

Organizational Transformation Series

Launching a New Mission: Michael Griffin and NASA's Return to the Moon



W. Henry Lambright
Professor of Public Administration and
Political Science
The Maxwell School of Citizenship and Public Affairs
Syracuse University



IBM Center for
The Business of Government

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F O R E W O R D

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, "Launching a New Mission: Michael Griffin and NASA's Return to the Moon," by W. Henry Lambright.

This is the third report profiling NASA administrators that W. Henry Lambright has prepared for the IBM Center for The Business of Government. Two previous reports profiled Administrators Dan Goldin (1992-2001) and Sean O'Keefe (2001-2005). This new report begins in January 2005 when Michael Griffin was offered the position of NASA administrator to replace O'Keefe. Together, this unique series provides insights into the challenge of managing in government by closely examining and analyzing the tenure of three administrators in the same agency over a 17 year time period.

The report on Sean O'Keefe, "Executive Response to Changing Fortune: Sean O'Keefe as NASA Administrator," ends with Administrator O'Keefe beginning to implement President Bush's new "space exploration vision": back to the moon, on to Mars, and beyond. O'Keefe received initial funding to begin implementing the vision. It then fell to Michael Griffin to continue work on planning and executing a return to the moon, including the development of a replacement vehicle for the space shuttle.

One lesson from all three excellent case studies is that new political appointees should expect changing situations and be prepared for the unexpected. Turbulence and unanticipated events are likely to occur for most executives, many of which are beyond the leader's full control. Another lesson is that executives must continually monitor and "manage" a constantly changing environment. During his tenure, Michael Griffin was continually forced to make financial trade-offs that brought him into conflict with constituencies who disagreed with him. He did, however, make significant progress in redirecting NASA toward the new Moon-Mars program.

There are many additional lessons which can be learned from Michael Griffin, as well as Dan Goldin and Sean O'Keefe. We trust that this series will be useful and informative to the next administrator of NASA, as well as to other executives confronting changing environments and significant fiscal challenges.



Albert Morales



Toni Yowell

A handwritten signature in cursive script that reads "Albert Morales".

Albert Morales
 Managing Partner
 IBM Center for The Business of Government
 albert.morales@us.ibm.com

A handwritten signature in cursive script that reads "Toni M. Yowell".

Toni M. Yowell
 Vice President, Public Sector Strategy and Change
 IBM Global Business Services
 yowell@us.ibm.com

EXECUTIVE SUMMARY

How does a federal agency leader launch a new mission in an environment of fiscal constraint, political turbulence, opposition, and public focus on other issues? That was the question posed to Michael Griffin, who served as NASA administrator from April 2005 to January 2009.

In 2004, President George W. Bush called for NASA to retire the space shuttle by 2010, finish the International Space Station (ISS), and develop a shuttle successor capable of taking the U.S. back to the moon by 2020. The moon would be an interim step to a later Mars venture. Unfortunately, the resources to implement this new mission in the context of a relatively stagnant NASA budget were inadequate.

Griffin inherited that policy. His task was to turn it into a sustainable program. He had to make a series of decisions to launch the new mission while maintaining those he inherited. These decisions entailed technological choices of great scale and high risk. They required financial trade-offs that brought him into conflict with constituencies who disagreed strongly with his priorities. He had to build support for the new mission while overcoming opposition and minimizing harm to existing programs.

He thus was the leader of a transition of potential historical significance from old to new at NASA—from decades of low-Earth orbit operations to manned exploration of the moon and Mars. He dealt with NASA, the White House, Congress, scientists, industry, and international partners.

He won some battles and lost others. He kept his eye on his prime goal, that being to advance the new mission so effectively that it would be sustained after President Bush (and Griffin himself) left office. Griffin's experience thus illuminates the possibilities and limits of leadership in getting a major new federal initiative underway, with limited time, in a harsh political and financial environment.

Introduction

How does a federal agency leader launch a new mission in an environment of extreme fiscal constraint, political turbulence, opposition, and public focus on other issues?

On January 14, 2004, President George W. Bush proclaimed a new goal for NASA: to return to the moon by 2020, and later to go to Mars and beyond. He called for NASA to retire the space shuttle by 2010, finish the International Space Station (ISS), and develop a shuttle successor—what came to be called Orion/Ares—by 2014. The successor to the shuttle would be capable of going not only to the ISS, like the shuttle, but farther, on to the moon. At long last, after decades of circling in low-Earth orbit, the U.S. would resume its manned *exploration* mission.

Former NASA administrator Sean O’Keefe made initial moves to establish the Moon-Mars mission and obtained start-up funds from Congress. When O’Keefe left NASA in February 2005, it would be up to his successor, Michael Griffin, to take NASA to the next step on this epic journey. The new exploration goal was clear. The chief problem was how to implement it while completing existing programs in human space flight and maintaining other unmanned space activities. Griffin’s task was to orchestrate a monumental transition. Under normal circumstances, implementation is difficult. Given the mission he had, and the environment in which he had to work, it was daunting.

Griffin was a 55-year old rocket scientist who had been NASA’s associate administrator for exploration in 1991-93. President George H.W. Bush had challenged NASA and the nation to go back to the moon and on to Mars in 1989, and Griffin had joined NASA to lead the earlier effort. This nascent program was

opposed by the Democratic majority in Congress, and terminated when President Clinton took office in January 1993. For Griffin, coming back to lead NASA in 2005 was his opportunity for a second, and likely final, chance to manage a long-term exploration program in which he passionately believed.

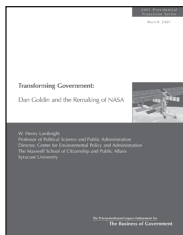
Griffin took office when the nation was embroiled in an unpopular and expensive war in Iraq. There was a huge budget deficit, and it was growing. Within months of joining the agency, the devastating Hurricane Katrina hit the Gulf Coast. Space fell as a national priority at a time when Griffin sought to get essential funds to accelerate the Moon-Mars mission. Moreover, as he tried to build support for the new venture, the old shuttle and space station programs had to be pursued and critics of his policies countered. NASA had much to do, and its overall budget was stagnant.

As the Bush administration ended, Griffin complained in a memo to his aides that became public: “In a rational world, we would have been allowed to pick a shuttle retirement date to be consistent with Ares/Orion as early as possible (rather than ‘not later than 2014’) and we would have been provided the necessary budget to make it so.” Moreover, he accused the Office of Management and Budget (OMB) and Office of Science and Technology Policy (OSTP) as working against him, allied in the “jihad” against the shuttle and ISS.¹ Griffin said his words had been misconstrued, but they were the rhetoric of an administrator with a deep rationalist-technical background coping with the turbulent political environment of the later Bush years.

This study of Griffin as NASA’s leader illuminates the realities of implementation, what an administrator

The NASA Trilogy

This is the third report profiling NASA Administrators that W. Henry Lambright has prepared for the IBM Center for The Business of Government. The three reports cover the past 17 years of NASA history (1992-2009).



Transforming Government: Dan Goldin and the Remaking of NASA (2001)

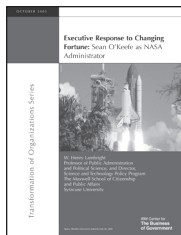
This report covers the tenure of Dan Goldin as NASA administrator, the longest in the history of NASA. Goldin was appointed in April 1992 and served under Presidents George

H.W. Bush, Bill Clinton, and George W. Bush. He served until November 2001.

According to Lambright, Goldin had four significant achievements during his tenure:

1. **“Saving” the International Space Station (ISS).** Goldin succeeded in maintaining the Russian-U.S. alliance to work on the space station.
2. **Revamping the unmanned space science program.** Goldin directed the Hubble repair and oversaw the successful *Pathfinder* Mars exploration project.
3. **Streamlining NASA.** When Goldin took over, the agency was considered bloated and bureaucratic.
4. **Restoring the authority of the office.** When Goldin assumed the position of administrator in 1992, the administrator’s office was weak, the agency was under fire from all sides, and had lost much support in Congress.

This report is available on the Center’s website: www.businessofgovernment.org/pdfs/LambrightReport.pdf.



Executive Response to Changing Fortune: Sean O’Keefe as NASA Administrator (2005)

This report covers the tenure of Sean O’Keefe as NASA administrator. O’Keefe served from December 2001 to February 2005 under President George W. Bush.

According to Lambright, O’Keefe’s tenure was marked by three distinct periods:

- **Period One: Consolidator and incremental innovator.** During this period, O’Keefe focused on solving a series of financial problems caused by the International Space Station.
- **Period Two: Crisis manager.** During this period, O’Keefe devoted nearly full time to responding to the *Columbia* space shuttle tragedy after its disintegration on February 1, 2003.
- **Period Three: Steward of the president’s vision.** During this period, O’Keefe began implementation of President Bush’s vision for manned exploration to the moon, Mars, and beyond.

This report is available on the Center’s website: www.businessofgovernment.org/pdfs/LambrightReport4.pdf.

can do, what he cannot do, and how an administrator can play well or poorly the hand that is dealt.

Griffin’s Background and Style

Griffin was born in 1949 in Aberdeen, Maryland, the son of a father who was then in the army, and later became an army civilian employee. As early as he could remember, Griffin was fascinated with space. As a child, he received an astronomy book for his birthday. It featured an elementary discussion of the solar system and comets and stars. The book made a lasting impression on the boy and stimulated the beginning of his lifelong love of space.²

Griffin received his bachelor’s degree in physics from Johns Hopkins University and then a PhD in aerospace engineering at the University of Maryland

in 1977. Griffin had watched the space race in the 1960s, the moon landing in 1969, and wanted to work for NASA to take the next step in manned exploration, to Mars. He joined the Jet Propulsion Laboratory (JPL), managed for NASA by the California Institute of Technology, soon after graduating from the University of Maryland. After a stint on an outer planets mission, Voyager, Griffin was able to work on Mars. NASA had recently landed two Viking spacecraft on Mars, and he joined a team at JPL working on follow-on robotic programs, including a Mars Rover and Mars Sample Return.

For two years, Griffin enthusiastically devoted himself to the Mars missions. Then, abruptly, NASA cancelled the work in 1979. How could that be? Griffin could not fathom this decision. This kind of effort



Michael Griffin. Photo courtesy of NASA.

defined NASA and JPL. Devastated and angry, he was so upset that he resigned, and recalls saying at the time, “The hell with this! I’m going to go somewhere where there’s money for programs.”³

He returned to the state of Maryland and went to work for the Applied Physics Laboratory (APL) of Johns Hopkins. APL performed most of its research for the Defense Department. It was akin to JPL, a federally-funded R&D center managed by a university. In the 1980s, President Ronald Reagan launched his Strategic Defense Initiative (SDI), known as “Star Wars.” This was intended as a space-based missile shield. APL was deeply involved in the program and Griffin attracted the attention of the Strategic Defense Initiative Office (SDIO). In 1989, the Defense Department hired Griffin as Deputy for Technology, SDIO.

