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Roger D. Launius
National Air and Space Museum, Roger.D.Launius@edu.edu

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Roger D. Launius
National Air and Space Museum

Before the beginning of the space age in 1957, the Department of Defense (DOD) of the United States sought to gain the mission and the technologies to carry out human operations in space. Even after 1958, when President Dwight D. Eisenhower made the decision to assign the human spaceflight mission to the newly created National Aeronautics and Space Administration (NASA), DOD champions continued to argue for a role for military astronauts. The military pursued several flight projects in the 1960s, achieved flight status for military astronauts on classified missions on the Space Shuttle in the 1980s, and has continued to advocate a human military mission in space as the twentieth century came to an end. All this happened despite an exceptionally weak rationale for military astronauts in space. While the DOD commitment to human spaceflight has moderated in the post-cold war era, there remains some who seek this activity as a military mission. This essay reviews the history of the military quest for human spaceflight, and suggests that a human military presence in space will come as other humans settle beyond Earth as has long been the case in terrestrial exploration and settlement. It points to the continuing difficulty of developing a rationale for human spaceflight, a difficulty that has come to a head in the early twenty-first century as the Space Shuttle is retired and plans for future vehicles remain unclear.

When the administration of President Barak Obama took office in January 2009, American human spaceflight efforts were at a crossroads. In the aftermath of the Columbia accident on 1 February 2004, the Bush administration had taken the decision that the venerable Space Shuttle, flown since 1981, had grown unsafe and needed replacement. It set 2010 as the date of shuttle retirement and directed NASA to pursue a follow-on technology. This would help create technologies necessary to return to the Moon and eventually travel to Mars.[1]

The result was the Constellation program established in 2005 as an effort to use modified Space Shuttle hardware to go beyond Earth orbit, with the Moon as a target. By 2009, however, it had become highly uncertain whether that goal could be realized. The new administration realized that the Constellation program had run into technological and budgetary problems and took action to end it in February 2010.[2]

In this context, the way forward for NASA's human spaceflight efforts remains unclear. Moreover, the American military's periodic enchantment with human spaceflight vehicles

[1]Frank Sietzen Jr. and Keith L. Cowing, *New Moon Rising: The Making of the Bush Space Vision* (Apogee Books, 2004); Craig Cornelius, "Science in the National Vision for Space Exploration: Objectives and Constituencies of the 'Discovery-Driven' Paradigm," *Space Policy* 21 (February 2005): 41-48; Wendell Mendell, "The Vision for Human Spaceflight," *Space Policy* 21 (February 2005): 7-10; and Thor Hogan, *Mars Wars: The Rise and Fall of the Space Exploration Initiative* (Washington, DC: NASA SP-2007-4410, 2007).

[2]Office of Science and Technology Policy/National Aeronautics and Space Administration Fact Sheet, "A Bold New Approach for Space Exploration and Discovery," 1 February 2010, copy in possession of author.

remains unsettled. The Air Force has proposed in the past that it pursue its own human spacecraft; and some on the fringe believe that it already has a capability that is unknown to the general public.[3] How has the United States military viewed the human spaceflight mission since the origins of the space and its role in it? Has this changed over time and why? What possibilities for the future might exist for a human military presence in space?

Origins of the Military Human Spaceflight Effort

Well before the beginning of the space age, the DOD had angled for the mission of placing humans in space for tasks ranging from space-based reconnaissance, to navigation, to communications, and to early warning. Over time, especially as it has become increasingly obvious that the national security mission is effectively conducted by robotic spacecraft, it has come to be called, rather crassly, "astronaut envy." Thus, in the early 1950s, Wernher von Braun, working for the Army Ballistic Missile Agency in Huntsville, Alabama, proposed a massive space station with more than fifty military personnel aboard to undertake Earth observation for reconnaissance and as an orbiting battle station. Von Braun believed this could be used for nuclear missile strikes against the Soviet Union.[4] He could not get anyone in authority in the Eisenhower administration to adopt his plan, though some senior officials in the DOD did see a role for military astronauts.

After a series of studies and high level deliberations, in 1957 the United States Air Force (USAF) proposed the development of a piloted orbital proposal designated "Man-in-Space Soonest" (MISS).[5] Initially dismissed before the launch of Sputnik, afterwards Air Force leaders invited Edward Teller and other leading members of the scientific/technological elite to reconsider the issue of human spaceflight as a national security objective. Teller's group concluded that the Air Force could place a human in orbit within two years, and urged the department pursue this goal. Teller understood, however, that there was essentially no military reason for undertaking this mission and chose not to tie his recommendation to any specific rationale, instead falling back on a belief that the first nation to do so would accrue national prestige and advance, in a general manner, science and technology.[6]

Early in 1958, Lieutenant General Donald L. Putt, the USAF Deputy Chief of Staff for Development, informed Director of the National Advisory Committee for Aeronautics (NACA), Hugh L. Dryden, that the Air Force intended to pursue "a research vehicle program having as its objective the earliest possible manned orbital flight, which will

[3]William B. Scott, "Two-Stage-to-Orbit 'Blackstar' System Shelved at Groom Lake?" *Aviation Week & Space Technology*, 5 March 2006, http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=awst&id=news/030606p1.xml (accessed 19 February 2010).[4]Wernher von Braun, "Crossing the Last Frontier," *Collier's*, 22 March 1952, pp. 24–29, 72–74; and Michael J. Neufeld, "Space Superiority: Wernher von Braun's Campaign for a Nuclear-Armed Space Station, 1946–1956," *Space Policy* 22 (February 2006): 52-62.

[4]Wernher von Braun, "Crossing the Last Frontier," *Collier's*, 22 March 1952, pp. 24–29, 72–74; and Michael J. Neufeld, "Space Superiority: Wernher von Braun's Campaign for a Nuclear-Armed Space Station, 1946–1956," *Space Policy* 22 (February 2006): 52-62.

[5]The Man-in-Space-Soonest program called for a four-phase capsule orbital process, which would first use instruments, to be followed by primates, then a pilot, with the final objective of landing humans on the Moon. See David N. Spires, *Beyond Horizons: A Half Century of Air Force Space Leadership* (Air Force Space Command, 1997), p. 75.

