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Viewpoint

Why did the United States retreat from the moon?☆

John M. Logsdon

Space Policy Institute, Elliott School of International Affairs, The George Washington University, Washington, DC, USA

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ABSTRACT

On July 20, 1969, Neil Armstrong and Buzz Aldrin took the first human steps on a celestial body other than Earth. Just over two weeks later, on August 4, NASA presented to a committee charged with making recommendations on the U.S. post-Apollo space program a bold plan of continued lunar and Martian exploration. Over the next six months, that plan was decisively rejected by the administration of President Richard M. Nixon. In 1970, NASA canceled the final two Apollo missions to the Moon, and on January 5, 1972, President Nixon announced approval of the space shuttle program. Focusing the U.S. space program on operating the space shuttle and building a space station has kept the United States human space flight program confined to low Earth orbit for over four decades. There are lessons to be learned from the post-Apollo decisions in the United States for today's attempts to gain political support for a renewed and sustainable program of human exploration of the Moon, Mars, and other solar system destinations. This paper, drawing on in-depth research on the events of the 1969–1972 period in U.S. space policy, will discuss those lessons.

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As Apollo 17, the final lunar landing mission, lifted off the lunar surface on December 14, 1972, U.S. President Richard Nixon issued a statement saying “this may be the last time in this century that men will walk on the Moon.”¹ By the decisions he made between 1969 and 1972, Nixon ensured that his forecast would come true. This paper will discuss those decisions, their impact on the U.S. space program over the last four decades, and their relevance to today's planning for future human missions beyond Earth orbit.

1. After the Moon, Mars?

As Richard Nixon became president on January 20, 1969, the first steps on the Moon were exactly six months in the future. Nixon's predecessor as president, Lyndon B. Johnson, had explicitly deferred a decision on what the United States should do after Apollo to his successor. Nixon soon after taking office chartered a top-level review, managed by what he designated as the Space Task Group, to recommend post-Apollo space goals and programs. That review

took place even as Apollo 11 gained world-wide acclaim; Nixon made sure that he would bask in the glow of that achievement. But when presented with a Space Task Group recommendation for an ambitious post-Apollo space effort, including establishing lunar bases and preparing to send Americans to Mars in the 1980s, Nixon decided that the United States public neither wanted nor could afford such an undertaking. The first Nixon space decisions were thus made with respect to what *not* to do—not to continue during the 1970s a fast-paced, high priority, Apollo-like effort aimed at rapid development of new space capabilities, more permanent stays on the Moon, and leading to human missions to Mars. The refrain “after the Moon, Mars” did not resonate with the Nixon White House.

2. Three key decisions

Having quickly rejected setting human missions to Mars as a new national goal, the Nixon White House was faced with the question “if not an ambitious post-Apollo program centered on human space flight, then what?” The answer to that question came in the form of three major decisions:

- To treat the space program, not as a special, high priority government activity as had been the case during Apollo, but rather as part of the “day in and day out” activities of government, with its budget determined “within a rigorous

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E-mail address: logsdon@gwu.edu.

¹ Unless otherwise noted, all quotations and other material in this paper are drawn from my forthcoming book *After Apollo? Richard Nixon and the American Space Program*, to be published by Palgrave Macmillan in spring 2015.

system of national priorities.” The Nixon administration formalized NASA's need to compete through the political and budgetary process with other government agencies for budget priority, and then assigned a relatively low priority to the space budget in that competition.

- **To lower U.S. ambitions in space by not setting another challenging space goal and by ending for the foreseeable future human space flights beyond low Earth orbit.** As assistant to the president Peter Flanigan remarked at the time, there was in the White House in 1969 and early 1970 “a feeling that the country had had enough excitement [in space] for now”; there was no inclination on the part of Richard Nixon to propose another Kennedy-like space goal for the post-Apollo period or even to indicate in any but the most general terms that the United States would continue to work towards human exploration beyond low Earth orbit.
- **To build the post-Apollo program around a space shuttle, without linking the shuttle to a long-term strategy for its use.** The shuttle was seen as a new capability for carrying out the space program of the 1980s and beyond. However, its approval was not coupled by the Nixon administration to a strategic perspective on space program goals for that period, and particularly not to the resumption of human travel beyond Earth orbit. As historian Walter McDougall would observe, “Apollo was a matter of going to the moon and building whatever technology could get us there; the Space Shuttle was a matter of building a technology and going wherever it could take us” [1]. That “wherever” turned out to be low Earth orbit.

