



Office of Science and Technology Policy National Aeronautics and Space Administration

FACT SHEET

A Bold New Approach for Space Exploration and Discovery

- Adds \$6 billion to NASA's budget over five years and draws upon American ingenuity to enable us to embark on an ambitious 21st century program of human space exploration and observation of the Earth and the Universe.
- Ends NASA's Constellation program, which was planning to use an approach similar to the Apollo program to return astronauts to the Moon 50 years after that program's triumphs. An independent panel found that Constellation was years behind schedule and would require large budget increases to land even a handful of astronauts back on the Moon before 2030. Instead, we are launching a bold new effort that invests in American ingenuity to develop more capable and innovative technologies for future space exploration.
- In consultation with our partners, extends operation of the International Space Station likely to 2020 or beyond and enhances its utilization, bringing nations together in a common pursuit of discovery in space.
- Initiates several new programs to transform the state of the art in space technologies, including flagship exploration technology development and demonstration programs, investments in early-stage advanced concepts, potential "game-changing" technologies, and new propulsion technologies – all intended to increase the reach and reduce the costs of future human space exploration as well as other NASA, government, and commercial space activities.
- Enhances the Nation's global climate change research and monitoring system, accelerating decadal survey missions and re-flying a satellite that will identify global carbon sources and sinks. Expands NASA's aeronautics efforts to bring cleaner, safer, and more efficient transportation to our skies.
- Directs NASA to partner with the aerospace industry in a fundamentally new way, making commercially provided services the primary mode of astronaut transportation to the International Space Station. This new policy harnesses our nation's entrepreneurial energies, and will create thousands of new jobs and catalyze the development of other new businesses that capitalize on affordable human access to space.
- Provides for a robust program of robotic solar-system exploration and new astronomical observatories, including a probe that will fly through the Sun's atmosphere and an expanded effort to detect potentially hazardous asteroids.

KEY ELEMENTS OF THE NEW STRATEGY

Restructures and Invests an Additional \$6 Billion Over Five Years in NASA's Programs to Set a Bold New Course for Space Exploration and Scientific Research.

NASA's Constellation program -- relying largely on existing technologies -- sought to return astronauts to the Moon by 2020. However, the program was over budget and behind schedule and lacked innovation and pioneering approaches due to a longstanding failure to invest in critical new technologies. Using a broad range of criteria, an independent review panel determined that, even if fully funded, NASA's program to repeat many of the achievements of the Apollo era some 50 years later was a less attractive approach to space exploration relative to several potential alternatives. Furthermore, NASA's attempts to pursue its Moon goals had drawn funding away from other NASA programs, including robotic space exploration, science, Earth observations, and aeronautics. NASA will cancel the Constellation Program in favor of a bold new approach that invests in the building blocks of a more capable alternative to space exploration. This new investment in NASA and the corresponding reorientation of the human space flight program will create thousands of jobs nationwide, offsetting the job losses that may be associated with the cancellation of Constellation.

Commits Funds to Safely and Prudently Fly the Remaining Space Shuttle Flights. The Administration is committed to a safe and orderly retirement of the Space Shuttle program by providing funding for the Shuttle to fly its final five missions, even if the schedule slips into Fiscal Year 2011.

Supports Promising Commercial Space Transportation by Investing \$6.1 Billion Over Five Years to Develop New Crew Transportation Capabilities to the International Space Station.

Commercial launch vehicles have for years carried U.S. military, commercial, and most NASA satellites to orbit. NASA will now partner with industry in a fundamentally new way for commercially provided astronaut transportation to the International Space Station. Fifty years ago, the nation upgraded existing launch vehicles for human transportation, when American industry human-rated an existing launch vehicle and successfully created the Gemini system; NASA safely flew 10 crewed missions within five years. Now, as then, NASA will set standards and processes to ensure that commercially built and operated crew vehicles are safe. Partnering with industry in this new way potentially accelerates the availability of U.S. access to low-Earth orbit and reduces the risk of relying solely on foreign crew transports for years to come. A strengthened U.S. commercial space launch industry will also bring needed competition, act as a catalyst for the development of other new businesses capitalizing on affordable access to space, help create thousands of new jobs, and help reduce the cost of human access to space.

Extends and Enhances Utilization of the Space Station. The International Space Station is poised to reach its full complement of international crew and laboratories in 2010. NASA will extend operations of the Space Station past its previously planned retirement date, likely to 2020 or beyond. Working with partners around the world, NASA will maximize return on this investment by deploying new scientific facilities to conduct research and test technologies in space and by making Space Station research capabilities available to educators and new

researchers. New capabilities could include inflatable space habitats, additional research facilities, and a program to continuously upgrade Space Station capabilities.