[6]Loyd S. Swenson, James M. Grimwood, and Charles C. Alexander, *This New Ocean: A History of Project Mercury* (Washington, DC: NASA SP-5201, 1966), pp.73–74.

contribute substantially and essentially to follow-on scientific and military space systems." Putt asked Dryden to collaborate in this effort, but with the NACA as a decidedly junior partner.[7] Even though Dryden agreed, by the end of the summer of 1958, Putt found the newly created NASA leading the human spaceflight effort for the United States, with the Air Force being the junior partner.[8]

Throughout the first part of 1958, Air Force officials pressed for leadership of MISS. As the most experienced in developing space technology, the Air Force expected to lead any space program for the United States. Specifically, it believed hypersonic space planes and lunar bases would serve national security needs. To help make this a reality, the Air Force requested $133 million for the MISS program and secured approval by the Joint Chiefs of Staff.[9] However, a series of disagreements between Air Force and NACA officials disturbed the picture. These difficulties reverberated all the way to the Office of the President, prompting a review of the roles of the two organizations.[10] Hugh Dryden complained in July 1958 to the President's Science Advisor, James R. Killian, about the lack of clarity on the part of the Air Force. He asserted:

> The current objective for a manned satellite program is the determination of man's basic capability in a space environment as a prelude to the human exploration of space and to possible military applications of manned satellites. Although it is clear that both the National Aeronautics and Space Administration and the Department of Defense should cooperate in the conduct of the program, I feel that the responsibility for and the direction of the program should rest with NASA.

He urged that the president state a clear division of responsibility between the two organizations on the human spaceflight mission.[11]

As David N. Spires and Rick W. Sturdevant have pointed out, the MISS program became derailed within the DOD because of funding concerns:

> Throughout the spring and summer of 1958 the Air Force's Air Research and Development Command had mounted an aggressive campaign to have ARPA [Advanced Research Projects Agency] convince administration officials to approve its Man-in-Space-Soonest development plan. But ARPA balked at the high cost, technical challenges, and uncertainties surrounding the future

[7]Lt. Gen. Donald L. Putt, USAF Deputy Chief of Staff, Development, to Hugh L. Dryden, NACA Director, 31 January 1958, Folder #18674, NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, DC.

[8]NACA to USAF Deputy Chief of Staff, Development, "Transmittal of Copies of Proposed Memorandum of Understanding between Air Force and NACA for joint NACA-Air Force Project for a Recoverable Manned Satellite Test Vehicle," 11 April 1958, Folder #18674, NASA Historical Reference Collection.

[9]The breakdown for this budget was aircraft and missiles—$32M, support—$11.5M, construction—$2.5M, and R&D—$87M. See Memorandum for ARPA Director, "Air Force Man-in-Space Program," 19 March 1958, Folder #18674, NASA Historical Reference Collection.

[10]Maurice H. Stans, Director, Bureau of the Budget, Memorandum for the President, "Responsibility for "Space" Programs," 10 May 1958; Maxime A. Faget, NACA, Memorandum for Dr. Dryden, 5 June 1958; Clotaire Wood, Headquarters, NACA, Memorandum for files, "Tableing [sic] of Proposed Memorandum of Understanding Between Air Force and NACA For a Joint Project For a Recoverable Manned Satellite Test Vehicle," 20 May 1958, with attached Memorandum, "Principles for the Conduct by the NACA and the Air Force of a Joint Project for a Recoverable Manned Satellite Vehicle," 29 April 1958; and Donald A. Quarles, Secretary of Defense, to Maurice H. Stans, Director, Bureau of the Budget, 1 April 1958, Folder #18674. All in NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C.

[11]Hugh L. Dryden, Director, NACA, Memorandum for James R. Killian Jr., Special Assistant to the President for Science and Technology, "Manned Satellite Program," 19 July 1958; Folder #18674, NASA Historical Reference Collection.

> direction of the civilian space agency.[12]

By the summer of 1958, political leaders in Washington viewed the human spaceflight mission more useful as an international prestige program than as a national security initiative.

By the time that Dwight D. Eisenhower signed the National Aeronautics and Space Act of 1958 into law, he had decided to split the human space mission from military leadership, and he formally assigned the coveted human spaceflight mission to NASA. Thereafter, the MISS program was folded into what became Project Mercury. In early November 1958, the DOD acceded to the president's desire that the human spaceflight program be a civilian effort under the management of NASA. For its part, NASA invited Air Force officials to appoint liaison personnel to the Mercury program office at Langley Research Center in Hampton, Virginia, and they did so.[13]

The… objective for a manned satellite program is the determination of man's basic capability in a space environment as a prelude to the human exploration of space and to possible military applications of manned satellites…

The decision to make human spaceflight the sole responsibility of NASA, a very public non-military organization, proved prescient. It might even be considered a brilliant geopolitical decision, possible because of civilian leadership of the military, a foundational pillar of the American military. Eisenhower helped cement that pillar by this and other decisions helping to inexorably weave it into the military culture.

By de-coupling it from the DOD, the president exponentially reduced the confrontational aspect of the space race in its most dramatic element. With NASA officially charged with the peaceful exploration of space, and with human spaceflight as a core element of that mission, a space race could exist without fear of national survival. Numerous international agreements stated this fundamental truth from the decisions of the United Nations (UN) in the latter 1950s to the *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space* in 1967.[14]

Regardless of who was to manage the human spaceflight program, American officials recognized that time was of the essence in undertaking the human space missions. The compelling nature of this aspect of the space race pushed NASA to pursue the Mercury orbital program. Roy Johnson, director of Advanced Research Projects Agency (ARPA)

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[12]David N. Spires and Rick W. Sturdevant, "…to the very limit of our ability…: Reflections on Forty Years of Civil-Military Partnership in Space Launch," in Roger D. Launius and Dennis R. Jenkins, eds., *To Reach the High Frontier: A History of U.S Launch Vehicles* (University Press of Kentucky, 2002), p. 475.

