.2 | 126.1 | -25.5% | 175.0 | 3.4% | 140.1 | -17.2% | 182.5 | 7.8% |
| TOTAL, NASA | 17,782.4 | 18,686.0 | 5.1% | 18,203.3 | 2.0% | 18,686.0 | 5.1% | 18,724.3 | 5.3% |

Highlights from the [Conference Report \(12-10-09\)](#):

Yesterday, Congress unveiled a \$446.8 billion Consolidated Appropriations bill which contains six of the seven remaining fiscal year (FY) 2010 spending bills.

The Consolidated Appropriations bill will provide the National Aeronautics and Space Administration (NASA) with \$18.724 billion for FY 2010, which is \$942 million or 5.3 percent above the FY 2009 enacted level and \$38 million above the President's request. None of the figures below include the funding NASA received as part of ARRA.

Science Mission Directorate: Within this total, \$4.469 billion is for the Science Mission Directorate, a reduction of \$34 million from the FY 2009 level and \$8 million below the President's request. The reductions are the result of administrative changes and the removal of construction costs to a new agency-wide construction account. Earth science funding will again be a major winner in the science portfolio, receiving \$1.450 billion, \$48 million above the President's request. This amount includes \$15 million for the next round of Tier 1 Earth Science Decadal missions and \$6 million for pilot initiatives in the development of carbon monitoring systems. In addition, \$25 million in new funding will be provided for initial costs to replace the Orbiting Carbon Observatory (OCO), which failed its launch earlier this year, and the bill will additionally require NASA to provide \$25 million for OCO from prior year balances.

Other highlights in the Science Mission Directorate include \$15.5 million for the Europa Jupiter system mission, \$5.8 million for Near Earth Object Observations (\$2 million above the request), \$3 million for the Global Learning and Observations to Benefit the Environment (GLOBE) program, \$15 million for the International Lunar Network (\$11 million above the request), and \$40 million for the Solar Probe Plus mission (\$36 million above the request). The bill will also direct the National Oceanic and Atmospheric Administration (NOAA) to include funding for a scatterometer in its FY 2011 budget request to replace the current scatterometer, QuikSCAT, which is at the end of its life.

Aeronautics Research: The bill will provide \$501 million for aeronautics research, which is \$1 million above the FY 2009 enacted level and \$6 million below the request. The reduction is entirely the result of administrative changes.

Exploration: The bill will provide \$3.746 billion for exploration activities, which is \$241 million above the FY 2009 level but \$217 million below the request. The reductions below the request include \$21 million from Exploration Technology Development, \$39 million from the Constellation program, \$52

million in general reductions, \$34 million in administrative changes, and \$91 million in construction costs that were moved to a new agency-wide construction account. The bill will provide \$3.466 billion for the Constellation program, close to the request level, but Congress expresses frustration with the Administration's lack of response to the Norm Augustine-led Committee to Review U.S. Human Space Flight Plans report that was released in October.

Education: The bill will provide \$182.5 million for education which is \$13.3 million above the FY 2009 level and \$56.4 million above the request. This amount includes \$45.6 million for the National Space Grant College and Fellowship program, \$5.6 million over the FY 2009 level and \$17.2 million above the request, and \$25 million for the Experimental Program to Stimulate Competitive Research (EPSCoR), \$5 million above the FY 2009 level and \$15 million above the request.

Excerpts from the Senate Committee Report (6-25-09):

“Earth Science Decadal Survey Missions.--The Committee supports the ongoing development of the Tier I missions, and provides the full budget requests for the Soil Moisture Active and Passive [SMAP] and the Ice, Cloud, and Land Elevation Satellite [ICESat II] missions. The Committee is disappointed that the request does not include funding for the Climate Absolute Radiance and Refractivity Observatory [CLARREO] or the Deformation, Ecosystem Structure, and Dynamics of the Ice [DESDnyl] missions, which are also part of the Tier 1 recommendations. The National Academies recommended flying a suite of these four missions concurrently to gather critical information about the Earth and its climate. The Committee strongly encourages NASA to realign priorities in future budget requests to accelerate these missions to more closely match the Academies' recommended schedule, while also supporting development of Tier 2 and Tier 3 missions, as well as venture class missions. The Committee provides the full budget request of \$135,100,000 for decadal-related projects and missions.

“ICESat II Mission.--The Committee is aware that the Science Definition Team [SDT] for the ICESat II mission determined that the use of a photon-counting approach to provide cross-track measurement capabilities is the preferred method of meeting the objectives of the Earth Science Decadal Survey for this mission. The Committee supports this approach to ensure the highest level of accuracy in measuring ice melt; however, the SDT did not assess its technical readiness level. The Committee directs NASA to complete a technical readiness level evaluation, and to report on options to implementing this preferred approach without significantly increasing the cost, or substantially delaying the launch, of the mission.”