In this same year, President George H.W. Bush proclaimed his Moon-Mars program. Griffin’s heart was with human space exploration. He readily agreed when NASA asked him to join the agency as associate administrator for exploration to manage the Moon-Mars program. At NASA, Griffin developed preliminary plans for making the Moon-Mars mission a reality, but could not get funding from the Democrat-controlled Congress to move beyond paper plans. In 1993, President Clinton killed the Bush program altogether. After serving for awhile as NASA’s chief engineer, Griffin left in 1994 for the private sector.

He worked first as a top executive for Space Industries International, then Orbital Science Corporation, and then joined In-Q-Tel. The latter was a firm involved in developing advanced con-

cepts for the intelligence community. In 2004, he returned to APL to head its Space Department.

Griffin was the epitome of a rocket scientist. Over the years, he had added five master’s degrees to the bachelor’s degree and PhD he already possessed. They were in various engineering fields plus one in business. He said he wished to “fill out” his knowledge base as he moved higher into technical and technical-management roles. “I’m something of a perfectionist,” he explained, and “somewhat driven.”⁴ While holding technical-managerial positions, he found time to teach as an adjunct professor in various universities, write research papers, and co-author a book, *Space Vehicle Design*.

He characterized himself a “Spock,” the super-rational Vulcan science officer aboard the Starship Enterprise in the Star Trek series.⁵ He demanded data in making technical choices rather than softer forms of information. A hard-working technocrat, he had three children from a first marriage, and a fourth child from his second. He found time for golf and activity as a general aviation pilot and flight instructor. He liked to ski and scuba dive. He worked with a highly structured discipline. At NASA, his typical workday ran from 6 a.m. to 6 p.m. What he did not do was watch television and engage in idle conversation. He was blunt, honest, impatient, and a student of the civil space program and its history.

He had developed a philosophy about space and its place in human destiny. He believed it was a new ocean that human beings had to sail. The nation that led in space exploration would be like England in a previous century, which rose to world leadership by conquering the seas. He believed that humanity would migrate into the solar system eventually. He fervently wanted America to pioneer in this quest, and to bring the ideals of western civilization to man’s new habitat. He declared that “the future for humankind is in space not on Earth.”⁶

When his appointment was announced in early 2005, Griffin was widely viewed as arguably the most qualified person in the country, from a technical and managerial perspective, that the president could have selected for leadership in implementing the Moon-Mars goal. The only question about Griffin was whether he could handle the political dimensions of the job.

Year One (2005): Fast Start, Troubled End

Appointment

In December 2004, then-NASA administrator Sean O'Keefe announced he was leaving NASA soon after the end of the year. In January 2005, the White House called Griffin and he eagerly accepted. In making the rounds at the White House, he received his charge most clearly from Andrew Card, Bush's chief of staff, who emphasized that the president needed someone to implement the Moon-Mars program. "We're looking for someone to do what the president wants to do," he told Griffin.⁷ Griffin was already on record saying that was exactly his intent.

Griffin did not make any requests or demands during his White House interviews. The budget projection that had been announced by O'Keefe in January 2004, when Bush's decision was made known, was adequate in Griffin's view. In fact, he felt he could speed up the deployment of a shuttle successor, rather than have a four-year gap between shuttle and Orion/Ares.

However, in February, as O'Keefe left and an acting administrator, Fred Gregory, took over pending Griffin's Senate confirmation, the president's budget request for the next fiscal year was announced. While NASA got a raise, it was not what had been promised in 2004. Moreover, in the longer-term five-year (FY 2005–FY 2010) budget projection for NASA, there was a \$2.9 billion cut from what had been stated in 2004. O'Keefe had in 2004 declared, "What you'll see is the means to carry it [the decision] out: the budget, the dollars, the bucks, the capacity to actually do it." The president, said O'Keefe, would fight for "dollars to carry it out."⁸

President Bush did want the Moon-Mars policy implemented. But he *also* wanted to cut the massive

federal deficit in half by the time he left office and ordered OMB to take a hard line with all non-defense agencies. OMB was implementing the cutback presidential policy, and, in its view, treating NASA more generously than other domestic agencies.⁹ OMB made President Bush aware of the NASA cutback and he approved it. Also Clay Johnson, deputy director for management at OMB, who was a close advisor and personal friend of the president, strongly urged him not to devote any of his political capital to the Moon-Mars mission. A second-term president whose popularity was fragile, Bush took Johnson's advice seriously as he considered what to push and what not to promote in his second term.¹⁰

The numbers left by O'Keefe for future years were called "placeholders," a term meaning they were those on which O'Keefe and OMB could agree at the time, but which would be revisited later. O'Keefe, of course, would try to get more money and OMB would push for less. Nothing was "settled" until the money was in the agency's hands and spent. A former deputy director of OMB with close ties to Richard Cheney, the powerful vice president, O'Keefe understood the Washington game and how it was played. Griffin had neither the insider experience nor contacts with influential White House officials.

When Griffin testified in his confirmation hearings in March 2005, he was aware of the budget situation, but felt comfortable that President Bush was serious about Moon-Mars and that he, therefore, could get the money back that OMB wished to extract.¹¹ Moreover, both the White House and Congress seemed eager to speed up the implementation process. They viewed Griffin as a vigorous champion of space exploration who could galvanize

action. Further, some in Congress saw him as having an appreciation of science and technology that his predecessor, O'Keefe, with a nontechnical background, did not have. Senator Barbara Mikulski (D-MD), who had clashed with O'Keefe over his Hubble Space Telescope termination decision, introduced Griffin to her Senate colleagues by declaring, "Much has been made of the fact that [Griffin] is a rocket scientist. Thank God!"¹²

The signals from his political masters were thus mixed. Griffin's confirmation hearings went smoothly. He emphasized that his top priorities would be the safe return to flight of the space shuttle (grounded since the Columbia accident in February 2003), and eliminating the four year gap between retiring the shuttle in 2010 and launching its successor in 2014. "President Bush said not later than 2014. He didn't say we couldn't be smart and do it early. And that would be my goal."¹³ He also promised he would take another look at O'Keefe's Hubble decision.

The only controversial issue that Griffin faced at the time of the hearings was over the perennial conflict between manned space flight vs. robotic space science. Congressman Sherwood Boehlert (R-NY), Chairman of the House Science Committee, supported the Moon-Mars decision, but demanded that robotic space science, including Earth science, not be raided financially to pay for Moon-Mars. There were many lawmakers who agreed with him—as did, of course, the scientific community. In his Senate testimony, Griffin dispelled fears that he would only push human spaceflight. "Those who claim that NASA cannot afford robust programs in both robotic science and manned spaceflight are mistaken. We as a nation can clearly afford well-executed, vigorous programs in both robotic and human space exploration."¹⁴ Bush's science adviser, John Marburger, swore Griffin into office on April 14, and he immediately took command of the space agency.

Getting Underway

Griffin brought Chris Shank with him to be his key personal assistant. Shank had been a top Republican staffer on the House Science Committee. He made Paul Morrell, a man with Republican Party leadership staff experience on the Hill, his senior adviser, and later selected him as his chief of staff. He

appointed Scott Pace, an experienced policy analyst, associate administrator for program analysis and evaluation. Courtney Stadd, who had White House connections and had been chief of staff at NASA under both O'Keefe and his predecessor, Dan Goldin, served Griffin temporarily as a consultant. What these and a few other individuals in his inner circle had in common was a belief that Griffin was administrator at a critical moment in the history of the space program, and that he had a limited time (i.e., the remainder of the Bush years) to get the Moon-Mars mission solidified and sustainable. Griffin made it clear he wanted officials who shared his policy perspectives and could move at his pace.¹⁵

Those perspectives began with getting Orion developed not by 2014, but instead by 2011, thereby producing a seamless transition from the shuttle to its successor. To do that, he asserted authority over the division in charge of hardware development, the Exploration Systems Directorate. O'Keefe's appointee in Exploration Systems was retired admiral Craig Steidle, who came to NASA from DOD, where he had led large technical programs. Steidle called his hardware strategy "spiral development." It was an evolutionary strategy that did not pre-judge the way Orion would be designed. It supported a broad range of research and development efforts. It would eventuate in a "fly-off" between the two contractors selected for concept development, Lockheed Martin and a Northrop Grumman-Boeing consortium. This fly-off would take place in 2008, and the winning contractor would bring Orion into service by 2014, President Bush's deadline.

The Steidle strategy also called for an external contractor to do "system of systems" integration. Orion was part of a larger "Constellation Program." This involved the rockets to propel Orion and development of a moon lander. This strategy also included international partnerships in technology development for Moon-Mars. Steidle had established 13 "road-mapping committees," an elaborate network of NASA and non-NASA specialists to identify "the best paths forward toward an integrated approach to space exploration." Soon after his arrival at NASA, Griffin abolished the 13 strategic roadmap committees and replaced them with one small, internal team headed by Doug Stanley, a man he trusted and with whom he had previously worked in industry. He directed Stanley to report back to him by July

with a plan for *how* to return to the moon. Griffin was already on record from writing prior to his appointment as favoring a shuttle-derived launch system. Such a system would make use of existing technology and personnel associated with the shuttle program, and thus contribute to Griffin's preference for a quick transition from old to new. The Stanley study was to look at the shuttle-derived launch system, as well as other options. The Stanley study was known as the Exploration Systems Architecture Study (ESAS).

Griffin made other changes in Steidle's managerial approach. He did not want international partners on the "critical path" of shuttle successor development. He believed it essential that the U.S. control development of its prime means of human access to space. Griffin saw partnership as fine once NASA got to the moon, but not for the key spacecraft/rocket technology to get there.

Unlike Steidle, he wanted NASA, not some contractor, to manage systems integration. Griffin said he believed this work too important to be contracted out. He also wanted to rebuild NASA's technical capacity, not delegate it. Indeed, he indicated that he intended to remake NASA in the image of the 1960s: a finely-tuned, technology-development organization. In the shuttle-space station era, he believed, NASA had lost much of its technical edge and become more "operational" in tone as it dealt with slow-moving programs like the shuttle and space station.¹⁶

In May, he informed Lockheed Martin and Northrop Grumman-Boeing that they should mold their Orion proposals in line with the ESAS study, still to be accomplished. NASA would not have a fly-off, but would select a prime contractor for Orion as soon as possible so it could shift rapidly to hardware development.

To pay for the faster-paced work, he reprogrammed funds from longer-term R&D ventures under Exploration Systems, targeting in particular one O'Keefe initiative, Project Prometheus. This was a large effort to develop nuclear propulsion for longer robotic stays in deep-space, especially at Jupiter's alluring moon, Europa. Indeed, Griffin emphasized the moon in the Moon-Mars vision. From the outset of his tenure at NASA, it was clear that charting NASA's "return to the moon" was the focus of his

tenure—to the extent he could control his and NASA's agenda.