[13]Memorandum for Dr. Silverstein, "Assignment of Responsibility for ABMA Participation in NASA Manned Satellite Project," 12 November 1958; Abe Silverstein to Lt. Gen. Roscoe C. Wilson, USAF Deputy Chief of Staff, Development, 20 November 1958; and Hugh, L. Dryden, Deputy Administrator, NASA, Memorandum for Dr. Eugene Emme for NASA Historical Files, "The "signed" Agreement of 11 April 1958, on a Recoverable Manned Satellite Test Vehicle," 8 September 1965, Folder #18674. All in NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C.

[14]United Nations General Assembly Resolution 1721 (XVI), adopted on 20 December 1961; *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies,* Signed at Washington, London, Moscow, 27 January 1967.

for the DOD, noted in September 1958 that competition with the Soviet Union precluded taking a cautious approach to human spaceflight and advocated additional funding to ensure its timely completion. As he wrote to the Secretary of Defense and the NASA Administrator:

> I am troubled, however, with respect to one of the projects in which there is general agreement that it should be a joint undertaking. This is the so-called "Man-in-Space" project for which $10 million has been allocated to ARPA and $30 million to NASA. My concern over this project is due (1) to a firm conviction, backed by intelligence briefings, that the Soviets next spectacular effort in space will be to orbit a human, and (2) that the amount of $40 million for FY 1959 is woefully inadequate to compete with the Russian program. As you know our best estimates (based on some 12-15 plans) were $100 to $150 million for an optimum FY 1959 program.
>
> I am convinced that the military and psychological impact on the United States and its Allies of a successful Soviet man-in-space "first" program would be far reaching and of great consequence.
>
> Because of this deep conviction, I feel that no time should be lost in launching an aggressive Man-in-Space program and that we should be prepared if the situation warrants, to request supplemental appropriations of the Congress in January to pursue the program with the utmost urgency.[15]

Johnson agreed to transfer a series of space projects from ARPA to NASA, establishing protocols for cooperating in the development of equipment that would be used in the human spaceflight program.[16]

To aid in the conduct of this program, ARPA and NASA created a committee, the Joint Manned Satellite Panel, on 18 September 1958. Holding its first meeting on 24 September, this panel established goals and strategy. Chaired by NASA's Robert Gilruth, but also including such key figures as Max Faget and George Low, the panel focused on a wide range of technical requirements. Under this panel's auspices final specifications for the piloted capsule emerged in October 1958, as did procurement of both a modified Redstone, for suborbital flights, and Atlas boosters for orbital missions.[17]

Through this process, NASA gained a firm grasp of what soon became known as the Mercury program. Between the creation of NASA in 1958 and 1963, a little less than five years, this first human space program was completed at a cost of $384 million. This may have been the best bargain ever in human spaceflight, in no small measure because its goals were uncomplicated. Although lagging behind the original schedule, NASA's Mercury program succeeded in proving the possibility of safe human spaceflight and in demonstrating

[15]Roy W. Johnson, Director, ARPA, DOD, Memorandum for the Administrator, NASA, "Man-in-Space Program," 3 September 1958, Folder #18674, NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C.

[16]Roy W. Johnson, Director, ARPA, DOD, Memorandum for the Administrator, NASA, "Man-in-Space Program, 19 September 1958, with attached Memorandum of Understanding, "Principles for the Conduct by NASA and ARPA of a Joint Program for a Manned Orbital Vehicle," 19 September 1958, Folder #18674, NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C.

[17]Minutes of Meetings, Panel for Manned Space Flight, 24, 30 September, 1 October 1958; NASA, "Preliminary Specifications for Manned Satellite Capsule," October 1958; and Paul E. Purser, Aeronautical Research Engineer, NASA, to Mr. R. R. Gilruth, NASA, "Procurement of Ballistic Missiles for use as Boosters in NASA Research Leading to Manned Space Flight," 8 October 1958, with attached, "Letter of Intent to AOMC (ABMA), Draft of Technical Content," 8 October 1958, Folder #18674. All in NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C.

U.S. technological competence during its Cold War rivalry with the Soviet Union.

At the conclusion of the Mercury effort, Walter C. Williams noted that "in the period of about 45 months of activity, some 25 flights were made..." He then commented on what the United States learned in completing Mercury:

> I think we learned… about spacecraft technology and how a spacecraft should be built, what its systems should be, how they should perform, where the critical redundancies are required. I think we learned something about man-rating boosters, how to take a weapons system development and turn it into a manned transportation system. I think… we found primarily… that this was a matter of providing a malfunction detection system or an abort system, and, also, we found very careful attention to detail as far as quality control was concerned. I think that some of the less obvious things we learned – we learned how to plan these missions and this takes a lot of detail work, because it's not only planning how it goes, but how it doesn't go, and the abort cases and the emergency cases always took a lot more effort than the planned missions... We learned what is important in training crews for missions of this type. When the crew-training program was laid down, the program had to cover the entire gamut because we weren't quite sure exactly what these people needed to carry out the missions. I think we have a much better focus on this now. We learned how to control these flights in real time. This was a new concept on a worldwide basis. I think we learned, and when I say we, I'm talking of this as a National asset, not NASA alone, we learned how to operate the world network in real time and keep it up. And I think we learned a lot in how to manage development programs of this kind and to manage operations of this kind.[18]

Christopher C. Kraft, senior flight controller, agreed: Mercury "changed quite a few concepts about space, added greatly to our knowledge of the universe around us, and demonstrated that Man has a proper role in exploring it. There are many unknowns that lie ahead, but we are reassured because we are confident in overcoming them by using Man's capabilities to the fullest."[19]

The Military's Continued Interest in Human Spaceflight

The DOD, while certainly an important supporting organization in Mercury, remained committed to achieving an independent human spaceflight capability. "If we concede that man can go into space for peaceful missions," stated a USAF white paper in 1961, "we must admit that man can go into this same environment for military purposes. It is the Air Force view that many will be required to go into space to perform tasks that will be important to our national security."[20] From this position flowed a series of decisions aimed at creating what the DOD called the Manned Military Space Program (MMSP). Several immediate programs resulted and the Air Force noted: "Fully coordinated, cooperative and where appropriate, joint effort between the Air Force and the NASA is required in order that the content and objectives of the MMSP are properly defined

[18]Walter C. Williams, Deputy Director, NASA Manned Spacecraft Center, "Project Review," 3 October 1963, NASA Historical Reference Collection.