Excerpts from the House Committee Report (6-9-09):

“Dr. Ralph Cicerone and Dr. Lennard Fisk both stated in testimony before the Subcommittee that NASA's science activities are not markedly different or less important than other science disciplines funded by the NSF and NIST, and that there was little reason for their exclusion from the doubling path envisioned for those agencies in the America Competes Act. The Committee's recommendation reflects this sentiment and continues to invest in NASA's science activities.”

“Earth science, other missions and data analysis.-The recommendation includes \$201,300,000 for Earth science, other missions and data analysis. An increase of \$15,000,000 is provided above the request to advance further the studies of the next two decadal survey missions, the Climate Absolute Radiance and Refractivity Observatory (CLARREO) and the Deformation, Ecosystem Structure, and Dynamics of the Ice (DESDnyl).”

“Orbiting carbon observatory (OCO).-In February, a rocket failure sent OCO into the ocean off the coast of Antarctica, depriving climate scientists of measurements meant to bridge data collected by a seven-year-old satellite and a more advanced spacecraft is not expected to launch for at least several years. This satellite was to map Earth's carbon dioxide concentrations in unprecedented detail. Several options have been suggested following the loss of the OCO: extend the operations of the Atmospheric Infrared Sounder (AIRS) instrument aboard the Aqua spacecraft, launched in 2002; accelerate the development of the follow-on spacecraft, ASCENDS, which is currently not slated until after 2013; and building and flying another OCO. The Committee awaits NASA's informed judgment on how best to proceed, including schedule and cost estimates for its recommendation, but expects such determination by September 1, 2009.”

“GLOBE.-Within the amounts provided for Earth science, \$3,000,000 is provided for the GLOBE program. NASA is directed to work cooperatively with NOAA during fiscal year 2010 to transition program responsibility for GLOBE from NASA to NOAA.”

*“Education.-The Committee rejects the Administration's proposal to cut NASA's education programs from comparable fiscal year 2009 enacted levels. The 2005 National Academies' report, *Rising Above the Gathering Storm*, noted that the scientific and technological building blocks of the United States' economic leadership are eroding at a time when other nations are gathering strength. The necessary key identified in the report is to improve America's talent pool by vastly improving Kindergarten through twelfth grade science and mathematics education. In addition, a recent congressionally- mandated task force found that by the end of this year; over one-quarter of the U.S. aerospace workforce will be eligible to retire, with too few engineers graduating from college to replace them. A continuing dearth of students and graduates in math, science and engineering cannot be sustained. Short-term cuts in education programs have long-term effects. Accordingly, for fiscal year 2010, the Committee recommends \$175,000,000, an increase of \$48,900,000 over the budget request, and \$5,800,000 over comparable fiscal year 2009 enacted levels.”*

More Detail on President's FY 2010 Request (5-11-09):

Science Mission Directorate (SMD)

The Administration has requested \$4.48 billion for the Science account, a reduction of \$36 million, or 0.8 percent, from the FY 2009 enacted level. However, all of the science themes would see an overall increase with the exception of Astrophysics, which would receive an overall decrease.

Earth Science

Overall this theme would receive \$1.4 billion, which is \$25 million, or 1.8 percent, more than the FY 2009 enacted level, including increases in the Research and Analysis awards, accelerated development for the first four Decadal Survey missions (SMAP, ICESat II, DESDynI, and CLARREO), and continued funding for Landsat Data Continuity Mission (LDCM), NPOESS Preparatory Project (NPP), Global Precipitation Measurement (GPM) mission, Aquarius, and other ongoing precursor missions to maintain current schedules. In addition, NASA is still evaluating its options to recover from the loss of the Orbiting Carbon Observatory (OCO) earlier this year. Revitalizing NASA's earth sciences funding is a high priority politically because of the growing public concern about climate change.

Planetary Science

Overall this theme would receive \$1.35 billion, which is \$21.4 million, or 1.6 percent, more than the FY 2009 enacted level. This level would include funding for the Mars Exploration Program and ongoing development of the Mars Science Laboratory (MSL) for launch in 2011 as well as future development of an outer planets flagship mission to Jupiter's Europa. Additional priorities that would be funded in this theme include new opportunities and funding for the Discovery and New Frontiers programs, and increases for the Research and Analysis awards.