He emphasized his intent to retire the shuttle in 2010, even if the ISS were not completed, so NASA could have money to move forward in exploration. He launched another study to determine the minimal number of shuttle flights NASA needed to complete the station by adding international partner modules. The number he had inherited was 28, and he called that number unrealistic. Reinforcing his decision to trim the shuttle launch manifest was his finding, soon after he arrived, that technical problems would delay the shuttle's return to flight, scheduled for May 2005 to July 2005.¹⁷

Griffin had pushed Steidle aside in making decisions to reorient the lunar return. Steidle, to no one's surprise, departed early. At the 60-day mark of his tenure, Griffin announced a host of other personnel changes, effective as soon as feasible, that would replace all headquarters associate administrators and several center directors. In some cases, he reached below associate administrators to remove their subordinates. Probably the most controversial change he made was the removal of Steidle's deputy, Steve Isakowitz. Isakowitz, who soon departed NASA, was O'Keefe's right-hand man for budgeting. He had come from OMB and was considered an important resource in agency-OMB negotiations. Griffin now leaned on Shank and a former Isakowitz associate to handle Isakowitz's role. Having Isakowitz in Exploration Systems was not what Griffin wanted in any event. He desired managers in the operating divisions of NASA who emphasized technical excellence first and foremost. Critics saw Griffin's personnel policies as a purge that cost NASA good people, while supporters characterized his start at NASA as "a sprint" and necessary to move the agency into a higher level of technical accomplishment. Griffin believed he had to restore NASA's technical credibility, especially as it moved more to a developmental mission and culture from the operations orientation it had.

Completing the Leadership Team

As planning for NASA's near- and longer-term future moved ahead, Griffin gradually completed his leadership team. A student of NASA's history, he sought to reinstate successful managerial models. In the

Apollo era in particular, NASA administrator James Webb spoke of a “triad” of top leaders including himself (“Mr. Outside”), Hugh Dryden (deputy administrator and “Mr. Science”), and Robert Seamans (associate administrator and “Mr. Inside”). Webb was highly skilled politically, and he relied considerably on Dryden (a physicist) and Seamans (an engineer), who brought complementary technical and managerial skills to the non-technical Webb.¹⁸

Griffin admired Webb and reconstituted the triad during the course of 2005. For “Mr. Inside,” general manager–associate administrator, he appointed Rex Geveden, an experienced NASA engineer-manager, to this position. When the deputy Griffin inherited retired, Shana Dale became his deputy. Dale was a lawyer who came from a senior position in Marburger’s White House Office of Science and Technology Policy, who also had staff experience on the Hill. It was expected that she would help Griffin in the political area. The triad thus was reborn, with individuals playing complementary roles as seen in the 1960s. Ironically, Griffin, the man on top, was not the one with the political background.¹⁹ Dale did have White House contacts, but not with the most powerful individuals.

The “Big Three” would preside over a set of functional associate administrators for major programs and center directors, most of whom were Griffin appointees. The associate administrator for exploration systems was Scott Horowitz, a “brilliant systems engineer,” in Griffin’s view, with a PhD from Georgia Tech and astronaut experience. His appointee for associate administrator for space operations (shuttle, ISS) was Bill Gerstenmaier, a veteran engineer-manager at NASA. The person he put in charge of space science (probes to Mars and other planets, Hubble and additional telescopes, and Earth science) was Mary Cleve. She was another NASA veteran, an Earth scientist, and former astronaut. There were several other important positions he filled in Washington and the centers. With the exception of Dale and a few others, the appointees generally were in Griffin’s mold. That is, they were technically-trained with ample managerial experience, technocrats in the best sense of the word.²⁰

A Shuttle Setback

Griffin had no love for the shuttle or space station. His interest clearly was exploration. But he had to deal with these ongoing programs and complete them in an effective manner. That was the president’s policy to which he had agreed in taking NASA’s helm. He also knew that the space program, in general, could not stand another shuttle disaster. Consequently, he inserted himself firmly into the decision process concerning return to flight. Having delayed the May flight to July, he engaged shuttle managers, asking hard questions that showed his technical expertise, concern, and sense of risks involved.

O’Keefe had set up an advisory group (the “Thomas Stafford-Richard Covey panel”) to assess NASA’s adherence to the recommendations of the Columbia Accident Investigation Board (CAIB) in achieving safety in return to flight. O’Keefe had said NASA would abide by CAIB’s report without equivocation. But the Stafford-Covey panel noted there were certain CAIB recommendations to which NASA had not adhered, chiefly, the ability to make repairs in space, away from the space station. It was this particular circumstance that had triggered O’Keefe’s Hubble decision.

Griffin announced in June that he was satisfied that NASA had done everything it could to abide by CAIB’s recommendations, and that the shuttle was now ready and could go for launch in July. Griffin stated bluntly that the panel’s recommendations were recommendations only, and that he was in charge and thus responsible for decisions. NASA could not develop the in-space repair capability CAIB had wanted. Such a capability was not technically possible at this point in time. However, he believed the risk was acceptable.²¹ The head of CAIB, Admiral Harold Gehman, backed Griffin, saying CAIB never intended NASA to adhere to the letter of all its recommendations. It wanted NASA to do the best it could, and he believed it had.²² The agency had spent approximately \$1 billion since Columbia to improve the shuttle. The time had come, said Griffin, to fly. He said that publicly, and in private to the astronauts who would make the flight.²³

On July 13, almost 2 ½ years after the Columbia accident, the shuttle flew again. In early August, it

landed safely. While successful in most respects, the flight was marred by unanticipated shedding of foam in a manner that was potentially dangerous and all-too-reminiscent of Columbia. Once again, NASA grounded the shuttle fleet, this time for the remainder of the year. The flight—with its foam problems—constituted a significant setback given the high hopes NASA set for it. *The New York Times* and other critics called for ending the shuttle earlier than Griffin intended.²⁴ Rumors circulated that Andrew Card, Bush's chief of staff, told Griffin over lunch that the president was worried about the shuttle's safety, and would not "be all that upset if it never flew again."²⁵ In reality, the two men never discussed the shuttle, but such rumors contributed to the atmosphere of uncertainty about the shuttle's future.

Griffin wanted to stick with NASA's plans. The internal study he had commissioned had found that NASA could substantially complete ISS with 18 shuttle flights by 2010 rather than the 28 scheduled earlier. An additional flight could be scheduled for Hubble repair, although Griffin said he would await two additional successful shuttle flights before making a final decision. He had told NASA to prepare, via astronaut training, for a possible Hubble mission, however.²⁶ He well knew that the shuttle was a risky machine, but Griffin wanted to hold to the policy mandate he had pledged to implement when he came to NASA: return the shuttle to flight, finish the space station, and, above all, move the Moon-Mars program rapidly forward.

Deciding *How to Go to the Moon*

Over the spring and into the summer of 2005, the ESAS group labored on the all-important question for how to return to the moon. There were two leading options. One was called shuttle-derived and the other was based on a Defense Department (DOD) system called the Evolved Expendable Launch Vehicle (EELV). There were technical advantages and also disadvantages to both approaches. There were also institutional considerations. The shuttle-derived system would ease transition within NASA and could save jobs of NASA employees. The EELV option would link DOD closely to NASA in a "national system." A DOD connection had helped NASA sell and maintain the shuttle in its development stage in the 1970s, but also complicated its design by forcing the shuttle to serve diverse users.

Griffin was on record prior to becoming administrator as favoring the shuttle-derived version on technical grounds, and he was closely engaged in the ESAS study. However, he wanted ESAS to give him its best judgment and the ESAS team looked at various options. The ESAS report was given to Griffin in July, and then finalized later in the summer. Griffin personally persuaded DOD officials of the merit of the choice. It was approved by the White House. In early September, Griffin announced the NASA technical strategy.

The basic technological choice for launch was a shuttle-derived vehicle. It would go to the moon by 2018, two years earlier than the Bush deadline. Griffin put the cost at \$104 billion, calling the design "Apollo on Steroids."²⁷ Like Apollo, there would be a capsule (Orion) atop a rocket launcher (Ares I). Orion would carry four astronauts to the moon (six to ISS). The moon rocket, Ares I, would be based on shuttle concepts. A second "heavy-lift" rocket, to be called Ares V, would be designed to carry far greater weights, such as cargo, to the moon. It could also be powerful enough for Mars exploration. Ares V would not be initiated until Ares I was well along in development. Nor would the moon lander. The emphasis in the near term would be the Orion/Ares system. The entire system, "Constellation," would be built sequentially as resources were available. Asked about the manned exploration program taking money from space science, Griffin said that would not happen. "Not one thin dime" would come from science, he said.²⁸

There was grumbling about the hardware choice among EELV supporters, especially possible contractors for the system. However, the resistance was muted. But so also was the support. The announcement did not generate the broad public and congressional endorsement Griffin hoped to see. A large part of the reason for the flat response was timing. The announcement came shortly after Katrina hit the Gulf Coast, a hurricane that was the most expensive natural disaster in U.S. history. Americans were preoccupied with the graphic images of human suffering in New Orleans and inept governmental response. Griffin responded to criticism over his timing by saying Moon-Mars was a long-term program that would have to succeed in spite of a number of disasters, natural and manmade, that would occur over its course.²⁹

Griffin was correct in theory, but in practice, this was not a good time to announce a \$104 billion program. The announcement of an expensive lunar return seemed politically insensitive to many observers, especially in the media. Actually, Griffin was quite cognizant of the Katrina situation, in part because NASA had facilities in the Gulf Coast that were damaged, and employees who endured losses. Still, Griffin's intent was to push ahead with implementation, as quickly as possible, the politics and criticism notwithstanding.

He felt even more strongly about accelerating the pace of the U.S. program when China launched its second manned spaceship into Earth orbit on October 11. This event stimulated vast public excitement and expressions of national pride in China, but received relatively scant attention in the U.S. Griffin wanted America to notice, and assert its leadership role through the return to the moon. But America's attention was elsewhere.

Revisiting the Moon-Mars Decision

By the late fall of 2005, Griffin had put his stamp firmly on the Moon-Mars program. He had given emphasis to speeding the lunar return, and defined how that would be done. At first, he pushed to get Orion/Ares developed in 2011, but shifted to a more realistic goal of 2012, still two years ahead of the O'Keefe schedule. What he needed now was the money to carry out the accelerated mission—while also funding the shuttle, space station, space science, and other vital NASA enterprises. Griffin wanted to reorient NASA to exploration beyond Earth orbit. As it would divest itself of the shuttle, so NASA would relieve itself of routine service flights to ISS. NASA would need to make arrangements with Russia for future manned launches to ISS after 2010, although he hoped these would be few with his accelerated transition to Orion/Ares. Griffin also hoped the private sector could take cargo to ISS. He initiated a program called Commercial Orbital Transportation Services (COTS). Under COTS, various companies could get NASA funds to seed their own efforts to create transport services to ISS, thereby sparing Orion/Ares this role. Griffin regarded COTS as a part of his overall strategy to transition NASA back to the moon and on to Mars. This was change aimed at reorienting NASA to exploration first and foremost—transformative change.