[19]Christopher C. Kraft, "A Review of Knowledge Acquired from the First Manned Satellite Program," NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C.

[20]United States Air Force, "White Paper on the Air Force Manned Military Space Program," Military Records Center, National Archives and Records Administration.

within the framework of the total national space program."[21]

Accordingly, several programs were aimed towards realizing a human military space program. The first was a cooperative program with NASA to fly the X-15 research aircraft. Several flights reached above 50 nautical miles in altitude (about 93 kilometers), the USAF recognized point at which space began. The highest military flight was by pilot Robert White at 314,750 feet (59 miles or 96 kilometers). The Air Force awarded four of its pilots in the program—William Knight, Michael Adams, Joe Engle, and Robert Rushworth—astronaut wings. This upset NASA officials, and for 40 years, NASA did not recognize any of its X-15 pilots as astronauts, although NASA pilot Joe Walker had exceeded 62 miles (the official definition of where space begins at 100 kilometers). In 2005, NASA recognized all the NASA pilots – Walker, John McKay, Bill Dana – who had exceeded the 50 mile altitude as astronauts, and the USAF had always recognized theirs.[22]

In addition, USAF pursued the X-20 Dyna-Soar, a military space plane to be launched atop a newly developed space launch vehicle. The Air Force believed that the X-20 would provide long range bombardment and reconnaissance capability by flying at the edge of space and skipping off the Earth's atmosphere to reach targets anywhere in the world. Begun on 15 October 1957, although the program may be traced directly to the Bomi (skip-glide space bomber project) and Robo glider (manned hypersonic bomber) programs of the early 1950s; the Air Force intended to use the Titan IIIC to launch its space plane.[23] This winged, recoverable spacecraft did not possess as large a payload as NASA's capsule-type spacecraft and was always troubled by the absence of a clearly defined military mission. Several problems were apparent. First, the difficulty of defining the military mission separate from that of NASA proved a challenge. At some level, there were many possibilities and it was difficult to separate them from those of NASA. Second, the technical capabilities of Dyna-soar made determining on a specific mission out of the many envisioned very difficult.

Accordingly, in September 1961 Defense Secretary Robert S. McNamara questioned whether Dyna-Soar represented the best expenditure of funds. This resulted in numerous studies of the program, but in 1963 McNamara cancelled the program in favor of a separate human spaceflight program, the Manned Orbiting Laboratory (MOL). This military space station, known as Gemini-B, would be launched into orbit aboard a Titan IIIM vehicle that used seven-segment solids and was human-rated that went by the name of Blue Gemini. As an example of the seriousness with which the Air Force pursued the MOL program, the third Titan IIIC test flight boosted a prototype aerodynamic mockup of the MOL laboratory into orbit. It was as close as MOL would come to reality. The new military space station plan ran into numerous technical and fiscal problems, and

United States leaders supported the Space Shuttle not on its merits, but on the image it projected.

[21]Ibid.

[22]Dennis R. Jenkins, *Hypersonics Before the Shuttle: A Concise History of the X-15 Research Airplane* (Monographs in Aerospace History, NASA SP-2000-4518, 2000), pp. 61, 67, 117.

[23]As the weight and complexity of Dyna-Soar grew, it quickly surpassed the capabilities of the Titan II and was switched to the Titan III. Just before the program was canceled it looked like weight growth had outclassed even the Titan IIIC and plans were being made to use Saturn IBs or other boosters.

in June 1969 the Secretary of Defense, Melvin R. Laird, informed Congress that MOL would be canceled.[24]

Military space policy analyst Paul Stares summarized the fallout from the loss of the X-20 and MOL programs upon the Air Force during the 1960s:

> With the cancellation of the Dyna-soar and MOL, many believed in the Air Force that they had made their "pitch" and failed. This in turn reduced the incentives to try again and reinforced the bias towards the traditional mission of the Air Force, namely flying. As a result, the Air Force's space activities remained a poor relation to tactical and strategic airpower in its organizational hierarchy and inevitably in its funding priorities. This undoubtedly influenced the Air Force's negative attitude towards the various ASAT modernization proposals put forward by Air Defense Command and others in the early 1970s. The provision of satellite survivability measures also suffered because the Air Force was reluctant to propose initiatives that would require the use of its own budget to defend the space assets of other services and agencies.[25]

Even so, the next major effort involved persuading NASA to alter its Space Shuttle concept and to include a military mission in its planning scenarios in the 1970s.[26]

The Department of Defense and NASA's Space Shuttle

After Apollo, the human element of the United States civil space program went into a holding pattern as nearly a decade passed. During that time, the space program moved from its earlier heroic age to one that may be characterized as a "routinization" of activities, perspectives, and processes; it was an institutionalizing of critical elements from a remarkably fertile heroic time into something much more mundane not at all unlike that analyzed by longshoreman philosopher Eric Hoffer in *The True Believer*.[27]

During the 1970s, the Space Shuttle became the "sine qua non" of NASA, intended as it was to make spaceflight routine, safe, and relatively inexpensive. Although NASA considered a variety of configurations, some quite exotic, it settled on a stage-and-one-half partially reusable vehicle with an approved development price of $5.15 billion. On 5 January 1972, President Nixon announced the decision to build a Space Shuttle. He did so for both political reasons and for national prestige purposes. Politically, it would help a lagging aerospace industry in key states he wanted to carry in the next election, especially

[24]Roy F. Houchin III, "Air Force-Office of the Secretary of Defense Rivalry: The Pressure of Political Affairs in the Dyna-Soar (X-20) Program, 1957-1963," *Journal of the British Interplanetary Society* 50 (May 1997): 162-68; Matt Bacon, "The Dynasoar Extinction," *Space* 9 (May 1993): 18-21; Roy F. Houchin III, "Why the Air Force Proposed the Dyna-Soar X-20 Program," *Quest: The Magazine of Spaceflight* 3 (Winter 1994): 5-11; Terry Smith, "The Dyna-Soar X-20: A Historical Overview," *Quest: The Magazine of Spaceflight* 3 (Winter 1994): 13-18; Roy F. Houchin III, "Interagency Rivalry: NASA, the Air Force, and MOL," *Quest: The Magazine of Spaceflight* 4 (Winter 1995): 40-45; Donald Pealer, "Manned Orbiting Laboratory (MOL), Part 1," *Quest: The Magazine of Spaceflight* 4 (Fall 1995): 4-17; Donald Pealer, "Manned Orbiting Laboratory (MOL), Part 2," *Quest: The Magazine of Spaceflight* 4 (Winter 1995): 28-37; and Donald Pealer, "Manned Orbiting Laboratory (MOL), Part 3," *Quest: The Magazine of Spaceflight* 5, No. 2 (1996): 16-23.

