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IS IT TIME TO RECONSIDER KENNEDY'S SPACE POLICY?
A POST-COLD WAR, POST-MODERN PERSPECTIVE

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Abstract

The answer to this question is a resounding yes. Because of the demise of the Soviet Union and the end of the Cold War there are opportunities not present before to reconsider the Kennedy space policy for Project Apollo. The major contours of that story have been told and retold many times, but the revisionist perspectives expressed about Kennedy in recent years, and especially the availability of new documentary materials—many of which had been highly classified as part of Cold War security concerns—offer an opportunity to reconsider the major themes of his centerpiece space policy announcement, the decision to land Americans on the Moon before the end of the decade. This paper explores the parameters of reinterpretation that forty years of perspective offer.

Introduction

From the perspective of nearly forty years, the Apollo program had enormous consequences, not all of them the usual ones that have been discussed in the past. In this paper I shall discuss only a few:

1. The Apollo decision has been used as a model for public policy formulation. This is an important legacy of the program, but one that requires reconsideration.
2. Apollo reshaped a very orderly, economical space exploration effort underway at NASA put in place by the Eisenhower administration that would have led to lunar and planetary exploration in the decades of the 1970s and 1980s. Apollo expanded enormously the size and shape of NASA as a government organization and set the agency at odds with other parts of the federal government, a conflict that has not abated even in the twenty-first century.

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3. Apollo established an unusual and difficult to meet set of expectations from the public when it came to NASA and space exploration.
4. Apollo left a questionable technological legacy, as most of its hardware was scrapped at the conclusion of the program in favor of an entirely different technological direction for later efforts. While there are other aspects of Apollo that might be appropriately discussed, this paper represents an attempt to stimulate discussion for future research. It does not represent the final historical judgment on anything, and seeks only to be provocative of possibilities for future consideration.

One: The Apollo Decision as a Model of
Public Policy Formulation

Four basic approaches to interpreting the Apollo decision-making process have been offered in the more than forty years since Kennedy stood before the American people and declared that we should send astronauts to the Moon.¹ By far the most influential of these interpretations is the conception that Kennedy made a single, rational, pragmatic choice to undertake the U.S. sprint to the Moon as a means of competing with the Soviet Union as a way to heighten international prestige during the height of the Cold War. The president and his advisors, therefore, undertook an exceptionally deliberate, reasonable, judicious, and logical process to define the problem, analyze the situation, develop a response, and achieve a consensus for action.² The timeline progressed from point to point with no cul-de-sacs and few detours from problem definition to sensible decision. It was all so neat and tidy! As such, it has served as a model for public policy formulation.

This rational choice argument begins with the assertion that JFK's space policy was a relic of the cold war struggle between the United States and the Soviet Union, and that it revolved around the question of international prestige. In this view, Apollo was a clear result of competition between the world's two superpowers to win the "minds of men" to a

specific economic and political system. In essence, the Apollo program was nothing less than the “moral equivalent of war.” It sought to weaken the Soviet Union while enhancing the United States.³

There is much to recommend this interpretation; and its study as a model of outstanding policy formulation is appropriate. Its main strength is its insistence that the American effort to land on the Moon served as an enormously effective response to a Cold War crisis with the Soviet Union. At the same time, the most significant problem with this interpretation is its unwavering belief that individuals—and especially groups of individuals, even competing ones—logically assess situations and respond with totally reasonable consensus actions. Since virtually nothing in human existence is done solely on a rational basis this is a very difficult conclusion to accept. Charles E. Lindblom wrote a generation ago that the “science of ‘muddling through’” is perhaps as useful an alternative approach to the study of decision-making as any, recognizing that “policy is not made once and for all; it is made and re-made endlessly.”⁴ There may have been more “muddling through” in the Apollo decision of 1961 than most people believe.

A second interpretation of the Apollo decision suggests that Kennedy’s tortured background and aggressive tendencies affected his decision-making, causing him to take a more combative approach toward the Soviet Union than required and necessitating his “winning” at whatever challenge came his way. At some level, Kennedy may have even created crisis situations wherein he reaffirmed his quintessential masculinity and enhanced his own dominance over everyone and everything. Most of these analyses depict JFK in an unfavorable light and focus on his tendencies toward the overarching competitiveness, general recklessness, and Machiavellian ambition instilled in all the sons of Joseph P. Kennedy. These character studies view Kennedy as an individual who had to dominate all and unconsciously, or in some cases deliberately, created situations calculated to demonstrate his mastery. His harsh treatment of women, as an ardent and destructive philanderer, demonstrated this fact, as did his competition with all others in sports, business, and politics.⁵ This competition may have prompted Kennedy’s tendency as president continually to evoke “the image of unparalleled crisis to justify his policies,” believing that “crisis combined with presidential charisma becomes a way for the chief executive to *connect* with the public, and create support for presidential policies.”⁶

President Kennedy’s assertive self-confidence may have provided an important element of the “Camelot mystique” but carried to a logical conclusion it also led to tense cold war situations in which on more than one occasion nuclear holocaust became a probable outcome. At the same time, that assertiveness hid a Kennedy weakness for indecisiveness and procrastination until pressed to take a stand. That, coupled with the lack of any essential ideology beyond a basic anti-communism and a faith in active government, ensured that there was more to the Apollo decision than rational action.⁷

Instead of taking a long view, Kennedy engaged in fear-mongering about supposed Soviet strength in space juxtaposed against American weakness, and responded with a lunar landing decision both spectacular in its achieving and outrageous in its cost. Kennedy, because of his competitive nature, was apparently anxious to strap on six guns and shoot it out with Khrushchev at the OK Corral. This was true despite his recognition that it may not have been the most effective way to deal with the Soviet Union.