Meanwhile, in preparing NASA's budget submission in the fall, Chris Shank, who worked closely with Griffin on budget strategy, discovered that the budget projections for retiring the shuttle that Griffin had inherited were off by \$3 billion to \$5 billion. The main reason for the shortfall was that the presidential decision assumed shuttle costs would go down in the years prior to retirement. But that optimistic projection was not going to happen, as delays and difficulties in returning to flight were highlighting. Griffin determined that the last shuttle flight in 2010 could cost almost as much as earlier flights. Then there was the money OMB had cut from NASA's five-year projected budget just as Griffin was becoming administrator. Griffin wanted to get this money back.³⁰ Griffin decided he had to take a strong stand for budget realism. He went to see the OMB Director, Josh Bolton, and made his case. However, he received no sympathy whatsoever.

Moreover, because of heightened Katrina and Iraq war expenditures, the Bush administration was looking at all the non-defense agencies for even more savings. Griffin proposed a long-term budget that allowed NASA to develop Orion and Ares I, make 19 flights of the shuttle to complete the space station and fix Hubble, provide increases for space science, and other efforts. Griffin's proposed budget for the upcoming fiscal year entailed a 9 percent raise from the previous year.³¹ OMB emphatically disagreed. "You'll have to solve your problem with the money you have," was OMB's reaction.³² Griffin was angry and frustrated. He had come to NASA to revitalize the agency. Would he be the administrator who presided over its demise? He spent some soul-searching time with Shank, and they pondered options, none of which were good.

By chance, Shank hosted a party at his home one evening after an anguished meeting with Griffin. An OMB staffer, Dave Radzinowski, who would in time join NASA, attended, and he and Shank informally discussed NASA's budget quandary. Radzinowski suggested Shank think about the Science Mission Directorate budget. Science had been getting relatively steady large raises in recent years, and the five-year projection called for continuing in that regard. But what if science were held to no raises for a period of time? That might help alleviate the shuttle shortfall.³³

Shank ran the numbers, and they seemed to work. Meanwhile, Griffin's negotiations with higher levels at OMB were getting nowhere. When Shank showed his boss the numbers of a science-to-shuttle transfer, Griffin saw at least the potential of a solution to his problem. Moreover, with other economies he could institute, he might even be able to hold to his goal of accelerating Orion/Ares and deploying it in 2012 rather than 2014. OMB did not agree with this "solution." If anything, it held even more strongly to its position, which was to end the shuttle program early and, with it, the building of the space station.

Decision making escalated to political levels of the White House in December 2005. President Bush did not customarily intervene in agency-OMB budget fights. He was a delegator, and saw his decision role as strategic, not tactical. That he was willing to have a White House meeting of "principals," including himself, was indicative of the importance of this juncture in the implementation of his 2004 decision. The NASA shuttle budget crisis was pivotal in how well and quickly implementation could go. Griffin wanted the Moon-Mars program carried out, but many other non-NASA priorities argued for holding expenditures to the absolute minimum.

The key protagonists at the meeting were OMB director Bolton and NASA administrator Griffin. President Bush, Vice President Cheney, Science Advisor John Marburger, a State Department representative, and various other officials and aides attended. The questions to be decided came down to two. First, should NASA fly out the shuttle to 2010, finish the space station, or not do so? Second, should the Science Mission Directorate be flat-lined with funds reallocated to Human Space Flight to mitigate the shuttle shortfall? Doing so would protect the new exploration mission and make it possible to accelerate Orion/Ares.

Bolton spoke for OMB. His position was that the shuttle and space station programs should end early. OMB especially opposed spending more money on the shuttle. "It sucks money out of the budget and is a dead-end program," was the longstanding OMB view.³⁴ Griffin argued that America's good faith with its international partners was at stake in finishing ISS, and to do that NASA needed the shuttle. The State Department representative spoke up for the interests of the partners. Cheney raised the issue of

shuttle safety. Bush asked about the possibility of another accident. Griffin said the odds were one in one hundred. Bush indicated that was acceptable. The president wanted to know what would happen if he ended the shuttle and space station programs early. "You could do that," Candida Wolfe, his legislative aide, responded, "but Congress would overturn your decision." Congress would be cognizant of the domestic job losses as well as international partner considerations. Bush decided that NASA would stay the course—fly out the shuttle to 2010 and complete the space station.

The second question had to do with the transfer of money from science to shuttle and thereby protection/acceleration of manned exploration. Griffin argued in favor of the science flat-lining strategy. OMB opposed this position. Science Advisor Marburger spoke up in favor of science as a priority. The president's decision was to give NASA a modest overall raise. Science would also get a small raise while the shuttle continued. Exploration Systems would thus have to pay for some of the extra shuttle costs. Griffin would not have the money needed to accelerate Orion/Ares, but enough to keep the original goal of 2014.

As Griffin saw it, he won his dispute with OMB on the first question, and lost on the second.³⁵ OMB told Griffin the outcome was the best he could get, and NASA was doing better than other non-defense agencies. When all the calculations were done, Griffin had to make up \$3 billion in extra shuttle costs over a five year period. Griffin had said "not one thin dime" would be taken from space science to support manned exploration. Now, thanks to the White House decisions, money would have to come from *both* exploration and space science to pay for the shuttle shortfall. Such decisions and trade-offs were exactly the kind Griffin had wanted to avoid. But he had no choice.³⁶ The political/budgetary situation of late 2005 was much harsher than when the Moon-Mars decision was announced in early 2004. With NASA's overall budget not rising as anticipated and the shuttle program costing far more than projected, the older programs were getting in the way of the new mission.

The NASA administrator at this time had also been working the Hill to get Congress to clearly endorse the Moon-Mars goal—something it had yet to do. In

this case, he scored a victory. That mission did get full congressional legitimization in December when Congress passed an authorization bill specifically backing Moon-Mars as a national goal. This language constituted an important event, and a positive one in strengthening the original presidential decision. What it meant was that Congress was explicitly on record on behalf of the 2004 decision, and it was a statement to which NASA could point in the future as presidents and Congresses changed. NASA could call Moon-Mars a bipartisan, national decision, rather than a Bush decision—an important strategy, especially as Bush's popularity sagged because of Iraq and Katrina.

Year Two (2006): Moving Forward, Facing Opposition

Assuaging Scientists

The budget decisions of December were made public in the president's budget announced in February 2006. NASA got \$16.7 billion for FY 2007, a sum that represented a marginal increase over the \$16.6 billion Congress approved for FY 2006. Griffin now had to defend the budget. He pointed out, "We're talking about doing different things with the money that's been allocated to us, and that involves turning a very large boat with a very small rudder. I'm the rudder and it's a difficult challenge."³⁷

The budget decisions cost the exploration mission approximately \$1.5 billion from projected five-year spending. One way found to save money was to change the shuttle-derived design for the rockets powering Orion. This action was made early in 2006 and required replacement of a modified space shuttle main engine with an updated version of an Apollo-era J2 engine. This and other design changes were seen by NASA as saving money over the long haul. The changes were debated, but disagreements were contained largely at the technical level.³⁸

Griffin was conscious that he needed his internal and external constituencies fully behind the Moon-Mars program. To help assure that, he made it clear in June that all 10 NASA centers would have a role in the new mission.³⁹ He wanted space scientists behind the mission as well, but they were smarting over what they saw as budget cuts. Mary Cleve, Griffin's associate administrator for science, felt the backlash of scientists' anger as soon as they found out about the budget in February. She attended a meeting in March and tried to assuage the scientists, explaining the rationale for budget actions. She found little support. The scientists were going to

have a relatively steady-state budget, averaging 1 percent raises, receiving \$2 billion less over five years than they had expected from earlier announced budget projections. Griffin had told them the Moon-Mars decision would cost them "not one thin dime," and they had taken him at his word. Cleve explained Griffin had little choice. Various scientific critics said he did have a choice. They charged he was writing the latest chapter in NASA's long-term saga of robbing robotic-science Peter to pay manned-space Paul!⁴⁰

In April, The Planetary Society, a large membership group of space enthusiasts, opened a campaign entitled SOS—"Save Our Science." The society lobbied the public and Congress to overturn Griffin's priorities. In May, Griffin attended a meeting of the Space Science Board of the National Academy of Sciences-National Research Council. He sought understanding for his position. Scientists there argued that robotic science flights were more exciting, in the context of exploration, than a manned return to the moon. One senior scientist charged that Griffin was imposing an "engineering culture" on NASA's science program, a comment not meant as a compliment.⁴¹ As he sought to dampen the protests, Griffin had again to concentrate his attention on getting the shuttle back into space.

Making a Gutsy Choice

For approximately a year, the shuttle had not flown. The last time a shuttle had launched, the foam problem that had doomed Columbia had recurred. NASA engineers had labored, at great expense, to solve this seemingly intractable problem. Griffin had stayed closely involved. In June 2006, shuttle program managers signaled that the spacecraft was

“ready.” However, the agency’s top safety official and chief engineer disagreed. They said NASA had more work to do to alleviate their concerns. The decision went up to Griffin. Confident in his own capacity to weigh the technical aspects of the decision, he said the risk was acceptable. The launch was set for early July.

The New York Times, among other critics, questioned the decision, but called it “gutsy.”⁴² On July 4, the shuttle roared into space. This time, all went smoothly and there were no significant problems. Landing July 16, it seemed that all the work that had gone into additional risk mitigation since the first return to flight had paid dividends. Griffin’s decision was vindicated. Also shown was a NASA openness to dissent. Griffin said that the time had come to resume building the ISS. It was important, he declared, to “finish what we have started.” Asked about his feelings at this moment of triumph, the self-described Spock replied, “I’ll have time for feelings after I’m dead.”⁴³

The next month, NASA announced another critical decision—who would build Orion. The prime contract—worth \$3.9 billion—went to Lockheed Martin, which prevailed over the Northrop Grumman-Boeing team. The contract could be worth \$8.15 billion through 2019, depending upon the number of reusable Orion spacecraft NASA ordered.⁴⁴ NASA also named two firms that would compete under the Commercial Orbital Transportation Services program. They were Rocketplane Kistler in Oklahoma and Space Exploration Technologies Corporation in California. Griffin said he was “gambling a half-billion dollars” that the companies would use the NASA money to leverage private investment “to step up” to the opportunity. “If that doesn’t work, I’ve frankly made the wrong bet.”⁴⁵

Excluding Dissenters

Even as Griffin dealt with the shuttle and lunar-return decisions, his problems with the scientific community mounted. This time, instead of seeking understanding, he used harsher tactics in dealing with his critics. He had shaped the topside NASA Advisory Council (NAC) to include members who shared his zeal for human spaceflight and the new mission to Moon-Mars. The chairman was Harrison Schmitt, former Apollo astronaut and later senator.