[25]Paul B. Stares, *The Militarization of Space: U.S. Policy, 1945-1984* (Cornell University Press, 1985), p. 242.

[26]Dwayne A. Day, "Invitation to Struggle: The History of Civilian-Military Relations in Space," in John M. Logsdon, gen. ed., *Exploring the Uniontown: Selected Documents in the History of the U.S. Civil Space Program, Volume II, External Relationships* (NASA SP-4407, 1996), pp. 233-70.

[27]Eric Hoffer, *The True Believer: Thoughts on the Nature of Mass Movements* (Harper & Row, 1951), pp. 3-23, 137-55. See also, Max Weber, "The Pure Types of Legitimate Authority," in *Max Weber on Charisma and Institution Building: Selected Papers*, ed. S. N. Eisenstadt (University of Chicago Press, 1968), p. 46.

in California, Texas, and Florida.[28] Supporters – especially Caspar W. Weinberger, who later became Reagan's defense secretary – argued that building the shuttle would reaffirm America's superpower status and help restore confidence, at home and abroad, in America's technological genius and will to succeed.

This was purely an issue of national prestige. As Weinberger wrote in August 1971, not approving the shuttle "would be confirming in some respects, a belief that I fear is gaining credence at home and abroad: that our best years are behind us, that we are turning inward, reducing our defense commitments, and voluntarily starting to give up our superpower status, and our desire to maintain world superiority." Weinberger appealed directly to the prestige argument by concluding, "America should be able to afford something besides increased welfare, programs to repair our cities, or Appalachian relief and the like." In a handwritten scrawl on Weinberger's memo, Richard Nixon indicated "I agree with Cap."[29]

The prestige factor belies a critical component. United States leaders supported the Space Shuttle not on its merits, but on the image it projected. That included NASA, whose leaders viewed it central to the agency's long-term welfare, but also some key figures in the DOD who recognized the Space Shuttle as a means of finally reaching the goal of military personnel going into space for military purposes. That military mission, as it came to coalesce around the new Space Shuttle in the 1970s, took as its raison d'être the deployment of reconnaissance and other national security payloads into low-Earth orbit (LEO). As such, the DOD and the intelligence community insisted that the shuttle's orbiter be designed so that it had a cross-range maneuvering capability to meet requirements for lift-off and landing at the same location after only one orbit. This would enable great flexibility in deploying those space assets into orbit, while masking their trajectories from the Soviet Union. Moreover, the payload bay of the Space Shuttle, so often viewed as excessive for most mission requirements, needed its 15 (4.6 meters) x 60 (18.3 meters) feet dimensions to satisfy DOD and intelligence community planners that it would accommodate national security payloads. Without those design modifications to support the military space program, the DOD would have probably withheld monetary and political support from the project. In essence, NASA embraced a military mission for the Space Shuttle program as a means of building a coalition in support of an approval that might not have been approved otherwise. In return, military astronauts would fly on classified missions in LEO. Most of those missions were for the purpose of deploying reconnaissance satellites but what else might have been accomplished on them is unknown in the non-classified world.[30]

[28]George M. Low, NASA Deputy Administrator, Memorandum for the Record, "Meeting with the President on January 5, 1972," 12 January 1972, NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C. The John Erlichman interview by John M. Logsdon, 6 May 1983, NASA Historical Reference Collection, emphasizes the political nature of the decision. This aspect of the issue was also brought home to Nixon by other factors such as letters and personal meetings. See Frank Kizis to Richard M. Nixon, 12 March 1971; Noble M. Melencamp, White House, to Frank Kizis, 19 April 1971, both in Record Group 51, Series 69.1, Box 51-78-31, National Archives and Records Administration, Washington, DC.

[29]Caspar W. Weinberger, Memorandum for the President, via George Shultz, "Future of NASA," 12 August 1971, White House, Richard M. Nixon, President, 1968-1971, NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C.

[30]Dwayne A. Day, "Invitation to Struggle: The History of Civilian-Military Relations in Space," in John M. Logsdon, gen. ed., *Exploring the Uniontown: Selected Documents in the History of the U.S. Civil Space Program, Volume II, External Relationships* (NASA SP-4407, 1996), p. 264; Alfred C. Draper, Melvin L. Buck, and William H. Goesch, "A Delta Shuttle Orbiter," *Astronautics & Aeronautics* 9 (January 1971):

It might be easy to underestimate the national security implications of the Space Shuttle decision and the desire of some in the DOD to gain a military astronaut foothold that facilitated it. But, this goal seems to be critical to DOD support. Caspar Weinberger was the key to the movement of the Space Shuttle through the White House, and he believed the shuttle had obvious military uses and profound implications for national security. "I thought we could get substantial return" with the program, he said in a 1977 interview, "both from the point of view of national defense, and from the point of view [of] scientific advancement which would have a direct beneficial effect."[31] He and others also impressed on the president the shuttle's potential for military missions. John Erlichman, Nixon's senior advisor for domestic affairs, even thought it might be useful to capture enemy satellites, a mission that would require military astronauts in effect "lassoing" those satellites during extra-vehicular activities (EVAs) and bringing them into the shuttle payload bay for return to Earth.[32] The Soviet Union, which built the Buran in the 1980s and flew it without a crew only one time, pursued a shuttle project as a counterbalance to the United States program solely because they were convinced that the United States shuttle was developed for military purposes. As Russian space watcher James Oberg concluded: "They had actually studied the shuttle plans and figured it was designed for an out-of-plane bombing run over high-value Soviet targets. Brezhnev believed that and in 1976 ordered $10 billion of expenditures. They had the Buran flying within ten years and discovered they couldn't do anything with it."[33]

…key figures in the DOD… recognized the Space Shuttle as a means of finally reaching the goal of military personnel going into space for military purposes.