A third explanatory approach toward understanding the Apollo decision suggests that Kennedy may have been more oriented toward cooperation with the Soviet Union in space than most people realized. In his inaugural address in January 1961 Kennedy spoke directly to Soviet Premier Nikita Khrushchev and asked him to cooperate in exploring “the stars.”⁸ In his State of the Union address ten days later, he asked the Soviet Union “to join us in developing a weather prediction program, in a new communications satellite program, and in preparation for probing the distant planets of Mars and Venus, probes which may someday unlock the deepest secrets of the Universe.”⁹

Even after Gagarin and the Bay of Pigs, during the month preceding the May 25, 1961, speech announcing Apollo, Kennedy had his brother, Robert F. Kennedy, quietly assessed the Soviet leadership’s inclinations toward taking a cooperative approach to human space exploration.¹⁰ In addition, NASA Deputy Administrator Hugh L. Dryden undertook a series of talks with Soviet Academician Anatoly A. Blagonravov. Kennedy also instructed Wiesner to convene a panel with representatives from NASA, the President’s Science Advisory Committee to come up with ideas to do something with the Soviets, including setting up an international lunar base. In a memo ironically written the same day as JFK’s Apollo speech, Eugene Skolnikoff, who was on Wiesner’s staff, proposed that “We should offer the Soviets a range of choice as to the degree and scope of

cooperation.”¹¹ As Ted Sorenson remarked, “It is no secret that Kennedy would have preferred to cooperate with the Soviets on space exploration.”¹²

Within two weeks of giving his bold May 25th speech, Kennedy met Khrushchev at the Vienna summit and proposed making Apollo a joint mission with the Soviets. The Soviet leader reportedly first said no, then replied “why not?” and then changed his mind again, saying that disarmament was a prerequisite for U.S.-U.S.S.R. cooperation in space.¹³ On September 20, 1963, Kennedy made a well-known speech before the United Nations, in which he again proposed a joint human mission to the Moon. He closed by urging, “Let us do the big things together.” In public the Soviet Union was noncommittal. *Pravda*, for example, dismissed the 1963 proposal as premature. Some have suggested that Khrushchev viewed the American offer as a ploy to open up Soviet society and compromise Soviet technology.¹⁴ Although these efforts did not produce a cooperative venture—Kennedy was assassinated in November 1963 and Khrushchev deposed the next year—the fact that Kennedy pursued various forms of space cooperation until his death suggests that he was unsure that a U.S.-only Apollo program was the best course.

Finally, one interpretation of the Apollo decision emphasizes Kennedy as visionary leader—as essentially a space cadet—committed to expanding the human presence throughout the Solar System. In this scenario the Apollo decision was merely the first step in an expansive effort to explore and colonize the heavens. Kennedy, therefore, approved Apollo because he was a visionary who saw space exploration as a noble, worthy goal in its own right. Even without cold war competition, even without Soviet successes in space, Kennedy would have made his decision to go to the Moon and stuck with it because he thought it a good thing to explore.

Lawrence Suid wrote, “Kennedy nurtured within himself an innate sense of adventure and curiosity about the unknown.” Similarly, Kennedy supposedly “had a genuine fascination with space.” Suid cites sources such as Robert Kennedy, Sorenson, and Kennedy’s press secretary Pierre Salinger in observing that Kennedy had a “romantic” view of space and saw himself as a latter-day Columbus or Lewis and Clark.¹⁵

Alas, there is not a shred of evidence to support this interpretation other than the wishful thinking of space enthusiasts who would like to believe that one of their own occupied the White House and set the nation on a bold spaceflight adventure. Instead,

Kennedy maintained a studiously ambivalent record on space exploration prior to the Gagarin flight of April 12, 1961, neither pro nor con. For instance, journalist Hugh Sidey noted that on assuming the presidency, Kennedy “seemed to know less” and to be “less interested in” space than in virtually any other major policy area.¹⁶ And if Kennedy had really been such a strong supporter of space exploration all along, why had he not approved NASA’s request for an increased budget for Apollo in March 1961?¹⁷

Finally, in recently released tape of a White House meeting taking place on November 21, 1962, between President Kennedy and NASA Administrator James E. Webb demonstrates the error of this approach beyond all dispute. When asked to more aggressively support a broad range of spaceflight activities, Kennedy responded, “I am not that interested in space.” The major reason he was expending so much money on Apollo, he said, was because of its importance in the cold war rivalry with the Soviet Union.¹⁸

All of this suggests that JFK’s Apollo decision was much more complex and involved than most have generally believed. It is, at best, an ambivalent representation of the rational actor approach to decision-making in recent American history. In part because of this, the Apollo program left a divided legacy for NASA and the aerospace community. The Apollo decision created for the space agency an expectation that the direction of any major space goal from the president would always bring NASA a broad consensus of support and provide it with the resources and license to dispense them as it saw fit. Something NASA officials have been slow to understand is that Apollo had not been conducted under normal political circumstances and would not be repeated.¹⁹

The Apollo decision was, therefore, an anomaly in the national decision-making process. The dilemma of the “golden age” of Apollo has been difficult to overcome, but moving beyond the Apollo program to embrace future opportunities has been difficult.

Two: Transformation of the Space Program

Everything changed when John F. Kennedy went before Congress and the American public on May 25, 1961, and announced: “I believe this Nation should commitment itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to earth. No single space project in this period will be more impressive to mankind, or more important for the long-range

exploration of space; and none will be so difficult or expensive to accomplish.”²⁰ This announcement set in train a set of events that changed the structure and priorities of space exploration ever after.