John Glenn, also a former astronaut and senator, was another Griffin appointee. Griffin wanted help on his priorities, but found certain scientists on NAC using their position to assert *their* claims, especially in regard to science cuts.

The schism within NAC between those supporting Griffin’s priorities and the scientists who opposed them became increasingly pronounced. In mid-August, one of the scientists countering Griffin resigned in protest, and Griffin fired two others, including Wesley Huntress, former head of the Science Mission Directorate in the early 1990s. He followed this action on August 25 with a speech in which he blasted his scientific opposition, accusing his critics of thinking more of their narrow interests than those of the agency as a whole. He was also reportedly displeased with Cleve’s inability to ameliorate the split. She would retire in the not-too-distant future.⁴⁶

Admitting Defeat on Program Acceleration

Griffin’s priority was obviously human space flight, and he was characteristically direct in defending his choice. In his view, human space flight had been slighted in recent years, while science had gained in relative terms as a percentage of NASA spending. He certainly appreciated space science, but he had severe budget problems and had to make choices. His felt he was being fair to scientists; they disagreed and did not like his manner in expressing his views. Meanwhile, he labored with the shuttle. The July flight of a shuttle was followed on September 10 with the launch of another shuttle, this one explicitly with a mission to resume ISS building. All evidence from this launch was that there were no significant foam or other safety issues. The shuttle seemed back in operation. But Griffin was not feeling particularly sanguine.

On September 12, he conceded publicly what he already knew privately: NASA would not achieve the goal he had set when he joined the agency—a seamless transition from the shuttle to its successor. “Orion will not be operational until 2014, the last year allowed by presidential policy guidance,” he declared. It was simply a matter of money, he emphasized. Also, he noted that it might have been possible to deploy Orion earlier, but there had been

a decision not to cut the science budget to the extent to make that possible.⁴⁷

Griffin made his announcement about the four year gap in U.S. access to space at NASA's Goddard Space Flight Center in Greenbelt, Maryland. Goddard was one of NASA's science-oriented centers. If Goddard was the site of an unhappy announcement, it soon became the locus for a much more positive statement. On October 31, Griffin traveled to Goddard again, accompanied by Senator Mikulski. He announced, to virtually universal acclaim, that NASA would send a space shuttle to service Hubble in 2008. Hubble would be saved!⁴⁸

Coping with Contentious Politics

Mikulski's support was essential to Griffin, NASA, and the exploration mission. The former Republican majority leader, Congressman Tom DeLay, so critical in 2004 and 2005 in getting initial funding to start the Moon-Mars program, had run into legal problems in Texas. His power in Congress had therefore diminished considerably. He relinquished his congressional leadership post and did not run for reelection in 2006. In November, the Democrats won the congressional elections, returning to power on Capitol Hill for the first time in 12 years. Mikulski, senior Democrat on the Senate Appropriations subcommittee funding NASA, would now be its chair. She said she would try to get at least \$1 billion extra for NASA from Congress to help make up for the unanticipated shuttle costs since Columbia.

The relations between congressional Democrats and the White House were partisan to an extreme. NASA and most other agencies still did not have their appropriations, and they were well into the fiscal year which had begun in October 2006. Congressional party leaders for the new Democratic majority made it known in December that they would extend the continuing resolution under which most agencies, including NASA, were operating, through the end of the fiscal year (September 30, 2007). That meant that NASA would have to live in 2007 at a 2006 funding level, not what the president had proposed.

In January 2007, the Democrats took control of Congress. Some of the new space committee chairs were friendly to NASA, others less so. Most found

Griffin credible even if they did not always like what he said. Democrats generally emphasized "balance" in the space program, more emphasis on science, including Earth science, the field relevant to climate change. What was most important was that there was bipartisan support for the fundamental policy *direction* of the human spaceflight program—i.e., the transition from low-Earth orbit to the moon, Mars, and beyond. The major issue in debate was *pace*, a decision based almost entirely on money and who got what among NASA programs. As they had promised, the Democrat-led Congress voted in January to extend the continuing resolution to the end of the fiscal year. Given what NASA had already spent, this meant NASA's operating the remainder of the year on a budget \$500 million below what it had expected to have at this time.⁴⁹

NASA's Exploration Systems Mission Directorate, which had been counting on a healthy increase, absorbed most of the shortfall. Griffin told a Senate panel in late February that as a result of the continuing resolution the agency would no longer guarantee a 2014 debut of the Orion Crew Exploration Vehicle and its Ares I launcher. The best NASA could reasonably expect to do, he said, given its budget situation, was field Orion/Ares by March 2015, some 4 1/2 years after the space shuttle was expected to conduct its last flight.⁵⁰

Significantly, while the Bush White House protested the impact of the continuing resolution on various agencies, it was silent on NASA, a fact suggesting NASA and its Moon-Mars program were a diminishing priority for Bush. Griffin thus had to be utterly clear about his own preferences. Having awarded the prime contract for Orion in 2006, he said that awarding contracts for development of the Ares I rocket was his top procurement priority for 2007. If doing what was most important for the agency meant doing less for those activities that were secondary and marginal, then so be it. "We will find a way to cope," he said.⁵¹

Among the programs he now deemed marginal was astrobiology, the search for life that scientists regarded as a major rationale for space exploration, human or robotic. Another was Earth science, in spite of the fact that a National Academy of Sciences (NAS) report urged NASA to fund 17 Earth-observing satellites between 2010 and 2020 in order

to rebuild the nation's network of environmental satellites, essential to understanding climate change and its impacts. Griffin opposed such an expenditure, but the new Democratic chair of the House Science Committee, Bart Gordon (D-TN), applauded the NAS report. Within the exploration line, Griffin said it was necessary to cancel a lunar rover program. NASA had planned a lunar reconnaissance mission to be followed by the lunar rover effort. This rover program had been moved from NASA's Ames Research Center in California to its Marshall Space Flight Center in Alabama. At a time when the various NASA centers were competing for limited NASA funding, they were not averse to using their states' congressional representatives to help them get their share. Marshall was aided considerably by Senator Richard Shelby (R-AL), and he was not going to let the lunar rover die without a fight.⁵²

Griffin said that as NASA flew out the remaining space shuttle missions, NASA's "greatest challenge"—the one to which he was devoting most of his attention—was managing the transition to the new vehicles that followed. That included transitioning the work force from old to new goals.⁵³ It did not help that NASA centers engaged in end-runs and he had to spend time reigning in these entities. He used meetings of top managers, including program and center directors, to press them to remember their obligations to the agency as a whole. To smooth the transition from the shuttle/space station era to that of Moon-Mars, he put the associate administrators for these respective programs in close physical proximity in NASA's headquarters and monitored the gradual redeployment of facilities and manpower from space operations to exploration systems.

Year Three (2007): Managing in a Turbulent Environment

In February 2007, the president's proposed new budget was announced. NASA was slated for a raise to \$17.3 billion. Mikulski said she'd try again to get an extra \$1 billion on top of that for NASA. She called it an effort to "reimburse" NASA for shuttle recovery costs since Columbia.⁵⁴ In March, Griffin warned Congress that the next humans on the moon might well be Chinese. The Chinese had launched a determined and well-funded effort, aimed at the moon, while the U.S. program was slipping in time. "I don't want China to get there before we do," echoed Mikulski. Wholly aside from the Chinese, Representative Gordon commented that the funding constraints meant NASA was headed for a "train wreck" if it did not get more money. There was simply too big a gap between what NASA was supposed to do and the money it had.⁵⁵ Whether Griffin and his supporters could get the agency more money remained to be seen.

Getting Help with Scientists

In early April 2007, Alan Stern came aboard as associate administrator for science, replacing the embattled Cleve. This was an important appointment. Stern was a veteran NASA principal investigator, an able scientist, and leader of the recently launched Pluto probe. The scientific community accepted him as a research manager in a way they had not accepted Cleve. He had a \$5.4 billion budget to manage and a constituency up in arms. He hit the ground running with a pitch to his battered staff urging support of human space exploration. He also promoted NASA scientist John Mather to his deputy and chief scientist. Mather was a co-winner of the Nobel Prize in physics in 2006 for his work in relation to understanding the Big Bang. With Stern and Mather in charge, the scientific community had to take the NASA science leadership seriously. Stern

told the space science community it would have to adapt to the tight financial prospect. He vowed to get more good science out of his budget and to stop "management by checkbook." Either principal investigators would manage projects within costs, or they would risk project cancellations.⁵⁶

Over succeeding months, Stern showed he meant business about good management, while also rescuing a NASA science program perceived in disarray. By providing strong and respected leadership, Stern became a buffer for Griffin—and allowed the administrator more leeway to concentrate on his priorities in transitioning human spaceflight.

Stern played hardball with an upcoming \$1.7 billion Mars Science Laboratory mission, eliminating several over-budget instruments from the spacecraft, and only later reinstating two of them after their builders found a way to get the job done without additional money from NASA. He brought astrobiology back as a priority. Stern said that the unmanned and manned exploration programs could march together and help one another. It was not a zero-sum game, as some of his scientific colleagues seemed to think.⁵⁷

It was clear that Griffin had problems with scientists, and particularly their external lobbying to change NASA's priorities with Congress. He also accused scientists of using the National Academy of Sciences decadal surveys of future needs to propose programs without serious consideration of actual costs. Stern said such surveys were worthwhile, but insisted that scientists honestly account for costs in their recommendations.⁵⁸ The tension between Griffin and the scientists did not disappear due to Stern's actions, but they lessened.

Griffin was not always careful in what he said or whom he offended. Most of the time, his candor was an asset, especially with Congress, but he was not always adept in what he said to the media. For example, in late May 2007, as President Bush was belatedly conceding that global warming was a serious problem, Griffin, in an interview on radio, seemed to deny it was a problem. Climate scientists inside and outside NASA erupted in loud disagreement and dismay. NASA's public affairs chief tried to explain what his boss had meant. It was that climate change was not a policy problem for NASA to address, although the agency would provide science data as a basis of climate policy. But Griffin's comment did not come across with that kind of subtlety.

The climate change flap highlighted Griffin's flaws as a public spokesman for NASA.⁵⁹ There was another time in a *USA Today* interview that he seemed to dismiss decades of NASA work on the shuttle and space station as not worthwhile.⁶⁰ What he meant was that these projects were a diversion from exploration, NASA's true mission, but the words came across negatively and harshly and he had to apologize to his agency for them.⁶¹ While he gave speeches frequently on space, public communication was not a role at which he excelled. Shana Dale, his deputy, found herself travelling frequently and making the case for space exploration to many audiences outside Washington and the space community. Griffin was more comfortable dealing with technical and management issues—of which there were a plentitude.