After a decade of development, on 12 April 1981, the Space Shuttle *Columbia* took-off for the first orbital test mission. It was successful and after only the fourth flight in 1982, President Ronald Reagan declared the system "operational." In keeping with plans developed in the Carter administration of the latter 1970s, the Space Shuttle would thereafter carry all U.S. government payloads; military, scientific, and even commercial satellites could all be deployed from its payload bay.[34] To prepare for this, in 1979, Air Force Secretary Hans Mark created the Manned Spaceflight Engineer program to "Develop expertise in manned space flight and apply it to Department of Defense space

26-35; Charles W. Mathews, "The Space Shuttle and its Uses," *Aeronautical Journal* 76 (January 1972): 19-25; John M. Logsdon, "The Space Shuttle Program: A Policy Failure," *Science* 232 (30 May 1986): 1099-1105; Scott Pace, "Engineering Design and Political Choice: The Space Shuttle, 1969-1972," M.S. Thesis, MIT, May 1982; and Harry A. Scott, "Space Shuttle: A Case Study in Design," *Astronautics & Aeronautics* 17 (June 1979): 54-58;

[31]Caspar W. Weinberger interview by John M. Logsdon, 23 August 1977, NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C.

[32]Jacob E. Smart, NASA Assistant Administrator for DOD and Interagency Affairs, to James C. Fletcher, NASA Administrator, "Security Implications in National Space Program," 1 December 1971, with attachments, James C. Fletcher Papers, Special Collections, Marriott Library, University of Utah, Salt Lake City, UT; James C. Fletcher, NASA Administrator, to George M. Low, NASA Deputy Administrator, "Conversation with Al Haig," 2 December 1971, NASA Historical Reference Collection, NASA History Division, NASA Headquarters, Washington, D.C.

[33]James Oberg, "Toward a Theory of Space Power: Defining Principles for U.S. Space Policy," p. 5, 20 May 2003, copy of paper in possession of author.

[34]The standard work on the shuttle and its operational history is Dennis R. Jenkins, *Space Shuttle: The History of the National Space Transportation System, the First 100 Missions* (Dennis R. Jenkins, 2001, 3rd Edition),

missions." In all, between 1979 and 1986 this organization trained 32 Navy and Air Force officers as military astronauts.[35]

Even so, the shuttle soon proved disappointing. By January 1986 there had been only 24 shuttle flights, although in the 1970s NASA had projected more flights than that for every year. Critical analyses agreed that the shuttle had proven to be neither cheap nor reliable, both primary selling points, and that NASA should never have used those arguments in building a political consensus for the program. The space shuttle's much-touted capabilities had not been realized. It made far fewer flights and conducted far fewer scientific experiments than NASA had publicly predicted.[36] Its national security possibilities, however, remained intact. The DOD flew missions as needed to deploy its assets and conduct other activities in Earth orbit with military astronauts.

Through the middle part of the 1980s, the DOD remained committed to supporting it for military purposes. The Air Force paid for the construction of the *Discovery* orbiter, and began building Space Launch Complex (SLC) 6 at Vandenberg Air Force Base, California, in 1979 (having been approved in 1974) for the launch of polar orbital flights. Furthermore, it negotiated with NASA an annual launch rate of 40 missions from the Kennedy Space Center with 20 from Vandenberg. This proved a ridiculous number of launches, but it pointed up the optimism of human spaceflight program as envisioned at the dawn of the Space Shuttle program.[37]

Any plans the DOD might have harbored for human spaceflight were dashed with the loss of *Challenger* during launch on 28 January 1986.[38] One of the results of this was the removal from the shuttle of all commercial and national security payloads and the reinvigoration of the expendable launch vehicle production lines. It became another instance of the DOD seeking a military human mission that eventually went awry.

This quest for military astronauts did not end there. In 1986, the DOD established a formal Military Man in Space (MMIS) Program to oversee efforts to ensure that a human military presence remained in space. They then undertook several experiments aimed at demonstrating the utility of humans in orbit in observation. As only two examples of military astronaut activity, Terra View took place on a shuttle flight where military astronauts observed the ground and reported observations of military interest. Additionally, in Terra Scout, Astronaut LTC Jim Voss and Payload Specialist CW3 Tom Hennen, aboard STS-44 in November 1991, used the Spaceborne Direct View Optical System (SPADVOS) to view terrestrial targets.[39] Since the beginning of the Space Shuttle flight program, the DOD has flown a myriad of payloads on the vehicle.

Also, in the 1980s, DOD began work, along with NASA, on a single-stage-to-orbit (SSTO) vehicle for military purposes. If there is a

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[35]USAF Fact Sheet 86-107, "Manned Spaceflight Engineer Program," 1986; Michael Cassutt, "The Manned Spaceflight Engineer Program," *Spaceflight*, January 1989, p. 32.

[36]Roger D. Launius, "The Space Shuttle—Twenty-five Years On: What Does it Mean to Have Reusable Access to Space?" *Quest: The History of Spaceflight Quarterly* 13, No. 2 (2006): 4-20.

[37]Dwayne A. Day, "Invitation to Struggle: The History of Civilian-Military Relations in Space," in John M. Logsdon, gen. ed., *Exploring the Uniontown: Selected Documents in the History of the U.S. Civil Space Program, Volume II, External Relationships* (NASA SP-4407, 1996), pp. 265-66.

[38]By far, the best work on the *Challenger* accident is Diane Vaughan, *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA* (University of Chicago Press, 1996).

[39]"Army Space Reference Text," chapter 9, http://www.fas.org/spp/military/docops/army/ref_text/chap09.htm (accessed 19 February 2010); "Astronauts begin Military Observation Experiences (aboard the Space Shuttle Atlantis)," *Defense Daily*, 27 November 1991.