Previously, the American civil space program had been operating at a measured pace with appropriate long-term goals. In 1959, just over a year after NASA began operation, it prepared a formal long-range plan that announced that its goal in the 1960s “should make feasible the manned exploration of the moon and nearby planets, and this exploration may thus be taken as a long-term goal of NASA activities.” The plan called for the “first launching in a program leading to manned circumlunar flight and to a permanent near-earth space station” in the 1965-1967 period. It also called for the first human flight to the Moon at an unspecified time “beyond 1970.”²¹

In essence, Kennedy threw out the long-range plan by making the Apollo commitment in 1961. In so doing he also overturned the orderly approach to space exploration established during the Eisenhower administration, one that led to the long-range plan and an incremental growth in the budget to about one percent of all monies expended by the federal government. Eisenhower had refused to fall prey to public hysteria after the Sputnik launches in 1957, and set in place only with some reluctance NASA as an independent Executive Branch agency in 1958. He took small steps because Eisenhower possessed a long-term vision for defeating the Soviet Union in the cold war without head-to-head competition across a broad spectrum. Indeed, he was committed to achieving without undue cost the development of scientific and technical capability both to gain access to space and to operate therein, but this had to be balanced against a wide range of other concerns.²²

In the crisis over Sputnik Ike had felt intense pressure from an alliance of diverse interests to establish a Cabinet-level federal entity, something he always thought unnecessarily expensive and once created almost impossible to dismantle, to carry out a visible program of space exploration. With NASA’s creation in 1958, an organization with less power and stature than others wanted, Eisenhower was able to deflect the coalition of interests that advocated an exceptionally aggressive space program. In so doing, he thwarted the goal of establishing a large, independent bureaucracy with expensive crash programs to race the Soviet Union into space and to accomplish spectacular feats that would impress the world.²³

Kennedy, however, had a much less refined strategy for how to win the Cold War and and

accordingly greater capacity to view each problem as if he was in a death match. Each confrontation with the Soviet Union took on spectacular proportions and desperate characteristics for Kennedy. For example, had Eisenhower been in office in 1961 it is doubtful that he would have responded to international setbacks with a similar lunar landing decision. Instead, he probably would have sought to reassure those stampeded by Soviet successes and explain carefully the long-term approach being taken by NASA to explore space. A hint of the Eisenhower approach came in 1962 when he remarked in an article: “Why the great hurry to get to the moon and the planets? We have already demonstrated that in everything except the power of our booster rockets we are leading the world in scientific space exploration. From here on, I think we should proceed in an orderly, scientific way, building one accomplishment on another.”²⁴ He later cautioned that the Moon race “has diverted a disproportionate share of our brain-power and research facilities from equally significant problems, including education and automation.”²⁵

Kennedy’s decision to race the Soviets to the Moon fundamentally altered the space program then underway by NASA, and whether or not one agrees that this alteration was good is very much a matter of perspective. For instance, it placed on hold an integrated space exploration scenario centered on human movement beyond this planet and involving these basic ingredients accomplished in essentially this order:

1. Earth orbital satellites to learn about the requirements for space technology that must operate in a hostile environment.
2. Earth orbital flights by humans to determine whether or not it was really possible for humanity to explore and settle other places.
3. Develop a reusable spacecraft for travel to and from Earth orbit, thereby extending the principles of atmospheric flight into space and making routine space operations.
4. Build a permanently inhabited space station as a place both to observe the Earth and from which to launch future expeditions to the Moon and planets.
5. Undertake human exploration of the Moon with the intention of creating Moon bases and eventually permanent colonies.
6. Undertake human expeditions to Mars and eventually colonize the planet.²⁶

Specifically because of Apollo, NASA lost the rationale for a space station, objective 4, viewed by

everyone both then and now as critical for the long-term exploration and development of space.

Instead of building the infrastructure necessary for sustained space exploration, as a space station would have done, JFK committed the nation to an expensive sprint to the Moon as a demonstration of American technological virtuosity, but ultimately it was a demonstration that had little application beyond its propaganda value. Of course, even though the project was not undertaken to advance scientific understanding so much as to resolve cold war rivalries, one could argue that the scientific return of Apollo was significant.²⁷ In reality, however, had we found something of interest on the Moon, instead of an aborted space exploration program Apollo would have been the vanguard of an armada of spacecraft from Earth. As it was, the belief of most Americans became “been there—done that,” and they pushed for decreased funding for NASA and emphases on other projects. The dreams of sustained human exploration in the solar system was trashed in the perceptions of Apollo as being something only mildly worthwhile for narrow scientific purposes.

Three: Expansion of the NASA Organization

Everyone is aware that NASA changed remarkably during the 1960s as it transformed itself from a relatively small research and development agency into a huge program management one. To realize the goal of Apollo under the strict time constraints mandated by the president, personnel had to be mobilized. This took two forms. First, NASA moved quickly during the early 1960s to expand its physical capacity. In 1960 the space agency consisted of a small headquarters in Washington, its three inherited NACA research centers, the Jet Propulsion Laboratory, the Goddard Space Flight Center, and the Marshall Space Flight Center. With the advent of Apollo, these installations grew rapidly. In addition, NASA added three new facilities specifically to meet the demands of the lunar landing program. In 1962 it created the Manned Spacecraft Center (renamed the Lyndon B. Johnson Space Center in 1973), near Houston, Texas, to design the Apollo spacecraft and the launch platform for the lunar lander. This center also became the home of NASA’s astronauts and the site of mission control.²⁸

NASA also greatly expanded for Apollo the Launch Operations Center at Cape Canaveral on Florida’s eastern seacoast. Renamed the John F. Kennedy Space Center on November 29, 1963, this installation’s massive and expensive Launch Complex

39 was the site of all Apollo Moon launches. Additionally, the spaceport’s Vertical Assembly Building (VAB) was a huge and expensive 36-story structure where the Apollo/Saturn rockets were stacked. NASA also created the Electronic Research Center (ERC) at Boston, Massachusetts, in 1962, an installation dedicated to the development of the multitudinous systems required to reach the Moon. It also opened the Michoud Assembly Facility in suburban New Orleans as an assembly and staging site for the Saturn launch vehicle. Finally, to support the development of the Saturn launch vehicle, in October 1961 NASA created on a Deep South bayou the Mississippi Test Facility, renamed the John C. Stennis Space Center in 1988. The cost of this expansion was great, more than 12.2 billion over the decade, with 90 percent of it expended before 1966.²⁹

In addition to the creation of this massive infrastructure, the NASA workforce exploded to meet the needs of Apollo. By 1966 the agency’s civil service rolls had grown to 36,000 people from the 10,000 employed at NASA in 1960. Additionally, NASA’s leaders made an early decision that they would have to rely upon outside researchers and technicians to complete Apollo, and contractor employees working on the program increased by a factor of ten, from 36,500 in 1960 to 376,700 in 1965. Private industry, research institutions, and universities, therefore, provided the majority of personnel working on Apollo.³⁰

The budget for NASA also grew exponentially throughout the first part of the 1960s to support the Apollo effort. As Kennedy had suspected, the cost of winning a race to the Moon was, pun intended, astronomical.³¹ Initial NASA estimates of the costs of Project Apollo were about \$40 billion through the end of the decade, a figure approaching \$160 billion in 2003 dollars when accounting for inflation. In the end it was not quite that expensive, costing \$25.4 billion (about \$103 billion in 2003 dollars).