All these problems and issues notwithstanding, Griffin had his agency moving forward. In 2007, NASA launched three shuttle missions to ISS, all difficult, risky, and important. The space station was getting built and international partners were coming aboard with astronauts and hardware. At long last, ISS was showing real progress toward completion. Griffin was deeply involved in decisions about these flights—far closer and more intensely than his recent predecessors. He wanted to understand the risks and direct work so as to minimize them as much as possible. His technical acumen was undeniable and he kept subordinates on their toes.

Keeping Focus on the Moon

His top goal, however, was always the Moon-Mars program. He had said at the outset of the year that getting contracts in place for building the Ares I

rocket was his priority for 2007. In July 2007, NASA gave a \$1.2 billion sole-source contract to Pratt and Whitney Rocketdyne of California for the J-2X engine that would power Ares I and also serve in its planned heavy-lift follow-on, the Ares V. The ensuing month, NASA signed a \$1.8 billion sole-source contract with Alliant TechSystems for development of the Ares I main stage, a larger version of the solid-rocket boosters the company built for the space shuttle program.

Also, in August, NASA awarded a \$515 million contract to Houston-based Boeing Space Exploration for production of the Ares I upper stage. Then, in December, it put the final piece of the Ares stack, the avionics ring that would guide the rocket in flight, under contract with an \$800 million award, also to Boeing Space Exploration.

During the summer, as these major hardware decisions were finalized, two of NASA's top managers—Geveden, the associate administrator who served a general manager role, and Horowitz, the associate administrator for exploration systems, announced they would be leaving to go to the private sector. Griffin selected successors quickly. He named Chris Scolese, the chief engineer and a man who had opposed him on the decision to fly the shuttle in 2006, the new (general manager) associate administrator. He named Richard Gilbrech, former director of Stennis Space Center, to replace Horowitz.

Griffin had to be pleased that the Orion/Ares I hardware decisions were made. He was decidedly displeased with the slippage of its launch to 2015. He saw space as a statement of national leadership and resolve and critical to U.S. standing in the world. "I personally believe that China will be back on the moon before we are," he told Congress in late September. "I think when that happens Americans will not like it, but they'll just have to not like it."⁶²

On October 24, China successfully launched its first lunar probe, Chang'e 1, to conduct reconnaissance of the moon. Having become the third nation in history to have a human spaceflight capability, China dramatically pursued its ambitions. Griffin drew his conclusions about Chinese intent. But few politicians in Washington—much less the media and public—seemed to give his remarks much heed. Griffin worked hard behind the scenes to persuade OMB

to let him have more money in the next budget to make up the gap in time caused by the continuing resolution and get back to the president's original 2014 goal. OMB said no. At this point, with many of the Bush administration officials involved in the original Moon-Mars decision leaving office and/or seeking new jobs, there were few allies in the White House willing to make a case on NASA's behalf to the president. Another "principals" meeting at the White House was not in the cards. Griffin's main conduit in the White House was Marburger, the science advisor, who had very limited clout.

On October 30, Griffin announced roles that NASA's 10 field centers would play in connection with the Ares V and lunar lander. These roles, along with those already assigned for Orion and Ares I, would help define their manpower requirements for the years ahead and help keep them gainfully employed in the future.⁶³ They would also contribute to transforming them into the kind of development-oriented centers Griffin wanted for making the total Constellation "system of systems" a reality.

Also in October, NASA eliminated Rocketplane Kistler from the competition to provide cargo services to ISS after the shuttle's planned retirement in 2010. In NASA's view, the firm had not met milestones established in a contract with the firm under NASA's COTS program. The company protested the decision, and opposed NASA's directing funds to another possible entrant in the Commercial Orbital Transportation Services program.

Meanwhile, the political environment worsened. Throughout 2007, conflict between the Democratic Congress and Republican White House made it difficult to get almost any kind of policy decision made. The struggle was about the Iraq war as well as domestic priorities. As the year lumbered toward a close, the Democratic majority in Congress and Bush White House engaged in a game of "chicken," testing who would blink first in getting their way on the federal budget. NASA was buffeted by partisan crossfire, living month after month on a continuing resolution, suffering mounting anxiety over inadequate funds. It was not an issue of getting the extra \$1 billion Senator Mikulski had tried to obtain. No one expected that to come forth. NASA needed at least the money President Bush had requested the previous February.

Finally, in December, just before Congress adjourned for the Christmas and New Year's break, the Democrats bowed to reality. They went along with the president's total budget number in a gigantic omnibus bill that included budgets for most of the non-defense agencies, including NASA. NASA received its full \$17.3 billion request for 2008 in the bill signed into law December 26. Congress provided more money for science and aeronautics than NASA had requested. The Exploration Systems Mission Directorate was funded at \$3.84 billion, approximately \$82 million less than the agency requested. Most of that cut was absorbed by COTS. Congress directed NASA to spend \$42 million in 2008 developing the robotic lunar lander project the agency had tried to cancel in 2007. Congress also barred NASA from making a new award under its Commercial Orbital Transportation Services demonstration program until it settled its dispute with Rocketplane Kistler, which had raised formal objections to NASA's eliminating it from the program.⁶⁴

Year Four (2008): Securing the Mission in an Election Year

Managing Against the Wind

The year 2008 was a presidential election year. What this meant for Griffin was that it was most likely his final year in office. There was a chance a new president would ask him to stay, but he could not count on that, even if he wished to stay. Hence, what he did had to be geared to the long term, handing on to his successor a program that was solidly and clearly directed. Most of his decisions dealt with his top priority—the Orion/Ares transition. However, the science program also required decisions. Throughout, he was second-guessed on all sides and found himself cross-pressured by influential constituencies, including the White House, Congress and international partners.

Griffin entered 2008 with an appropriated budget of \$17.3 billion. The president's budget proposal for FY 2009, announced in early February, called for a raise to \$17.6 billion. Griffin had made a last-ditch effort behind the scenes to get enough funds to narrow the transition gap by as much as two years and failed. He faced opposition from OMB and indifference in the White House. The presidential budget's modest raise would keep the Orion/Ares development on target for 2015, and allow for new starts in Earth observation satellites. The latter initiative was a consequence of President Bush's conversion to greater priority for climate change. The new moves for Earth science came by redistributing money within the overall Science Directorate budget, most notably, from Mars exploration.⁶⁵

Griffin had brought Stern aboard to manage the Science Directorate and help mend his schism with the science community. Stern was a strong-willed individual intent on accomplishing a great deal even

with constrained resources. He had a serious overrun on his biggest Mars project, the Mars Science Laboratory, scheduled to launch in 2009. At the same time, he proposed in February 2008 an even larger project, Mars Sample Return, by 2020.⁶⁶ As a scientist whose personal interest was with the outer planets, he also called for a major "flagship" project involving Jupiter or Saturn in the future.

Griffin's intent was to give his science director great autonomy, but Stern wanted more leeway than Griffin was willing to grant, particularly where particular programs or projects had high congressional visibility. In March, Stern made it known he was going to save money by reducing the activity of Spirit/Opportunity on Mars. Griffin learned about this decision after the fact, and also heard protests from the many supporters of Spirit/Opportunity, including lawmakers.

When Griffin publicly overruled the decision, Stern abruptly resigned. Griffin tried to change Stern's mind, but could not do so. He then quickly replaced him with Ed Weiler, who had held the job previously and then became director of NASA's Goddard Space Flight Center. While the scientific community was concerned about the turmoil in NASA science, it was reassured by the appointment of Weiler, a known quantity and respected manager. If anyone could deal with difficult budget issues with judgment, Weiler was seen as the man.⁶⁷

Griffin faced a good deal of second-guessing, and not just about the Stern resignation. In late February 2008, Scott Hubbard and Wesley Huntress, former NASA officials (Griffin had earlier fired Huntress from the NASA Advisory Council) convened a meeting of space policy veterans at Stanford University to assess

the Moon-Mars program and where it was headed. Many observers believed that this meeting aimed to seek change in NASA's transition plans by removing the moon as an initial destination. This being an election year, an event like this could be construed as trying to influence decision making about space after Bush. Griffin was sufficiently wary that he issued a public statement affirming the lunar goal.⁶⁸

The Stanford meeting turned out to back the moon as a first step, but warned that it should not become an end in itself, but an interim step to Mars. It would be a learning experience for NASA, but too much attention to lunar base building would hold NASA back from the ultimate prize.⁶⁹

There was also increased second-guessing (again, likely, with an eye to the presidential succession) about the technical "how" question. Griffin was more certain than ever that the shuttle-derived method was the way to go back to the moon. However, there was enhanced carping from companies and their allies associated with alternative methods. They said their technical routes were better. These complaints, which went beyond words to active lobbying, gained some credibility in 2008 from reports that the Ares rocket was suffering glitches. Griffin dismissed these technical problems as "normal" and fixable, and emphasized that NASA had studied alternative routes to replacing the shuttle, and the one it had chosen back in 2005 was still the best.⁷⁰ Moreover, with all that had been done in terms of contracting and developing hardware, the die was cast, in his view, with the right approach.

Reassuring Florida and International Partners

Along with countering the second-guessers about Orion/Ares glitches was Griffin's need to deal with the worry on the part of Florida and the international partners about the gap. The gap had always been Griffin's greatest concern, and now that it was clear he could not narrow it (without additional funds), he had to cope with worries about its human, economic and international impact.

The threat congressional representatives from Florida saw were layoffs of personnel at Kennedy Space Center (KSC). It was not just civil servants. Indeed the

far greater problem, in numbers, was the contractor community. Other human space flight centers—Johnson in Texas and Marshall in Alabama—were development centers. They had work ahead on Orion/Ares and then the Ares V and lunar lander projects. But KSC was operations-oriented. Without maintaining the shuttle, what would it do?

Throughout 2008, Griffin tried to reassure Florida lawmakers that the layoffs would be as limited as possible. However, one NASA report suggested as many as 10,000 people would be laid off. Griffin told Congress the number would be between 3,000 and 4,000. That number was still too many for Florida lawmakers to accept. Their solution was to extend the shuttle beyond 2010. In April, the Florida congressional delegation was reported as lobbying colleagues to change the policy on shuttle retirement. In line with White House policy, Griffin resisted such a move. He said that he would alleviate layoffs to some extent by giving KSC a new mission of "sustaining engineering," a role that otherwise might be undertaken at the Texas or Alabama centers.⁷¹ This question of the shuttle's future was increasingly enmeshed in the presidential campaign. Both Barack Obama and John McCain, the two candidates vying to replace President Bush, came to Florida and the KSC area to affirm their support of the space program and Florida's interests in it.