Heliophysics

Overall this theme would receive \$605 million, which is \$13.4 million, or 2.3 percent, more than the FY 2009 enacted level. The theme is expected to grow over the next five years and the increase for FY 2010 would be primarily to fund Solar Terrestrial Probes and 2009 awards in the Explorer program.

Astrophysics

Overall this theme would receive \$1.12 billion, which is \$85 million, or 7 percent, less than the FY 2009 enacted level, making it the big loser among the four Science themes for the second year in a row. The request would continue funding for the James Webb Space Telescope and Hubble servicing mission as well as other ongoing missions such as Kepler, the Wide-field Infrared Survey Explorer (WISE) and SOFIA, but it would delay new mission starts and other missions under development pending the results of the ongoing National Academies Decadal Survey for Astronomy and Astrophysics.

Aeronautics Research Mission Directorate (ARMD)

The Administration has requested \$507 million for the Aeronautics account, an increase of \$7 million, or 1.4 percent, from the FY 2009 enacted level. The recommended flat funding marks a sharp departure from the previous Administration which had proposed four consecutive years of large decreases to the budget, which Congress partly restored.

The request would include:

- \$228.4 million for the Fundamental Aeronautics Program, focusing on physics-based methods and technologies to improve low-cost, reliable entry and re-entry from space;
- \$81.4 million for the Airspace Systems Program to further enable development of NextGen;
- \$60.1 million for the Aviations Safety Program;
- \$74.7 million for the Aeronautics Test Program to bolster aeronautics test facilities; and
- \$62.4 million for a new Integrated Systems Research Program to take a systems level approach to reduce the environmental impact of aviation in the area of air vehicle technologies.

Within these amounts, funding would be available for FY 2010 grants, contracts, and cooperative agreements with academia, non-profit organizations, and industry, including:

- \$40 million through the Fundamental Aeronautics Program;
- \$13.6 million through the Airspace Systems Program;
- \$8 million through the Aviations Safety Program;
- \$2 million through the Aeronautics Test Program; and
- \$10 million through the new Integrated Systems Research Program.

Exploration Systems Mission Directorate (ESMD)

The Administration has requested \$3.96 billion for the Exploration account, an increase of \$450 million, or 11.4 percent, from the FY 2009 enacted level. This increase is consistent with a similar

increase provided by Congress over the FY 2008 level and would continue funding for the Lunar Reconnaissance Orbiter, the Lunar Precursor Robotic Program, and other high profile missions begun by the Bush Administration.

NASA and the White House Office of Science and Technology Policy will be conducting a review of post-Shuttle human space flight activities this summer through a new independent blue ribbon panel. The panel's findings will be due by August 2009, in time to influence the FY 2011 budget request; the panel will be chaired by Norm Augustine.

Education

The Administration has requested \$126.1 million for the Education account, a reduction of \$43.1 million, or 25.5 percent, from the FY 2009 enacted level. This reduction is primarily the result of the President eliminating funds for Congressional earmarks included in the final FY 2009 appropriations bill and would return the account nearer to its FY 2007 level after an increase by Congress for two consecutive years.

Space Operations Mission Directorate (SOMD)

The Administration has requested \$6.2 billion for the Space Operations account, an increase of \$411 million, or 7.1 percent, from the FY 2009 enacted level.

This amount would include:

- \$3.0 billion for the Space Shuttle program;
- \$2.1 billion for the International Space Station; and
- \$722.8 million for Space and Flight Support.

In addition, NASA notes that the Alpha Magnetic Spectrometer (AMS) science mission will be flown in 2010 provided all other shuttle missions can be completed by that time.

Cross-Agency Support

The Administration has requested \$3.4 billion for the Cross-Agency Support account, an increase of \$94 million, or 2.8 percent, from the FY 2009 enacted level.

Detail on President's FY 2010 Request (March 2, 2009):

On February 26, President Obama released his preliminary FY 2010 budget request, which only unveiled numbers for programs at their highest levels. The NASA request for FY10 is \$18.7 billion, a 5.1 percent increase over the House and Senate levels for FY09. This reflects an eight percent increase over FY 2008.

Overall, the top line funding details for research and education are promising and build upon the increases provided by the American Recovery and Reinvestment Act (stimulus legislation) and the pending FY 2009 Omnibus Appropriations bill. The information released, in most cases, does not include information regarding specific programs, but only top line numbers and priority areas for agencies.

- Would reinforce commitment to global climate change and Earth Science Decadal survey priorities
- Would renew commitment to aeronautics research
- Projects flat funding in subsequent years beyond FY 2010

Additional details about the FY 2010 budget are expected to be unveiled in April.