3. The space program and national priorities

Richard Nixon made it clear to his associates that he did not want the post-Apollo space effort to appear to take money away from government programs on Earth. As a March 7, 1970, statement outlining his space policy was being prepared, Nixon stressed that it should be written in a way to avoid “positive statements on space” being “invidiously” compared to his attitude towards “problems in poverty and social problems here on earth.” He did not want to be put in a position of seeming to be “taking money away from social programs and the needs of the people here to fund spectacular crash programs out in space.”

This perspective was formalized in what is characterized here as the “Nixon space doctrine,” clearly stated in that 1970 presidential statement. The framework for space decision-making set out in the Nixon statement has in its essence been accepted by most presidents since, and thus has had a four decade impact. The Nixon space doctrine had two elements. The first was to change the status of the space program from an effort formally assigned the highest national priority, as had been the case during Apollo, to just one of many “normal” government activities. In the language of the space statement: “We must think of them [space activities] as part of a continuing process—one which will go on day in and day out, year in and year out—and not as a series of separate leaps, each requiring a massive concentration of energy and will and accomplished on a crash timetable.” Space was to become “a normal and regular part of our national life.” The second element of the doctrine was to declare that the space program from 1970 forward would have to compete with other government activities for priority and corresponding budgetary support. The space statement said: “Space expenditures must take their proper place within a rigorous system of national priorities. What we do in space from here on in must therefore be planned in conjunction with all of the other undertakings which are also important to us.”

At the peak of the Apollo buildup in 1966, the NASA budget comprised nearly 4.4 percent of Federal spending overall and 19 percent of discretionary non-defense Federal spending. (The NASA share of the Federal budget is most frequently cited in terms of a percentage of the overall budget. This can be misleading. Given the inexorable growth of the portion of the U.S. budget devoted to mandatory entitlements, it seems more useful to discuss the NASA budget in terms of its share of the discretionary non-defense budget, since it is in that realm that space spending competes with other government programs for funding priority.) As President Lyndon B. Johnson refused to approve any of NASA's post-Apollo proposals in the 1966–1968 period, that budget share quickly began to decline; by the time Richard Nixon became president in 1969 the NASA budget was just above eight percent of discretionary non-defense spending. The early Nixon space decisions continued this trend; by mid-1973, the NASA discretionary budget share was approximately six percent and continuing on a downward trajectory. While it was Lyndon Johnson rather than any of his successors that made the biggest percentage reduction in NASA's budget share, that reduction came from deferring a decision on what to do in space after Apollo, not on the basis of a specific decision to lower the space program's priority. By contrast, Richard Nixon consciously made that crucial choice—to reduce NASA's priority rather than assign it new, expensive programs. This choice continued the decline in NASA's budget share. The NASA portion of discretionary non-defense spending vacillated between six and four percent between 1977 and 2002 and between four and three percent since. By any measure, the space program has not done well in competition for budget share; in fact, compared to other government programs, it has declined in priority over the years [2].

The consequences of this declining share of the overall discretionary budget have been clear to most observers. For example, the Columbia Accident Investigation Board in 2003 observed that “NASA has had to participate in the give and take of the normal political process in order to obtain the resources needed to carry out its programs.” In that give and take, “NASA has usually failed to receive budget support consistent with its ambitions. The result is an organization straining to do too much with too little” [3].