Without question it was an enormous undertaking, with only the building of the Panama Canal rivaling the Apollo program’s size as the largest non-military technological endeavor ever undertaken by the United States and only the Manhattan Project to build the atomic bomb in World War II being comparable in a wartime setting.³²

Needless to say, as soon as Apollo’s success seemed assured, political leaders moved to cut the NASA budget. President Lyndon B. Johnson’s budget director, Charles Schultze, informed Johnson in the fall of 1965 that cost overruns in the space program were eating up the funds that Johnson needed for his “War

on Poverty” and other domestic programs as well as to expedite resolution of the conflict in Vietnam. Schultz urged Johnson to cut the NASA budget by \$600 million, a decision that would delay Kennedy’s goal until after 1970. With great care, Johnson allowed cuts to the NASA budget but ensured that the timing for the lunar landing was not compromised.³³

The NASA funding level, much of it going to Apollo, represented 5.3 percent of the federal budget in 1965. A comparable percentage of the \$1.9 trillion Federal budget in 2003 would have equaled more than \$75 billion for NASA, whereas the agency’s actual budget then stood at less than \$15 billion. NASA’s budget began to decline beginning in 1966 and continued a downward trend until 1975. NASA’s fiscal year 1971 budget took a battering, forcing the cancellation of Apollo missions 18 through 20. With the exception of a few years during the Apollo era, the NASA budget has hovered at about one percent of all money expended by the U.S. treasury. Stability has been the norm as the annual NASA budget has incrementally gone up or down in relation to that one-percent benchmark.³⁴

But the punchline to this issue is that NASA built an enormous infrastructure to support Apollo for which future uses were limited. Even so, the agency has fought to keep this infrastructure in place despite thirty years of limited usefulness. As support for the civil space program grew softer, the budget and personnel assigned to NASA declined to about half of what they had been during the heyday of Apollo. Faced with deteriorating resources, NASA Administrator James C. Fletcher tried to protect as best he could the technical and scientific core of personnel located at the NASA field centers, the truly essential resources needed carry out the agency’s mission. He designated “roles and missions” for each of the centers, thereby avoiding duplication of effort. This created a particularly difficult environment inside NASA, given the interlocking interests present between installations, contractors, and geographic regions on the one hand and their representatives in Washington on the other. Political infighting became more common as each NASA center struggled for survival. In the end, the NASA centers have limped along as best they could since the 1970s, losing their best personnel to industry, the military, and universities, and working both to sustain their infrastructure and conduct spaceflight activities on a shoestring.³⁵

Too many decisions have been made to feed the infrastructure rather than support space operations. This has sparked periodic attempts to reduce its size, complexity, and direction—with only moderate

success. Just as Apollo was being completed, a White House memo commented that “NASA is—or should be—making a transition from rapid razzle-dazzle growth and glamor to organizational maturity and more stable operations for the long term,” adding that “we need a new Administrator who will turn down NASA’s empire-building fervor and turn his attention to (1) sensible straightening away of internal management and (2) working with OMB and White House to show us what broad but concrete alternatives the President has that meet all his various objectives.”³⁶ The White House failed to accomplish this in 1971, and later. The result has been a constant push and pull between the desire for measured, incremental progress in space exploration and aggressive funding increases that would both feed the NASA infrastructure and allow for aggressive Apollo-like programs.³⁷

Nothing shows this more effectively than the debate over the Space Exploration Initiative (SEI) between 1989 and 1991. In July 1989 President George Bush proposed this ambitious program to return Americans to the Moon, establish a lunar base, and, then, using a NASA-built space station, send human expeditions to the planet Mars.³⁸ Within two years the program was dead, largely because of the incredible cost NASA estimated for it, more than \$700 billion. Most of that was for the sustenance of NASA as an institution, critics asserted. Mornally a strong supporter of NASA efforts, Maryland Senator Barbara Mikulski bluntly declared, “We’re essentially not doing Moon-Mars.”³⁹

Would this have turned out differently had NASA been less institutional and more entrepreneurial? Perhaps. But with the billions required to support NASA infrastructure, most of it created to support Kennedy’s Apollo program, the space agency’s leaders viewed this as an opportunity to fix lots of problems that years of starvation budgets had created. In the process, to take a term from nursery rhymes, they killed the “goose that laid the gold egg.” Perhaps the United States would have been better not to have built the infrastructure in the first place.

Four: NASA as a “Can Do” Agency

NASA’s rise as a “can do” agency can be traced directly to the experience of Apollo and its legacy of success. If we have heard the quote we have heard it a million times: “If we can send a man to the moon, why can’t we clean up Chesapeake bay?”⁴⁰ Or choose the task of your choice.

The space race thus provided a national self-examination, a trial of the ability of Americans and their government to overcome great obstacles, just as the mobilization for World War II had tested the American system two decades earlier. As the decade progressed, and the Apollo flights began, a government whose space program had begun with exploding rockets put its reputation on the line and carried out one successful mission after another, each a more complex or daring task.

In the process Americans forgot that failures had always been a part of the effort. They were reminded of that in January 1967 when the Apollo 1 crew was lost during a ground test, but NASA weathered that tragedy and moved forward. Even it was viewed in retrospect as a triumph of sorts, as observers pointed to the recovery from the fire as necessary in successfully completing the landings. Finally, even such a public failure as Apollo 13 has been interpreted as a success story. Flight Director Eugene Kranz has been erroneously credited with saying during the desperate hours in Houston as NASA engineers worked to bring the crew home alive, that “failure is not an option.” While one must give Kranz high marks for never giving up on the possibility of successfully recovering the crew, it is ironic that neither Kranz nor too many others had realized that the mission has already failed, and failed catastrophically.⁴¹

Ever increasing through the early 1960s, a culture of confidence grew up around NASA because of the presumed success of Apollo. The expectation was that every project should succeed. No exceptions.