"holy grail" of spaceflight it is the desire for reusable SSTO technology, essentially a vehicle that can take-off, fly into orbit, perform its mission, and return to Earth landing like an airplane. This is an exceptionally difficult flight regime with a myriad of challenges relating to propulsion, materials, aerodynamics, guidance, and control. Fueled by the realization the Space Shuttle could not deliver on its early expectations, DOD leaders pressed for the development of a hypersonic space plane. With the beginning of the administration of Ronald Reagan, and its associated military buildup, Tony DuPont, head of DuPont Aerospace, offered an unsolicited proposal to the Defense Advanced Research Projects Agency (DARPA) to design a hypersonic vehicle powered by a hybrid integrated engine of scramjets and rockets. DARPA program manager Bob Williams liked the idea, and funded it as a "black" program code-named "Copper Canyon" between 1983 and 1985. The Reagan administration later unveiled it as the National Aerospace Plane (NASP), designated the X-30. Reagan called it "a new Orient Express that could, by the end of the next decade, take-off from Dulles Airport and accelerate up to twenty-five times the speed of sound, attaining low earth orbit or flying to Tokyo within two hours."[40]

The NASP program initially proposed to build two research craft, at least one of which should achieve orbit by flying in a single stage through the atmosphere at speeds up to Mach 25. The X-30 would use a multicycle engine that shifted from jet to ramjet and to scramjet speeds as the vehicle ascended burning liquid hydrogen fuel with oxygen scooped and frozen from the atmosphere.[41] After billions spent, NASP never progressed to flight stage. It finally ended in 1994, trapped as it was in bureaucratic politics and seemingly endless technological difficulties.[42]

Yet, elements of the DOD remain committed to this mission to the present. Throughout the 1990s, a succession of studies argued for the potential of military personnel in space. One 1992 study affirmed:

> It is absolutely essential for the well being of today's space forces as well as the future space forces of 2025, that DOD develop manned advanced technology space systems in lieu of or in addition to unmanned systems to effectively utilize military man's compelling and aggressive warfighting abilities to accomplish the critical wartime mission elements of space control and force application. National space policy, military space doctrine and common sense all dictate they should do so if space superiority during future, inevitable conflict with enemy space forces is the paramount objective. Deploying military man in space will provide that space superiority and he will finally become the "center of gravity" of the U.S. space program.[43]

Another analysis found 37 reasons why military personnel in space would be required

[40]Ronald Reagan, "State of the Union Address," 4 February 1986, see http://www.c-span.org/executive/transcript.asp?cat=current_event&code=bush_admin&year=1986 (accessed 29 December 2009).

[41]Larry Schweikart, "Command Innovation: Lessons from the National Aerospace Plane Program," in Roger D. Launius, ed., *Innovation and the Development of Flight* (Texas A&M University Press, 1999), pp. 299-322.

[42]Carl H. Builder, "The NASP as a Time Machine," RAND Internal Note, August 1989, copy in possession of author; Roger Handberg and Joan Johnson-Freese, "NASP as an American Orphan: Bureaucratic Politics and the Development of Hypersonic Flight," *Spaceflight* 33 (April 1991): 134-37; Larry E. Schweikart, "Hypersonic Hopes: Planning for NASP," *Air Power History* 41 (Spring 1994): 36-48; and Larry E. Schweikart, "Managing a Revolutionary Technology, American Style: The National Aerospace Plane," *Essays in Business and Economic History* 12 (1994): 118-32.

[43]Daniel L. Hansen, "Exploration of the Utility of Military Man in Space in the Year 2025," NASA report 1992STIN, 9318267H, March 1992.

in the future, ranging from problem-solving and decision-making, to manipulation of sensors and other systems. It concluded that "A military space plane could play a key role in helping the United States Air Force transform itself from an air force into an aerospace force."[44] Yet another study found: "Our National Security Strategy must take full advantage of the full political, economic, and military power of this nation to be successful. That means soldiers, sailors, and airmen able to operate in every region of the world critical to national security, whether it is on land, at sea, in the air, or in space. A strategy built on anything less is incomplete and shortsighted."[45] The rationale for a military astronaut rests largely on the human flexibility of offering judgment, experience, and decision-making capabilities not present with machines. "There is no way that a price tag can be placed on such characteristics as flexibility or serendipity because the essence of these attributes is the ability to capitalize on the unanticipated or unknown," concluded one study.[46] According to some reports, DOD developed a space plane named "Blackstar" and began flying missions as early as 1990.[47] Notwithstanding these speculations, it is obvious the decision made initially by Eisenhower to split the civil and military space programs and to assign the human mission to the civil side remains difficult for some in the DOD to accept. It represents one instance, among many, in which a continuum between cooperation and competition has taken place in the interrelationships between the civil, military, and national reconnaissance space programs.

A military space plane could play a key role in helping the United States Air Force transform itself from an air force into an aerospace force.

Is There a Military Human Spaceflight Mission on the Horizon?

There has been both cooperation and competition between the civil and military space programs over the years relative to the role of humans in space. In a succession of recent studies ranging from the Air Force Science Board's "New World Vista" in 1995 to the Rumsfeld commission's 2001 analysis of national security space issues, the DOD persistently sought to find a role for humans in space.[48] While this has waned somewhat, there remains sporadic expressions of interest from military officials in favor of the development of systems for military human missions in space.[49] Indeed, as robotic technologies have improved, the trend has been away from placing humans in harm's way in favor of other options. The rise of unmanned aerial

[44]Maj. David M. Tobin, "Man's Place in Space-Plane Flight Operations: Cockpit, Cargo Bay, or Control Room?" *Airpower Journal* 13 (Fall 1999): 50-65, quote from p. 62.

[45]Lt. Col. Joseph A. Carretto Jr., "Military Man in Space: Essential to National Strategy," Executive Research Project, Industrial College of the Armed Forces, National Defense University, NDU-ICAF-95-S3, April 1995, p. 47.

[46]Air Force Space Command study, "The Utility of Military Crews in Space," 1985, quoted in Theodore Wierzbanowski, "Manned vs. Unmanned: The Implications to NASP," AIAA-90-5265 paper, presented at AIAA Second International Aerospace Planes Conference, 1990, Orlando, FL, p. 10.