The reaction to this situation on the part of the mainstream human space flight community has been predictable—continuing advocacy that the NASA budget share should be increased. A 1990 space program review led by aerospace industry executive Norm Augustine suggested that “a reinvigorated space program will require real growth in the NASA budget of approximately ten percent per year (through the year 2000), reaching a peak spending level of about \$30 billion per year (in constant 1990 dollars) by about the year 2000” [4]. A NASA budget of \$30 billion in 1990 dollars would have been the equivalent of a budget of almost \$40 billion in 2000 dollars; the actual NASA budget in 2000 was \$13.6 billion [5]. Almost two decades later, a similar review of NASA's human space flight program, again led by Norm Augustine, reached a similar conclusion, observing that “NASA's budget should match its mission and goals,” but then suggesting that “meaningful human exploration” would be possible only if the NASA budget were increased by up to \$3 billion per year [6]. Given that the proposed NASA FY2010 budget at the time the review was taking place was \$18.7 billion, this was a call for an over 15 percent increase in NASA's annual resources. More recently, astrophysicist and science spokesperson Neil deGrasse Tyson has gained widespread attention by his advocacy of doubling the NASA budget, bring it back to one percent of overall Federal spending, equivalent to some six to seven percent of discretionary spending. Such an action, suggests Tyson, would “give NASA enough money to do everything everyone has wanted NASA to do over all these years and enable us to go back to the moon and on to Mars in a bold and audacious way” [7].

All of these recommendations and suggestions fly in the face of a reality set in motion by the Nixon space doctrine: *When the priority of the space program is compared through the normal political process to the priority of other uses of government funds, the outcome is to allocate to the space program a relatively low share of Federal discretionary spending, inadequate to support a vigorous and sustainable program of space exploration.* This outcome has been consistent for over 40 years and is very unlikely to change anytime soon. A 2014 review of the U.S. human space flight program observed that “human spaceflight—among the longest of long-term endeavors—cannot be successful if held hostage to traditional short-term decision-making and budgetary processes.” But the Nixon space doctrine declared that it was through those processes that space budget decisions should be made. The same report also noted that “it serves no purpose for advocates of human exploration to dismiss these realities [the lack of public interest in space and the attendant low priority given to increasing space spending] in an era in which the citizenry and national leaders are focused intensely on the unsustainability of the national debt, [and] the growth in entitlement spending. There is at least as great a chance that human spaceflight budgets will be below the recent flat line trend as above it” [8]. The mismatch between the requirements of a successful program of human space exploration and the tenets of the Nixon space doctrine has been a central space policy reality since the doctrine was first stated in 1970.

4. The end of exploration

Richard Nixon's embrace of the Apollo 11 success as a tool of American soft power was short-lived. Once the United States had won the race to the Moon, Nixon perceived little foreign policy or domestic political benefit to himself and his administration from subsequent lunar landing missions or from approving a post-Apollo program focused on preparing for missions to Mars. Like many other Americans, Nixon quickly lost interest in continuing Apollo flights to the Moon. As early as December 1969, after the first two lunar landings, he remarked that he “did not see the need to go to the moon six more times.” When the Apollo 12 crew visited the White House that month, mission commander Peter Conrad came away “disappointed and disillusioned.” He reported that Nixon evidenced an “apparent lack of interest in the space program.” Nixon did become emotionally engaged with the fate of the Apollo 13 crew, but that near-fatal experience only added risk avoidance to lack of interest as part of Nixon's attitude towards lunar missions. For the Apollo 15 mission in July 1971, Nixon slept through the launch, even though the White House felt it should announce that he had followed the event closely. By that time Nixon was already urging his associates to find ways of canceling the last two Apollo missions, Apollo 16 and 17. At some point in 1970, the iconic “Earthrise” photograph taken during the Apollo 8 mission, which had been hanging on the Oval Office wall near the president's desk throughout 1969, was removed, a symbolic action reflecting the president's lack of commitment to continued lunar exploration.

Nixon coupled his lack of personal interest in continuing Apollo flights to a political judgment with respect to the space program—that the American public was not interested in supporting an expensive, exploration-oriented space program. While he had treated Apollo 11 as a strategic element of U.S. foreign policy, from the start of his presidency Nixon had seen the post-Apollo space program primarily as an issue of domestic policy, with its priority to be determined by political and budgetary considerations. Even in the afterglow of Apollo 11, he and his associates applied that perspective to proposals for continued exploration. As he met with NASA Administrator Tom Paine in January 1970 to explain his decision to reject the Space Task Group-recommended post-Apollo program,

Nixon told Paine “the polls and the people to whom he talked indicated to him that the mood of the people was for cuts in space.”