Develops and Deploys Flagship Exploration Technologies That Will Lead to a New Era in Human Space Flight. A new initiative, investing \$7.8 billion over five years, will target technologies that could be transformational in their ability to improve the capability, reduce the cost, and expand the reach of future human and robotic missions. NASA will implement and manage a broad test program of next-generation technologies in multiple flight demonstrations over the next decade. Flagship demonstrations may involve both international and commercial partners and will include efforts such as the demonstration of in-orbit propellant storage and transfer, automated and autonomous rendezvous and docking, and advanced closed-loop life support. NASA will also advance the state of the art on a range of technologies critical to enabling future human space exploration, like power generation and storage and tele-robotic operations.

Reinvigorates U.S. Propulsion Research and Development. Over the past decades, U.S. industry and the federal government have reduced investment in foundational R&D regarding space launch propulsion technologies, leading to concerns about sustaining U.S. expertise and innovation in propulsion technologies. To address these concerns, NASA, in cooperation with other government agencies as appropriate, will utilize \$3.1 billion to conduct research and development for a new U.S. first-stage engine for potential use in future heavy-lift (and other) launch systems. NASA will also perform foundational research in areas such as new or largely untested propellants, advanced engine materials, and combustion processes, and engine-health monitoring and safety.

Improves Our Understanding of Global Climate Change with Nearly \$2.5 Billion Over Five Years in Additional Funds for Earth Science. NASA's Earth science program conducts first-of-a-kind demonstration flights of sensors in air and space in an effort to foster scientific understanding of the Earth system and to improve the ability to forecast climate change and natural disasters. NASA will accelerate the development of new satellites that the National Research Council recommended as Earth science priorities, in addition to flying several research satellites currently in development, conducting a campaign to monitor changes in polar ice sheets, and pursuing enhancements to climate models. NASA will also develop and fly a replacement of the Orbiting Carbon Observatory, a mission designed to identify global carbon sources and sinks that was lost when its launch vehicle failed in 2009.

Invests \$3.9 Billion Over Five Years in New Foundational Technologies to Reduce Future Costs Across NASA, Expand Opportunities, and Grow the American Economy. NASA will increase its support for research in advanced concepts and game-changing technologies that can enable a broader range of NASA, other government, and commercial space missions, using a wide array of management, funding, and partnership mechanisms to engage the brightest minds in private industry and at all levels of academia. New technologies to be invested in include small satellites, advanced structural materials, concepts for low-cost access to space, techniques for rapid prototyping, and new communications technologies. This program will also generate spin-off technologies and potentially entire new industries.

Increases Scientific Understanding of the Solar System and Universe. NASA’s space probes, rovers, and telescopes have revolutionized humanity’s scientific understanding of the cosmos. NASA will support space science research grants and dozens of operating missions and telescopes currently studying the planets and stars as well as many more in development – including a telescope to succeed the Hubble Space Telescope, missions to study the Moon, and two Mars exploration missions. Early work will continue on a mission that will make the closest-ever approach to the Sun, flying through its outer atmosphere in an attempt to understand how it is heated and how it ejects the stream of charged particles known as the solar wind. NASA will also increase funding to detect asteroids that could potentially pose a hazard to the Earth.

Increases Support for Green Aviation and a More Efficient Air Transportation System. NASA’s enhanced green aviation initiative will focus on both innovative fundamental research and systems-level applications to reduce fuel needs, noise, and emissions of aircraft. These improvements to future air transportation will promote both the economic and environmental health of this country.

Revitalizes NASA’s Organization. Critical to the success of this new course for NASA will be the revitalization of NASA to ensure that it has the right workforce structures and facilities. An important element of this effort will be to create the 21st century launch facilities and infrastructure needed at Kennedy Space Center (KSC), transforming the facility to more effectively support future NASA, commercial, and other government launches. This long-overdue modernization of KSC's facilities—many of which date to the 1960s—in concert with ongoing modernization of the Florida launch range, will allow KSC to continue its critical role while creating hundreds of new jobs.

Inspires More Young People to Engage in Science, Technology, Engineering, and Mathematics. NASA has directed many of its education programs to meet the goals of the “Educate to Innovate” campaign in Science, Technology, Engineering, and Mathematics education. NASA’s Summer of Innovation, for example, will work with thousands of middle-school teachers and students to engage in stimulating, evidence-based math- and science-based education programs.