[47]William B. Scott, "USAF's Top Secret Two-Stage-to-Orbit Manned 'Blackstar' System," *Aviation Week & Space Technology*, 5 March 2006, http://www.aviationnow.com/avnow/news/channel_awst_story.jsp?id=news/030606p1.xml (accessed 19 February 2010).

[48]United States Air Force Scientific Advisory Board, *New World Vistas: Air and Space Power for the 21st Century* (USAF Scientific Advisory Board, 1995); and Donald H. Rumsfeld, et al., *Report of the Commission to Assess United States National Security Space Management and Organization* (Government Printing Office, 2001).

[49]See, for example, John Tirpak, "In Search of Spaceplanes," *Air Force Magazine*, December 2003.

vehicles (UAV) piloted from the remote sites in the 1990s was driven by the desire to limit crew exposure to harm, while increasing loiter time over target areas. The success of UAVs in carrying out missions that had formerly required flight crews has emboldened DOD executives to advance this type of technology for all future weapons systems.[50] In such an environment, whatever desires that still exist in favor of piloted military space vehicles have less possibility of achieving this goal than even a few years earlier. At a sublime level, human military pilots appear to be a twentieth century and not a twenty-first century priority.

…the military may create a Space Corps of Engineers. Its forces may expand to every location where humanity establishes a presence... It may serve as the peacekeepers and the law enforcers.

This is especially the case because rationales supporting human spaceflight are overall quite controversial even as they are sometimes passionately held – mostly resting on arguments of national prestige, rather than practical applications – and there does not seem to be much possibility of this changing in the near-term.[51] Of course, one could make the observation that since the end of the Cold War many of the historic policy options, of which the assignment of the United States human spaceflight mission to NASA is one, needs to be revisited. Reassigning that mission, or a portion of it, to the DOD might become a possibility should the space agency suffer another disaster on the order of the *Challenger* and *Columbia* shuttle accidents, or if enemies pursued a human presence in space, although this is unlikely in terms of policy options.

More likely, is a scenario in which military astronauts will enter space in a manner similar to what soldiers excelled at throughout the first century-and-a-half of the United States republic: exploring, extending, and protecting the frontier. The United States Army explored the American West, kept order on the frontier, and opened the region to colonization. The frontier army pushed the line of occupation far beyond the settlements that would have resulted otherwise. It raised crops, herded cattle, cut timber, quarried stone, built sawmills, and performed the manifold duties of pioneers in addition to its peacekeeping mission. It also restrained lawless traders, pursued fugitives, ejected squatters, maintained order, and served as the primary interface with the Native Americans. In this latter role, it was more benevolent than remembered in popular conception. This was largely peaceful work, with the military catalyzing the processes of territorial expansion and national development. The military outposts on the frontier also served as cash markets for early settlers and as centers of exploration, community building, and cultural development. In the past, the military accomplished these tasks in the American West; in the future, it might well do so in space.[52] This is a far different approach to "military men in space" than has been argued for thus far, but once there is a true space frontier the military will be required to be

[50]Michael J. Hirschberg, "To Boldly Go Where No Unmanned Aircraft Has Gone Before: A Half-Century of DARPA's Contributions to Unmanned Aircraft," AIAA 2010-158, 48th AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition, Orlando, Florida, 4-7 January 2010.

[51]Roger D. Launius, "Compelling Rationales for Spaceflight? History and the Search for Relevance," in Steven J. Dick and Roger D. Launius, eds., *Critical Issues in the History of Spaceflight* (NASA SP-2006-4702, 2006), pp. 37-70.

[52]For an outstanding explanation of this process, see Francis Paul Prucha, *The Sword of the Republic: The United State Army on the Frontier, 1783-1846* (Macmillan, 1969).

there just as in the past. How far into the future this might take place is an open question, but it will undoubtedly happen if the United States continues to pursue human space exploration and development.

This would amount to a significant a role for the United States military in space as any other that might be envisioned. In the nineteenth century, it conducted exploration, as with the Lewis and Clark Expedition, and its civil engineering efforts, led by the United States Corps of Topographical Engineers and the United States Army Corps of Engineers, proved remarkably significant in opening the West.[53] In the twenty-first century, the military may create a Space Corps of Engineers. Its forces may expand to every location where humanity establishes a presence, especially on the Moon. It may serve as the peacekeepers and the law enforcers. It may preserve American interests against any who might seek to subvert them. Withal, the military presence may well help to open a frontier beyond Earth in the same way that it did on the North American continent earlier. But before those possibilities emerge, there remains only a modest likelihood of the need for military personnel in space.

Conclusions

At the time when the United States is reconsidering its next steps in the human exploration and development of space, it bears considering this possibility for the future of military astronauts. What will take place in the near-term is very much a matter of yet to be resolved. Federal entities will certainly play a key role. Will they, however, continue to dominate or are there heightened prospects for commercial activities first in LEO and ultimately beyond? If it is the latter, then the prospects for military human space missions expand exponentially as a means of keeping order in this new regime.

This may become the new future for space exploration if Congress accepts the Obama Administration's approach. If it does, the false starts of the past could be replaced by what is envisioned as "A new era of Innovation and Discovery." This new direction and change is more than just semantics. It proposes a major shift in the way in which the United States government approaches human spaceflight. Simply put, it represents a paradigm shift in space exploration. In this new approach, NASA will return to its roots as a research and development organization to develop the transformational technologies, while private industry will operate the systems built. Turning LEO over to commercial entities, as in the classic 1968 feature film *2001: A Space Odyssey*, could allow the withdrawal of government operators out of this arena, allowing them to concentrate on regulatory, military, and oversight roles. In this environment, there is an important place for the peacekeeping function of a frontier, a natural mission for the DOD requiring a human spaceflight capability.[54]

[53]This story is magnificently told in the Pulitzer Prize-winning book by William H. Goetzman, *Exploration & Empire: The Explorer and the Scientist in the Winning of the American West* (Random House, 1966).

[54]I made this case in Roger D. Launius and G. Michael Green, "New Vision for NASA," *Florida Today*, 14 February 2010.