In May 1961, John Kennedy paid little attention to poll results showing that a majority of the U.S. public opposed spending the sums of money needed to send Americans to the Moon; Kennedy proposed Apollo as a top-down leadership initiative based on geopolitical considerations. In contrast, Richard Nixon saw no persuasive reason to lead a reluctant nation and its representatives in Congress toward accepting an ambitious post-Apollo space program. Staff assistant Clay Thomas Whitehead, who among the White House staff had the most level-headed approach to future space activities, commented that “no compelling reason to push space was ever presented to the White House by NASA or anyone else.”

The immediate consequence of Richard Nixon's decision not to support continued exploration was suspending production of the Saturn V Moon rocket and approving a NASA budget outlook that forced the agency's leadership to cancel two planned Apollo missions, Apollo 15 and Apollo 19, in order to have funds available for future projects. During the 1960s NASA had developed the Saturn V and its related ground facilities on the expectation that the vehicle would remain in service for many years and would be the frequently-launched workhorse of a continuing exploration-oriented space effort. These hopes were dashed by Richard Nixon's initial space decisions, which meant that the United States was voluntarily giving up for the foreseeable future the results from its multi-billion dollar investment in exploratory capabilities and transforming the unused Saturn V launchers into very impressive museum exhibits.

Exploring the space frontier was thus not part of Richard Nixon's strategic vision for America. By rejecting the 1969 recommendations of the Space Task Group, the Nixon administration attempted to reduce U.S. space ambitions to match the budget it deemed appropriate to allocate to NASA in the post-Apollo period. That lowering of ambitions did not happen, either during the Nixon administration or since. Discussing the persistence of the vision of human movement into the solar system held by space advocates (but few others), Howard McCurdy suggests “expectations invariably fail, but the underlying vision rarely dies. Rather, people update the vision. The dream moves on” [9]. That certainly seems to be the case with respect to human exploration of the solar system.

One can argue that Nixon made a major policy mistake in mandating that the space program should be treated as just one of many government programs competing for limited resources, and that space exploration should not receive special treatment in White House decision-making. Certainly that is the long-held position of space advocates. But it is also possible that Nixon's decision that U.S. space ambitions should be adjusted to the funds made available through the normal policy process was a valid reading of public preferences, and there were no countervailing public policy reasons to reject those preferences. At the time of the last lunar landing mission in December 1972, *New York Times* space reporter John Noble Wilford observed that “for all its vaunted technology,” Apollo was “somewhat old-fashioned. Apollo was an act of can-do optimism, of a belief in progress, in a time of reigning pessimism.” Mathew Tribbe suggests that “Apollo was of a specific historical moment, and that moment began to pass even before the moon program completed its run. After Apollo, Americans never again put much stock in the aggressive human exploration of the universe” [10]. If this is a valid observation, the outlook for U.S. leadership in future exploration is at best muted, if not dim.

Moreover, what has actually happened since Richard Nixon made his decisions to end lunar exploration, not to set a new exploratory goal, and to remove the space program's special priority is neither reduced ambitions nor increased budgets; instead, for more than 40 years there has been a mismatch between space ambitions and the

resources provided to achieve them. This outcome is close to the worst possible recipe for space program success; *a central part of Richard Nixon's space heritage is thus a U.S. civilian space program continually "straining to do too much with too little."*

5. Richard Nixon and the space shuttle

Although the Nixon decisions to normalize the space program as just one of many government activities and to defer human space exploration for the indefinite future have had lasting impacts, it is the space shuttle program that stands as Richard Nixon's most acknowledged space legacy. A full evaluation of this legacy is beyond the scope of this paper. But in the context of this analysis, several observations are germane.

The Nixon administration approved the space shuttle without a meaningful national commitment to post-Apollo space program objectives—there was no “strategic focus.” NASA Acting Administrator George Low in October 1970 had suggested that “with the shuttle the U.S. can have a continuing program of manned space flight without a commitment to a major new manned mission goal.” This proved to be a winning argument; by approving the space shuttle, a capability-justified means for carrying out a variety of space activities, Richard Nixon avoided having to define the long-term space objectives which the shuttle would serve, while still preserving the presence of U.S. astronauts in space. This lack of guiding goals for the U.S. space program while focusing on developing new capabilities has persisted for more than 40 years, causing many to characterize the program as “adrift.” If this characterization is accepted, it was Richard Nixon that set NASA on that goal-less voyage.