This, in reality, is so much nostalgia. As the whole record of human and instrumented spaceflight reveals, NASA did not operate a failure-free space program during that time. But its image was carefully crafted so as to avoid pejorative aspects of governmental activity. Politicians and pundits also presented the Apollo program as something that was difficult to accomplish. Part of its worthiness was contained in the difficulty that it possessed. Human flights to the Moon seemed incredibly perplexing to a public barely accustomed to rocketry. They even appeared difficult to NASA engineers.⁴²

Indeed, if there is one hallmark of the American people, it is their enthusiasm for technology and what it can help them to accomplish. Historian Perry Miller wrote of the Puritans of New England that they “flung themselves in the technological torrent, how they shouted with glee in the midst of the cataract, and cried to each other as they went headlong down the chute that here was their destiny” as they used technology to transform a wilderness into their “City

upon a hill.”⁴³ Since that time the U.S. has been known as a nation of technological system builders who could use this ability to create great machines, and the components of their operation, of wonder.

Perceptive foreigners might be enamored with American political and social developments, with democracy and pluralism, but they are more taken with U.S. technology. The United States is not just the nation of George Washington, Thomas Jefferson, Abraham Lincoln, Frederick Douglas, and Elizabeth Cady Stanton, but also of Thomas Edison, Henry Ford, the Tennessee Valley Authority, and the Manhattan Project. These reinforced the belief throughout the world that America was *the* technological giant of the world. Until the loss of *Challenger* and a few other embarrassing missteps, NASA and its accomplishments symbolized more than any other institution America’s technological creativity.

That symbolism, misplaced as it might have been all along, accounts more than any other for the difficulties the agency has felt in the recent past. It ensures that NASA can never meet the heightened expectations conjured up by recollections of putting an American on the Moon in 1969, a feat of admittedly astounding technological virtuosity. Every NASA failure raises the question of American technological virtuosity in the world, and questioning of much American capability in so many other areas is already underway that setbacks in this one are all the more damaging to the American persona. American doubts increased with every perceived failure in the space program.⁴⁴

Five: Apollo’s Questionable Technological Legacy

Not long after the first lunar landing in July 1969, Richard Nixon told an assembled audience that the flight of Apollo 11 represented the most significant week in the history of Earth since the creation.⁴⁵ Clearly, at least at that time, the president viewed the endeavor as both pathbreaking and permanent, a legacy of accomplishment that future generations would reflect on as they plied intergalactic space and colonized planets throughout the galaxy. Hans Mark, director of NASA’s Ames Research Center during the 1960s, recently voiced a less positive result for Apollo. “President Kennedy’s objective was duly accomplished, but we paid a price,” he wrote in 1987, “the Apollo program had no logical legacy.” Mark suggested that the result of Apollo was essentially a technological dead end for the space program. It did not, in his view, foster an

orderly development of spaceflight capabilities beyond the lunar missions.⁴⁶

Nixon's statement was political hyperbole made at the time of the dramatic lunar landing. Both he and the nation as a whole soon largely forgot about Apollo and the space program. Mark's later and more reflective statement revealed the skepticism of a leader in the techno-scientific establishment who was disappointed by the direction of later efforts in space. Somewhere between these two extremes probably lays a responsible set of conclusions about the Apollo program and its achievements, failures, and effect on later activities.

More to the point, prior to the Mercury, Gemini, and Apollo programs of the 1960s, everyone involved in space advocacy envisioned a future in which humans would venture into space aboard winged, reusable vehicles. That was the vision from Hermann Oberth in the 1920s through Wernher von Braun in the 1950s to the U.S. Air Force's X-20 Dyna-Soar program in the early 1960s.⁴⁷

Because of the pressure of the cold war, NASA chose to abandon that approach to space access in favor of ballistic capsules that could be placed atop launchers developed originally to deliver nuclear warheads to the Soviet Union. NASA developed its ballistic launch and recovery technology at enormous expense and used it with a 100 percent success rate between 1961 and 1975. As soon as Apollo was completed, NASA chose to retire that ballistic technology, despite its genuine serviceability, in favor of a return to that earlier winged, reusable vehicle. The Space Shuttle was the result.⁴⁸

This begs the question, had there not been the crisis of the cold war and the Apollo commitment that flowed from it, might NASA have pursued reusable spaceplane concepts as the launcher of choice earlier? Some certainly thought that with the investment made in Apollo technology that it should not have been abandoned, that it was a waste of both money and a fully reliable technology, and that the costs of moving in an entirely different technological direction at the conclusion of Apollo far outweighed the benefits that might accrue. This "minority position" on the Space Shuttle created a scandal in the 1969-1971 period as the debate over Apollo as a technological dead end surfaced for the first time. Iconoclastic aerospace engineer Robert C. Truax, for one, suggested that abandoning Apollo technology was ill-advised. He thought there was no necessity of building a new winged or lifting body vehicle. Instead, the approach taken in Apollo would do just as well and be recoverable in the ocean and reusable. That would cut

down development costs drastically, but since splash-downs were "inelegant," he thought, NASA was committed to a winged spacecraft that "could be an unparalleled money sponge."⁴⁹

So why did NASA turn away from effective launch vehicle technology in favor of creating a new launch system from scratch? While the timetable of the Apollo project, tied as they were to cold war public policy concerns, certainly drove NASA to exploit ballistic missile technology, the budget pressures in the post-Apollo era replaced it. Given that the era of virtually unlimited budgets that Congress gave NASA in the 1960s had ended, again one might think that adaptation of existing technology would have been attractive. As things turned out, it took almost a decade between the political announcement to build the shuttle and its first flight, so it ended up costing much more than anticipated for development alone.⁵⁰ In reality, NASA probably would have been better to stay with Saturn launch technology, perhaps emphasizing the Saturn 1B and incrementally improving it.