The issue of shuttle retirement could not be separated from the question of the U.S. role in ISS. The year 2008 marked a number of critical, successful shuttle missions to ISS taking major modules produced by Europe and Japan. The International Space Station was getting built. Once completed, ISS would shift fully from development to utilization. How could NASA and its partners use ISS without a shuttle to get there?

Griffin had established the COTS program to get private industry to provide at least cargo services to ISS in the post-shuttle era. The issues involving particular competing companies that had come up had been resolved but no firm was likely to be ready to help in 2010. Griffin reassured the partners that NASA would deal with the problem. The treaty obligations of the U.S. to its partners ended in 2015, but Griffin in June said it was inconceivable that NASA's participation in getting ISS used would cease then.⁷²

What was inconceivable to Griffin was apparently conceivable to OMB. He was hearing OMB tell him, "The president said you could build the space station. He didn't say you could use it."⁷³

Sounding the Alarm

Without a shuttle, the U.S. and partners would be forced to rely on Russian Soyuz rockets to get to the ISS after 2010. They had done so after the Columbia accident, before the shuttle's return to flight. But Congress had also passed legislation that restricted the U.S. continuing on this course in view of suspicions Russia was aiding in weapons proliferation to U.S. adversaries. If the shuttle was not extended and the Russian restrictions not eased, then there would be no way to have access to ISS. Griffin worked in 2008 to get Congress to amend the Russian restriction. But in August Russia invaded Georgia, a nation the U.S. was seeking to nurture as a democracy. Bush and the presidential candidates condemned Russia for its actions and congressional sentiment swung sharply against Russia. This situation made getting the amendment on Soyuz purchases extremely difficult. These events augmented pressure to continue the shuttle after 2010.

Griffin, to put it mildly, was frustrated. He believed that technically and managerially NASA was doing about as well as it could in hard fiscal times. But he saw a real crisis in policy ahead. The two presidential candidates were both urging that the shuttle's 2010 retirement decision get a second look. Florida lawmakers were pressuring in the same direction. It was a virtual certainty that after the election, the Bush 2004 decision would be revisited again. Both candidates lamented "the gap," and even said they would provide additional funds to NASA if elected, but no one presently in power seemed to understand NASA's financial situation enough to do anything about it. From his confirmation hearings onward, Griffin had warned that the gap from shuttle to its successor placed the U.S. in a bad situation. Now his fears were being borne out.

Responding to immediate political pressures, the Georgia invasion, and his uncertainties of the post-Bush future, he directed NASA to study shuttle program extension, among other contingencies, to narrow the gap. OMB was dead-set against this extension option. So was the Office of Science and

Technology Policy, which worked with OMB on technical-agency matters. To finance both Moon-Mars development and shuttle/space station operations at the same time after 2010 could require either \$3 billion more in the overall NASA budget or eviscerating everything else NASA did. One of these science missions, the robotic Mars program, had become—along with Hubble—a crown jewel in NASA's science endeavor. Hubble repair had been postponed to 2009 for technical reasons, but the Mars exploration program was going well. Phoenix landed successfully on Mars in May 2008, and in June it dug into Martian soil and found water-ice and nutrients that could perhaps support life. The Mars Science Laboratory was experiencing cost increases and would eventually be delayed as to launch, but was seen as exceptionally important and a flagship for NASA generally. Also, everyone now seemed to want NASA to spend more on Earth science because of climate change.

But when it came to his key priority—the transition from the shuttle to Orion/Ares—Griffin was "about as pessimistic as it is possible to be." In an August e-mail to senior managers that was leaked, he said that the White House science and budget offices were on a "jihad" to retire the shuttle. Though publicly supporting the 2010 retirement date, he was troubled, as he had been from the beginning of his tenure, with the gap between shuttle and Orion/Ares. This gap would force NASA to pay Russia to use Soyuz vehicles to transport astronauts to ISS, a facility whose construction the U.S. had largely financed.⁷⁴ Unless the U.S. did that, a situation could unfold that would be even worse, in Griffin's view.

In September, Congress passed a continuing resolution that would fund NASA at its 2008 level of \$17.3 billion through March 6, 2009. The resolution amended the Iran-North Korea-Syria Non-proliferation Act to permit NASA to continue buying Soyuz crew capsules and unmanned Progress cargo supply vehicles for ISS through July 1, 2016. This was an amendment for which Griffin had labored long and hard, helped very little by the White House. As Griffin saw it, without the Russians the U.S. would have little choice but to extend the risky shuttle use, but in doing that, money for Orion/Ares would be expended, and the new successor system set back.⁷⁵ This legislation, which was facilitated by presidential candidate Barack Obama, kept open the Russian

option that otherwise would have closed under existing law in 2012. But the continuing resolution kept NASA's budget static once again.

As Griffin wrote in his e-mail, the situation had unfolded during his years in office “exactly as I predicted.” The U.S. was now dependent on Russia. “In a rational world,” he wrote, “we would have been allowed to pick a shuttle retirement date to be consistent with Ares/Orion availability, we would have been asked to deploy Ares/Orion as early as possible (rather than ‘not later than 2014’) and we would have been provided the necessary budget to make it so.”⁷⁶ That had not happened, and Griffin had to play a difficult hand he was dealt. He was sounding an alarm about not only a technology gap, but a policy gap that would have to be addressed by the next president and the next NASA administrator.

Griffin hoped he would be asked to stay on by President Obama. He wanted to move the Moon-Mars program further toward fruition. Friends—even his wife—advocated on his behalf. But Griffin's cause was hurt by what the media reported as an argument between himself and leaders of Obama's transition team over his cooperation with that team. Griffin vehemently denied any lack of cooperation. Whatever the case, it became obvious in mid-January 2009 that the new president was not going to retain Griffin, and therefore Griffin left on January 20, 2009.

Conclusion

How does an administrator of a federal agency carry out a new mission when his or her agency's budget is relatively static and other programs need support? Michael Griffin had precisely that problem when he joined NASA in April 2005. What did he do? Where did he succeed? Where did he fail? What lessons can be learned from his record in the period from April 2005 to January 2009?

In his Senate confirmation hearings, Griffin pledged to implement the president's policy established in 2004, namely, to retire the shuttle in 2010, bring on a successor space vehicle by 2014, return NASA to the moon by 2020, and point the agency towards Mars. Implicit in the decision was the shuttle's completion of the ISS by 2010. Griffin said he would try to accelerate the transition from the shuttle to Orion/Ares, as the successor vehicle came to be known, to make it as seamless as possible. He indicated he could do all this without cannibalizing space science and other programs of NASA. He also said he would take another look at his predecessor's decision to terminate the Hubble Space Telescope.

Griffin believed deeply in the Moon-Mars mission and one reason he wanted so intensely to bring Orion/Ares on line quickly was to establish a strong momentum that would sustain the new program beyond the presidential transition of January 2009. The biggest obstacle he faced throughout his tenure was the failure of the White House and Congress to fund the new mission and NASA adequately. The agency was asked to do too much with the budget it had. All NASA's missions had constituencies that demanded resources. The main problem was the budgetary support of NASA as whole, and the constraints that problem put on the ability of Griffin to launch the new mission.

Still, Griffin accomplished much in a relatively brief time. Specifically, he:

- Kept the new mission at the top of his priorities through his years in office
- Specified clearly the major hardware requirements for how this mission would be accomplished
- Made organizational changes, and put competent officials he trusted in key positions to carry out the mission
- Let contracts with industry to initiate hardware development, and determined roles various NASA centers would play
- Established a sound technical-managerial direction for the Moon-Mars program, the name of which was Constellation
- Got Congress to endorse the program so as to make it a bipartisan national program rather than a Bush program

He thus presided over a critical early "launching" step in the transition from old to new in manned space. In addition, he returned the shuttle to flight and moved the space station further toward completion. He instituted a new program to enable industry to provide cargo services to the International Space Station after the shuttle was retired. This industrial initiative was part of a strategy to reorient NASA from operations to a development-engineering culture, emphasizing exploration as a prime purpose. Finally, he reversed his predecessor and decided to send a shuttle to extend the life of the Hubble Space Telescope.

In emphasizing a new mission and transition in manned spaceflight, Griffin gave less priority to space science and aeronautics. The space science

community, in particular, fought Griffin's priorities. Griffin also struggled mightily with OMB. He saw OMB as undermining the president's policy and weakening his own capacity to implement it. OMB, which emphasized fiscal savings, was a continual nemesis for Griffin. As the president and Congress vied over various national priorities, NASA fell as a national concern. Griffin found few allies in either branch who could help him gather additional funds.

While he accomplished much, in spite of his budget constraints, he was bitterly disappointed he could not narrow the gap between the shuttle and its successor, Orion/Ares. Instead of narrowing, the gap he inherited grew during his watch. It would be at least 4 1/2 years, and possibly longer, unless the president and Congress substantially increased NASA funding and did so quickly, or found some technological system that could be deployed faster than Orion/Ares.

In November 2008, Barack Obama was elected president. During the campaign he had said he would increase NASA's budget. In February 2009, Obama announced a budget plan that called for raising NASA's budget. Further, he endorsed NASA's goal of retiring the shuttle by 2010 and returning to the moon by 2020.⁷⁷ More money might accelerate Orion/Ares, but there were limits to what could be done.

Hence, Griffin can be said to have succeeded in getting the Moon-Mars program underway, but not in making the transition in space transportation move at the pace he set as a goal. Moreover, while he proved an able technical-managerial administrator in keeping a focus on his top priority, he could not build a large and enthusiastic constituency for the new mission. His style as a leader, which was usually direct and blunt, was both a help and hindrance. It gave him credibility with Congress, especially those lawmakers who found his predecessor, Sean O'Keefe, given to rhetorical obfuscation. But his style could also offend. Griffin knew he had some rough edges, but he was what he was.⁷⁸ The public, distracted in his tenure by war, Katrina, and economic problems, was largely indifferent to Moon-Mars, and scientists seethed at Griffin's priorities. The president and Congress provided minimal financial backing and the president used little if any of his political capital on NASA's behalf. As

Returning to the Moon

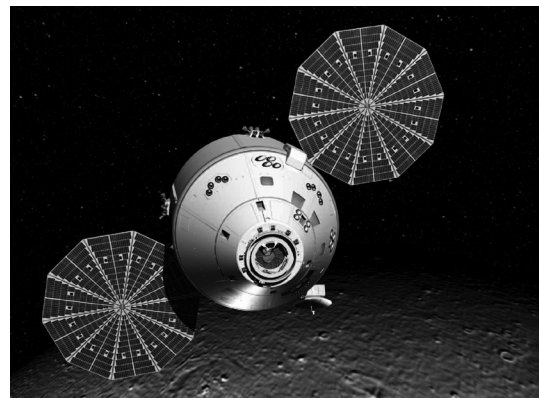
During his tenure at NASA, Michael Griffin began implementing key components for a return trip to the moon, including Ares I and Orion.