That going ahead with the space shuttle was a course of action fraught with the potential for future problems was clear to some of those examining the future of human space flight. For example, Alexander Flax, chairman of a panel of the President's Science Advisory Committee set up to assess the space shuttle, reported to Science Adviser Edward David in October 1971, as a decision on the shuttle neared, that “most of the members of the Panel doubt that a viable program can be undertaken without a degree of national commitment over the long term analogous to that which sustained the Apollo program. Such a degree of political and public support may be attainable, but it is certainly not now apparent.” Flax added “planning a program as large and as risky (with respect to both technology and cost) as the shuttle, with a long-term prospect of fixed ceiling budgets for the program and NASA as a whole does not bode well for the future.” This was prescient advice, but it was not heeded.

The 1972 commitment to the space shuttle (which carried with it a future intent on NASA's part to propose a shuttle-launched space station as soon as the shuttle started operating) created for more than four decades two very expensive “mortgages” on the NASA annual budget. Given that that budget was commanding a decreasing share of Federal discretionary spending, the necessity of servicing these mortgages meant that there were limited funds available for other worthy space endeavors, and in particular for a robust human exploration program.

6. The Nixon space heritage

A 2012 assessment of NASA's “strategic direction” observed that:

The National Aeronautics and Space Administration (NASA) is at a transitional point in its history. The agency's budget is under considerable stress, servicing increasingly expensive missions and a large, aging infrastructure established at the height of the Apollo program. Other than the long-range goal of sending

humans to Mars, there is no strong, compelling national vision for the human spaceflight program, which is arguably the centerpiece of NASA's spectrum of mission areas. The lack of national consensus on NASA's most publicly visible mission, along with out-year budget uncertainty, has resulted in the lack of strategic focus necessary for national agencies operating in today's budgetary reality.

The review concluded that “there is no national consensus on strategic goals and objectives for NASA” [11]. This judgment was echoed in the most recent review of the human space flight program, which observed that “a national consensus on the long-term future of human spaceflight remains elusive” [12].

To a significant degree this unsatisfactory condition of the U.S. human space flight program in the second decade of the 21st century is a heritage of the policy decisions made by Richard Nixon and his associates more than 40 years ago. Nixon and his closest advisers gave little attention to the longer term consequences of their decision to put the space shuttle at the center of the post-Apollo space program. Those consequences were compounded by approving a shuttle design that from NASA's standpoint was a step towards an eventual space station. The consequences were exacerbated by setting out an approach to determining the NASA budget that was very likely to result in funding insufficient to support efficient development and operation of both the space shuttle and space station while also funding the space activities they were designed to serve, much less at the same time restart a human exploration effort. It has been difficult to rally public and political support for the capability-driven approach inherent in Richard Nixon's post-Apollo space program, and the lack of broad public support for space exploration has persisted. The absence of a compelling exploration objective or other widely accepted goal has resulted for four decades in a human spaceflight program focused, for uncertain purposes, on developing and operating the shuttle and assembling the space station.

7. Is there a path forward?

There is no simple or immediate remedy to the current situation with respect to the U.S. space program. It will be very difficult to undo the consequences of policy decisions made more than four decades ago and to put the U.S. space program on a productive forward path. Only committed and continuing presidential leadership of the character provided so long ago by John F. Kennedy, once again singling out the space program for special priority and setting challenging goals, convincing a reluctant public and their representatives in Congress to accept those goals, and then, crucially, committing on a sustained basis the political, human, and financial resources needed to achieve them, will result in a viable human space flight program. The alternatives are to continue to drift along, trying to do too much with too little, or, less likely, to lower U.S. ambitions in space to match the funding available. A comprehensive review of the U.S. space program in 2014 once again concluded, as had its 2009 and 2012 predecessors, that “the human spaceflight program conducted by the U.S. government today has no strong direction” and that “the long-term future of human spaceflight is unclear” [12]. That situation is Richard Nixon's most fundamental space heritage. It will take dedicated and purposeful leadership and political will to overcome it.

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