Conclusion

This discussion represents a beginning in the process of reassessing the Apollo program. There is much that remains to be done. A post-modern discussion might well lead to an entirely different perspective on Apollo than the one earlier held. Scholars have been wrestling for some time now with an epistemological questioning of whether or not anything is truly knowable, in other words whether or not there are "facts" in any absolute sense. The fundamental philosophical thrust of recent historical inquiry has led to a blurring of the line between fact and fiction, between history and poetry, between the unrecoverable past and our memory of it. According to Robert F. Berkhofer, the philosophy of history presently in vogue essentially denies factuality. He claims, that the "transmutation of so much—some would say all—of the referential side of history into the presentational and narrative side destroys the effect of overall factual authority claimed for historical productions."⁵¹

Hayden White, a leader in the linguistic turn in historical analysis, argues that historical writing is not simply noting "facts" in a chronological sequence, since that does not offer any understanding whatsoever. It involves the historian consciously fashioning a story, an "emplotment" in White's jargon, that achieves coherence only through the deceptions and glossing of the historian.⁵²

All of this activity has raised the specter of the inexact character of historical “truth,” and of its relationship to myth and memory and the reality of an unrecoverable past. “Truths” have differed from time to time and place to place with reckless abandon and enormous variety. Religious, social, ethnic, national, language, and other types of groups over time have held a remarkably diverse set of truths, all internally consistent and rational. Choice between them is present everywhere both in the past and the present; my idea of fact dissolves into your idea of opinion almost as soon as it is articulated. We see this reinforced everywhere about us today, and mostly we shake our heads and misunderstand the versions of truth espoused by various groups about themselves and about those excluded from their fellowship.

Because of this inexact nature of truth—indeed I’m not sure that truth really exists or if it does that it is knowable—any debate about fact and opinion seems to me to be rather fruitless. Historians play a critical role in this search for truth, and abdication of our responsibility for pursuing the quest by invoking allegiance to some other person or hierarchy is an unacceptable position. As I see it, it is important for historians to mediate the unrecoverable past with myth and memory to assist the broader community that they serve in ascertaining their place among all the other groups with their own truths. Such activity has always been a part of the historical enterprise, and has helped fundamentally to define the identity of the group in ambiguous situations. Consciousness of a common past, as I stated earlier, is a necessary ingredient in defining an “us” and a “them.” Without this definition process, the group lacks identity. Historians are uniquely skilled in helping with this process, providing context and coherence that is useful to the group in shaping its identity. They are also properly trained to rectify memory, myth, and the unrecoverable past into a useful whole. Without them the group would have to invent them. Only time will tell.

Notes

¹ These have been analyzed in Stephen J. Garber, “Multiple Means to an End: A Reexamination of President Kennedy’s Decision to Go to the Moon,” *Quest: The History of Spaceflight Quarterly* 7 (Summer 1999): 5-17.

² By far the most influential study making this case is the seminal work of John M. Logsdon, *The Decision to Go to the Moon: The Space Program and the*

National Interest (Cambridge, MA: MIT Press, 1970).

³ Frank B. Gibney and George J. Feldman, *The Reluctant Space-Farers: The Political and Economic Consequences of America’s Space Effort* (New York: New American Library, 1965), Chapter 9.

⁴ Charles E. Lindblom, “The Science of ‘Muddling Through’,” *Public Administration Review* 19 (1959): 79-88.

⁵ Seymour Hersh, *The Dark Side of Camelot* (Boston: Little, Brown, and Company, 1997), pp. 17, 250-51, 254; Richard Reeves, *President Kennedy: Profile of Power* (New York: Simon and Schuster, 1993), pp. 14-17.

⁶ Michael Meagher, “‘In an Atmosphere of National Peril’: The Development of John F. Kennedy’s WorldView,” *Presidential Studies Quarterly*, summer 1997, pp. 475-76. Meagher points out that in his first State of the Union address, Kennedy told Congress that “I speak today in an atmosphere of national peril” (p. 471).

⁷ Reeves, *President Kennedy*, pp. 19, 137. Reeves argues, ironically, that Kennedy and Khrushchev both believed that they could prevail in any one-on-one situation regardless of the consequences.

⁸ “Inaugural Address, January 20, 1961,” in *Public Papers of the Presidents of the United States: John F. Kennedy, 1961* (Washington, DC: Government Printing Office, 1962), pp. 1-3.

⁹ “Annual Message to the Congress on the State of the Union, January 30, 1961,” in *ibid.*, pp. 19-28, quote from p. 26.

¹⁰ Aleksandr Fursenko and Timothy Naftali, *One Hell of a Gamble: Khrushchev, Castro, and Kennedy, 1958-1964* (New York: W.W. Norton and Company, 1997), pp. 110-13.

¹¹ These various memos can be found in the John F. Kennedy Presidential Library, President’s Office Files, various boxes. The Skolnikoff memo, “President’s Meeting with Khrushchev, Vienna June 3-4, 1961, Reference Paper, Possible US-USSR Cooperative Projects,” is from the President’s Office Files, Countries: USSR, Vienna Meeting, Background Documents 1953-1961 (G-4), Briefing Material, Reference Papers, Box 126; Dodd L. Harvey and Linda C. Ciccoritti, *U.S.-Soviet Cooperation in Space* (Miami, FL: University of Miami Center for Advanced International Studies, 1974), pp. 66-68.

¹² 1995 interview with Sorenson cited in Fursenko and Naftali, *One Hell of a Gamble*, p. 121.