Ares I

Building on cutting-edge launch technologies, evolved powerful Apollo and space shuttle propulsion elements, and decades of NASA spaceflight experience, Ares I is an in-line, two-stage rocket configuration topped by the Orion crew vehicle and its launch abort system. Ares I will also have the capability to use its 25-ton payload capacity to deliver resources and supplies to the International Space Station, or to "park" payloads in orbit for retrieval by other spacecraft bound for the moon or other destinations.

In August 2007, NASA awarded a contract to Boeing Space Exploration for production of the Ares I upper stage. In December 2007, NASA also awarded Boeing Space Exploration the contract for the avionics ring that would guide the rocket into flight.



Orion

Orion will be the capsule for the next generation of American space explorers. Orion will be the crew exploration vehicle. In August 2006, NASA awarded the prime contract to Lockheed Martin to build Orion.

Photographs courtesy of NASA

time went on, Bush had little capital to provide. OMB waxed in power to affect NASA under these circumstances.

The Moon-Mars mission may well have survived the shift in administrations but it remains vulnerable to political and economic vagaries. Reorientations of various kinds are possible. The gap exacerbates the difficulties in constituency building. What the next administrator must do is sell the Moon-Mars exploration program—or some variation of it—more expansively to the president, Congress, media, scientific community, and larger public. This assumes President Obama continues to advance this mission. What is needed is a stronger political base of support so resources match mission over time. Otherwise, the pace of progress could slow further.

These issues notwithstanding, it should be emphasized that Griffin passed to the Obama administration and Congress a functioning program. He put substance behind the presidential words of 2004. The policy direction he inherited he executed. The Moon-Mars program is moving forward thanks mainly to Griffin. It has a fighting chance to be sustained. That is an impressive achievement, given the extremely troubled times in which he served. Griffin had to work in an environment in which NASA was projected to have \$3.9 billion less in overall budget than planned for FY2005-FY2010 when Bush made his decision in 2004.⁷⁹

Lessons Learned

Lesson One: Leverage the appointment process.

When accepting a presidential appointment involving implementing a new mission of transformative scale, the prospective administrator should assure himself that there is ample political support from the president. Transformative programs are typically costly and disruptive. The individual charged with implementation will need presidential help, especially with resources.

Lesson Two: Establish a complementary leadership team. The administrator of an agency charged with launching a new mission should appoint a leadership team to help him. That team should be loyal to the transformative goals, competent to carry them out, and be complementary in skills. Thus, if the administrator is a technical manager in background,

he or she will need political help, not only in the broader politics of congress, media, and public, but with the bureaucratic politics of dealing with the executive branch. It is wise especially to be armed in dealing with OMB.

Lesson Three: Get off to a fast but sensitive start.

Administrators typically have a brief honeymoon during which they can get a new program off to a fast start, but they should be sensitive to the political environment in which they do so. The big decision in implementing the Moon-Mars goal that Griffin faced immediately was how to get back to the moon. There had to be an “enabling” technology. The process of choosing that technology had to be credible and stand up to scrutiny, since the choice was likely to be second-guessed by those favoring alternatives. At the same time, that decision should be announced with an eye to gaining support for it from the Washington political community and public. An administrator has to be sensitive to other events taking place. Announcing a multi-billion dollar space initiative at a time of human suffering and financial travail (i.e., the Katrina hurricane disaster) is poor timing from a political perspective.

Lesson Four: Secure congressional support—especially if presidential support is problematic.

Presidential priorities can change, and a president can become unpopular. That was the case with George W. Bush. The administrator needs to shore up congressional support in any event for the initiative if it is to succeed. Bipartisan support is needed since the political party in power can change with an election. Such support should be embodied not only in appropriations, but in legislative authorizations, specifically backing the new mission. Such bipartisan mandates may sustain a new program as presidents change. What the administrator needs are influential advocates (champions) in Congress who will fight for the new mission.

Lesson Five: Build internal support for the new mission.

New missions that are transformative can be threatening to existing interests and programs in an agency, especially if the overall funds for the agency are not augmented sufficiently to pay for what is new. The administrator needs the organization aboard with enthusiasm to succeed. One strategy to enlist internal support is to divide work so that various centers of organizational power have

ownership of parts of the program. The rhetoric of reassurance is necessary. When the new mission involves new skills, and possible layoffs, the administrator can stress the opportunities for retraining of existing personnel. However, the administrator must be firm about the need for the organization as a whole to change and the criticality of the new mission to the agency's future.

Lesson Six: Execute. Once the "how" question is resolved, the administrator must move as rapidly to execution of the mission as possible. This is not only in terms of division of labor within the organization, as noted above, but also in contracting with industry and universities. The faster he or she can turn a program into hardware in an agency like NASA, the better for sustaining it. Griffin understood the need to get a shuttle successor built and launched quickly and the danger of a long gap. Hence, he pushed from the outset for narrowing the gap between retiring the shuttle and launching its successor. He could not get this done, but his objective was right.

Lesson Seven: Neutralize opposition. The administrator should expect opposition particularly from internal and external actors who feel losses from transformational decisions. One of the strategies for neutralization is cooptation, by which the administrator grants opponents voice on advisory committees, but not necessarily undue influence. Another is to show respect, even deference to an opposition that perceives loss as the new mission gains priority.

An administrator who excludes opponents from advisory boards and who is especially direct and blunt can engender opposition rather than quiet it. That seems to have been the case in regard to Griffin and the scientific community. Griffin also hired an associate administrator for space science to buffer him and enlist scientific support. But this individual had his own agenda and differences with Griffin and did not stay. The "buffer" strategy is a good one, but the individual in that role has to be the "right" person, one who can deal with both his boss and his clientele.

Lesson Eight: Keep focused but recognize other responsibilities. The administrator will not get a new mission launched unless he or she stays focused throughout his or her tenure on what it takes technically, organizationally, and politically to do so.

However, the administrator needs to recognize other priorities that connect to the new mission and make sure they proceed effectively. The new mission is part of a broader transition process. By flying out the shuttle by 2010 and finishing the space station assembly by then, the administrator completes the old so that there is money for the new to emerge. Griffin was totally clear throughout his tenure about his need to manage a transition process in regard to human space flight.

Further, the administrator must support programs other than manned space flight. Griffin thought he did well by science programs. Many scientists disagreed. In addition, the administrator must recognize certain "hot button" issues facing the agency and deal with them. Thus, Griffin removed Hubble as an issue by reinstating the servicing mission his predecessor had canceled. He nipped in the bud a potentially controversial decision about the robotic Mars program his associate administrator made by negating that decision.

He provided guidelines for NASA scientists on how they might deal publicly with controversial issues. However, he got himself in trouble by seeming to downplay the global warming problem, even though NASA had helped raise the issue to high visibility through its Earth science research.

Lesson Nine: Anticipate threats to the new mission and counter them. The administrator should scan the horizon for internal and external events that are threats to the mission. Griffin saw the failure to continue Russian services to the Space Station because of legislative constraints as a threat to the new mission. With the U.S. unable to reach ISS without a shuttle, pressure would mount to keep the shuttle program alive longer in his view. The longer the shuttle flew, the less resources there would be for the successor Orion/Ares system. Others may not have seen this connection, but the administrator must look for potential threats so as proactively to head them off. It is his or her job not only to launch the new mission, but to protect it from future barriers to its accomplishment.

Lesson Ten: Remember the limits of power. When all is said and done, the administrator has only a limited time and influence to launch a new mission in a sustainable manner. Inheriting a presidential

decision, it was Griffin's task to turn that decision into a hardware program that could be sustained.

Griffin was in office only from April 2005 to January 2009. An administrator should do the best possible in the time available, under the circumstances served, getting the program as far along the path of implementation as possible. But the administrator should remember that legacies sometimes last no longer than the next president and administrator.

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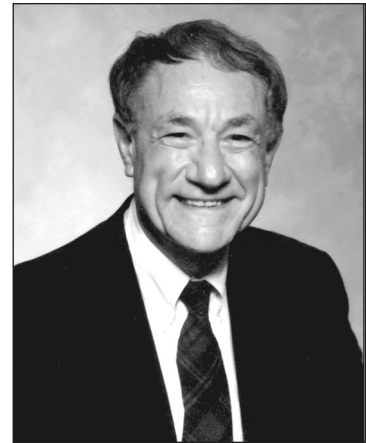
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ABOUT THE AUTHOR

W. Henry Lambright is Professor of Public Administration and Political Science and Director of the Science and Technology Policy Program at the Maxwell School of Citizenship and Public Affairs at Syracuse University. He teaches courses at the Maxwell School on technology and politics; energy, environment, and resources policy; and bureaucracy and politics.

Dr. Lambright has served as a guest scholar at The Brookings Institution; the director of the Science and Technology Policy Center at the Syracuse Research Corporation; and director of the Center for Environmental Policy and Administration at the Maxwell School at Syracuse University. He has served as an adjunct professor in the Graduate Program of Environmental Science in the College of Environmental Science and Forestry at the State University of New York. He has testified before Congress and been interviewed by the media on many topics, including the environment, science and technology, and government management.



A long-standing student of large-scale technical projects, he has worked for NASA as a special assistant in its Office of University Affairs and has been a member of its History Advisory Committee. Dr. Lambright has performed research for organizations including the National Science Foundation, NASA, the Department of Energy, the Department of Defense, and the State Department. He edited the book, *NASA in the 21st Century*, published by the Johns Hopkins University Press in 2003. He is also the author of four previously published IBM Center reports: "Transforming Government: Dan Goldin and the Remaking of NASA" (2001); "Managing 'Big Science': A Case Study of the Human Genome Project" (2002); "The Challenge of Coordinating 'Big Science'" (2003); and "Executive Response to Changing Fortune: Sean O'Keefe as NASA Administrator" (2005).

Dr. Lambright is the author or editor of six additional books, including *Powering Apollo: James E. Webb of NASA*; *Technology and U.S. Competitiveness: An Institutional Focus*; and *Presidential Management of Science and Technology: The Johnson Presidency*. In addition, he has written more than 275 articles, papers, and reports.

His doctorate is from Columbia University, where he also received a master's degree. Dr. Lambright received his undergraduate degree from Johns Hopkins University.

KEY CONTACT INFORMATION

To contact the author:

Dr. W. Henry Lambright

Director, Science and Technology Policy Program
Center for Environmental Policy and Administration
The Maxwell School of Citizenship and Public Affairs
Syracuse University
422 Crouse-Hinds Hall
Syracuse, NY 13244
(315) 443-1890

e-mail: whlambri@maxwell.syr.edu



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For additional information, contact:

Jonathan D. Breul

Executive Director

IBM Center for The Business of Government

1301 K Street, NW

Fourth Floor, West Tower

Washington, DC 20005

(202) 515-4504, fax: (202) 515-4375

e-mail: businessofgovernment@us.ibm.com

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