¹³ Harvey and Ciccoritti, *U.S.-Soviet Cooperation in*

Space, pp. 78-79. A State Department memo covering the two leaders' discussion in Vienna does not mention Khrushchev's fleeting acquiescence, instead focusing on Khrushchev's desire to have progress in disarmament before consenting to a joint lunar landing program. See, 6/4/61 Memcon between JFK and Khrushchev, 6/4/61, Luncheon, Soviet Embassy, Vienna in the Kennedy Presidential Library, Box 126 and the NASA Historical Reference Collection

¹⁴ Public Papers of the Presidents of the United States, John F. Kennedy, 1963, p. 695, cited in Harvey and Ciccoritti, *U.S.-Soviet Cooperation in Space*, p. 123; "Text of President Kennedy's Address on Peace Issues a U.N. General Assembly," *New York Times*, September 21, 1963, p. C6; see Yuri Karash, "The Price of Rivalry in Space," *Baltimore Sun*, July 19, 1994, p. 11A; Dodd Harvey and Linda Ciccoritti, *U.S.-Soviet Cooperation in Space* (Miami, FL: Center of Advanced International Studies, University of Miami, 1974), pp. 78-79; McDougall, . . . *the Heavens and the Earth*, p. 395.

¹⁵ Lawrence Suid, "Kennedy, Apollo and the Columbus Factor," *Spaceflight*, July 1994, p. 223-30.

¹⁶ Sidey, p. 59, cited in Logsdon, *Decision to Go to the Moon*, p. 93.

¹⁷ Dwayne A. Day, George Washington University Space Policy Institute, e-mail to Roger D. Launius, NASA Chief Historian, December 13, 1994, NASA Historical Reference Collection.

¹⁸ Tape Recording of meeting between President John F. Kennedy and NASA Administrator James E. Webb, November 21, 1962, White House Meeting Tape 63, John Fitzgerald Kennedy Library, Boston, MA.

¹⁹ This argument is made in Roger D. Launius and Howard E. McCurdy, "Epilogue: Beyond NASA Exceptionalism," in Launius and McCurdy, eds., *Spaceflight and the Myth of Presidential Leadership* (Urbana: University of Illinois Press, 1997), pp. 222-27. As a specific example, see the argument made in George M. Low, Team Leader, to Mr. Richard Fairbanks, Director, Transition Resources and Development Group, "Report of the NASA Transition Team," December 19, 1980, NASA Historical Reference Collection, advocating strong presidential leadership to make everything right with the U.S. space program.

²⁰ John F. Kennedy, "Urgent National Needs," *Congressional Record—House* (May 25, 1961), p. 8276; text of speech, speech files, NASA Historical Reference Collection, NASA History Office, Washington, DC.

²¹ Office of Program Planning and Evaluation, "The Long Range Plan of the National Aeronautics and Space Administration," December 16, 1959, NASA Historical Reference Collection, NASA History Office, NASA Headquarters, Washington, DC.

²² For example, the Eisenhower administration repeatedly tried to find ways to conduct necessary research and development (R&D) in the most expeditious and cost-effective way. This involved streamlining functions to eliminate duplication of effort, transferring some activities to nongovernmental organizations, and prioritizing projects to eliminate those of questionable value. See Joseph M. Dodge, Bureau of the Budget, "Research and Development," June 9, 1953, and L. Arthur Minnich, assistant White House staff secretary, Memorandum of Conference with the President, "Coordination of Basic Research," May 10, 1956, with attachments, both in box 743, "Research (1)," Official File, White House Central Files, Eisenhower Library.

²³ Roger D. Launius, "Eisenhower, Sputnik, and the Creation of NASA: Technological Elites and the Public Policy Agenda," *Prologue: Quarterly of the National Archives and Records Administration* 28 (Summer 1996): 127-43.

²⁴ Dwight D. Eisenhower, "Are We Headed in the Wrong Direction?" *Saturday Evening Post*, August 11-August 18, 1962, p. 24.

²⁵ Dwight D. Eisenhower, "Why I Am a Republican," *Saturday Evening Post*, April 11, 1964, p. 19.

²⁶ This approach to exploration has been analyzed in Dwayne A. Day, "The Von Braun Paradigm," *Space Times: Magazine of the American Astronautical Society* 33 (November-December 1994): 12-15; Dwayne A. Day, "Paradigm Lost," *Space Policy* 11 (August 1995): 153-59.

²⁷ See W. David Compton, *Where No Man Has Gone Before: A History of Apollo Lunar Exploration Missions* (Washington, DC: NASA SP-4214, 1989); David M. Harland, *Exploring the Moon: The Apollo Expeditions* (Chichester, UK: Springer Praxis, 1999); Don E. Wilhelms, *To a Rocky Moon: A Geologist's History of Lunar Exploration* (Tucson: University of Arizona Press, 1993); and Paul D. Spudis, *The Once and Future Moon* (Washington, DC: Smithsonian Institution Press, 1996); Curator for Planetary Materials, Johnson Space Center, "Top Ten Scientific Discoveries Made During Apollo Exploration of the Moon," October 28, 1996, NASA Historical Reference Collection, NASA History Division, Washington, DC.

²⁸ On this center see, Henry C. Dethloff, “*Suddenly Tomorrow Came . . .*”: *A History of the Johnson Space Center* (Washington, DC: NASA SP-4307, 1993).

²⁹ On these see, Virginia P. Dawson, *Engines and Innovation: Lewis Laboratory and American Propulsion Technology* (Washington, DC: NASA SP-4306, 1991); James R. Hansen, *Engineer in Charge: A History of the Langley Aeronautical Laboratory, 1917-1958* (Washington, DC: NASA SP-4305, 1987); Elizabeth A. Muenger, *Searching the Horizon: A History of Ames Research Center, 1940-1976* (Washington, DC: NASA SP-4304, 1985); Richard P. Hallion, *On the Frontier: Flight Research at Dryden, 1946-1981* (Washington, DC: NASA SP-4303, 1984); Alfred Rosenthal, *Venture into Space: Early Years of Goddard Space Flight Center* (Washington, DC: NASA SP-4301, 1968); Clayton R. Koppes, *JPL and the American Space Program: A History of the Jet Propulsion Laboratory* (New Haven, CT: Yale University Press, 1982); Charles D. Benson and William Barnaby Faherty, *Moonport: A History of Apollo Launch Facilities and Operations* (Washington, DC: NASA SP-4204, 1978); Mark R. Herring, *Way Station to Space: A History of the Stennis Space Center* (Washington, DC: NASA SP-4310, 1997); Harold D. Wallace Jr., *Wallops Station and the Creation of the American Space Program* (Washington, DC: NASA SP-4311, 1997); Lane E. Wallace, *Dreams, Hopes, Realities: NASA's Goddard Space Flight Center, The First Forty Years* (Washington, DC: NASA SP-4312, 1999); Andrew J. Dunar and Stephen P. Waring, *Power to Explore: A History of the Marshall Space Flight Center* (Washington, DC: NASA SP-4313, 1999).

³⁰ On this subject see Arnold S. Levine, *Managing NASA in the Apollo Era* (Washington, DC: NASA SP-4102, 1982), Chapter 4.

³¹ Logsdon, *Decision to Go to the Moon*, pp. 106-10.

³² Linda Neuman Ezell, *NASA Historical Data Book, Vol II: Programs and Projects, 1958-1968* (Washington, DC: NASA SP-4012, 1988), pp. 122-23.

³³ Robert A. Divine, “Lyndon B. Johnson and the Politics of Space,” in Robert A. Divine, ed., *The Johnson Years: Vietnam, the Environment, and Science* (Lawrence: University of Kansas Press, 1987), pp. 238-39; Glen P. Wilson, “The Legislative Origins of NASA: The Role of Lyndon B. Johnson,” *Prologue: Quarterly of the National Archives* 25 (Winter 1993): 363-73; Robert Dallek, “Johnson, Project Apollo, and the Politics of Space Program Planning,” in Roger D.

Launius and Howard E. McCurdy, eds., *Spaceflight and the Myth of Presidential Leadership* (Urbana: University of Illinois Press, 1997), chapter 3.

³⁴ This observation is based on calculations using the budget data included in the annual *Aeronautics and Space Report of the President* (Washington, DC: NASA Report, 2002), which contains this information for each year since 1959.

³⁵ This is discussed in Roger D. Launius, *NASA: A History of the U.S. Civil Space Program* (Malabar, FL: Krieger Pub. Co., 1994), pp. 94-96; Roger D. Launius, “A Western Mormon in Washington, D.C.: James C. Fletcher, NASA, and the Final Frontier,” *Pacific Historical Review* 64 (May 1995): 217-41.

³⁶ Clay T. Whitehead, White House Staff Assistant, to Peter M. Flanigan, Assistant to the President, 8 February 1971, Record Group 51, Series 69.1, Box 51-78-32, National Archives and Records Administration, Washington, DC.

³⁷ Greg Easterbrook, “The Case Against NASA,” *New Republic*, 8 July 1991, pp. 18-24.

³⁸ Thomas P. Stafford, et al., *American at the Threshold: Report of the Synthesis Group on America's Space Exploration Initiative* (Washington, DC: Government Printing Office, n.d. [1991]; “Space Program Faces Costly, Clouded Future,” *Congressional Quarterly Weekly Report*, April 5, 1986, p. 732; “NASA Cuts Slow Ambitious Plans,” *Congressional Quarterly Almanac 1990* (Washington, DC: Congressional Quarterly, 1991), p. 435; “Bush Goes on the Counterattack Against Mars Mission Critics,” *Congressional Quarterly Weekly Report*, June 23, 1990, p. 1958.

³⁹ “Bush Goes on the Counterattack Against Mars Mission Critics,” *Congressional Quarterly Weekly Report*, June 23, 1990, p. 1958.

⁴⁰ Tom Horton, “On Environment: If America Could Send a Man to the Moon, Why Can't We . . . ?” *Baltimore Sun*, July 22, 1984.

⁴¹ Jim Lovell and Jeffrey Kluger, *Lost Moon: The Perilous Voyage of Apollo 13* (Boston: Houghton Mifflin Co., 1994). Kranze admits in his book that he never made the statement, but wish he had. See, Gene Kranz, *Failure is not an Option: Mission Control from Mercury to Apollo 13 and Beyond* (New York: Simon & Schuster, 2000).

⁴² Courtney G. Brooks, James M. Grimwood, and Loyd S. Swenson, Jr., *Chariots for Apollo: A History of Manned Lunar Spacecraft* (Washington, DC: NASA SP-4205, 1979), chap. 3.

⁴³ Perry Miller, “The Responsibility of a Mind in a Civilization of Machines,” *The American Scholar* 31

(Winter 1961-1962): 51-69.

⁴⁴ Thomas Park Hughes, *American Genesis: A Century of Invention and Technological Enthusiasm, 1870-1970* (New York: Viking, 1989), p. 2.

⁴⁵ *10:56:20 PM, EDT, 7/20/69* (New York: CBS News, 1969), p. 159.

⁴⁶ Hans Mark, *The Space Station: A Personal Journey* (Durham, NC: Duke University Press, 1987), p. 36. See also p. 50.

⁴⁷ This quest has been well documented in Ray A. Williamson and Roger D. Launius, "Rocketry and the Origins of Space Flight," in Roger D. Launius and Dennis R. Jenkins, eds., *To Reach the High Frontier: A History of U.S. Launch Vehicles* (Lexington: University Press of Kentucky, 2002), pp. 33-69.

⁴⁸ On this issue, see T.A. Heppenheimer, *The Space Shuttle Decision: NASA's Search for a Reusable Space Vehicle* (Washington, DC: NASA SP-4221, 1999); Roger D. Launius, "NASA and the Decision to Build the Space Shuttle, 1969-72," *The Historian* 57 (Autumn 1994): 17-34.

⁴⁹ Robert C. Truax, "Shuttles—What Price Elegance?" *Astronautics & Aeronautics* 8 (June 1970): 22-23.

⁵⁰ See T. A. Heppenheimer, *Development of the Space Shuttle, 1972-1981 (History of the Space Shuttle, Volume 2)* (Washington, DC: Smithsonian Institution Press, 2002).

⁵¹ Robert F. Berkhofer Jr., "The Challenge of Poetics to (Normal) Historical Practice," *Poetics Today* 9 (1988): 435-52.

⁵² Hayden White, "The Historical Text as Literary Artifact," *The Writing of History: Literary Form and Historical Understanding*, Robert H. Canary and Henry Kozicki, editors (Madison: University of Wisconsin Press, 1978), 41-62.