

A Humans to Mars: A Political History

Louis Friedman, Feb 2018

Abstract

<u>President</u>	<u>Proposal/Initiative</u>	<u>Result</u>
Kennedy	Apollo: Race Soviets to the Moon, No Mars Connection	Success - Concluded
Johnson		
Nixon	Space Task Group's Mars Goal rejected	Shuttle program
Ford		
Carter		No "high challenge" goal
Reagan	<ol style="list-style-type: none"> 1. Space Station – No Mars Connection 2. U.S.-U.S.S.R. Summit – Consideration of joint Mars mission in context of broad peace and disarmament negotiations. Gorbachev intent to propose 	<ol style="list-style-type: none"> 1. Development delayed to Clinton Administration post-Soviet engagement 2. Foundered on issue of SDI testing in space as a weapons issue
Bush 41	SEI: Back to the Moon and on to Mars	nothing
Clinton	<ol style="list-style-type: none"> 1. Rejected Mars Goal 2. Engage Russians in ISS 	Shuttle-Mir, Built the ISS, no Mars connection
Bush 43	Vision for Space Exploration - Moon, Mars and Beyond	Constellation program only with Moon goal
Obama	<ol style="list-style-type: none"> 1. Cancel Constellation 2. Human to Mars goal with Asteroid first step 	ARM Mission development, Journey to Mars program formulated
Trump	<ol style="list-style-type: none"> 1. Cancel ARM – stops Journey to Mars 2. Back to Back to the Moon 	

Introduction

Mars is the only other world we can reach that has the basic stuff of life – atmosphere and water. It beckons us both as a possible place with extinct or even extant life and also as the most likely place where humans could evolve as a multi-planet species. The literature of Earth is replete with stories containing the visions.ⁱ

Sending humans to Mars has been a goal of space exploration since before the space age. In the space age that goal has remained constant, but mostly implicit – never resulting in any flight development and only in the last Administration (Obama) was it a specific program objective. When first suggested by Wernher von Braun in 1948ⁱⁱ he imagined it could be done in 1965 (17 years hence). 21 years later, in 1969, the same year as Apollo first Moon landing, von Braun published an updated and more detailed plan imagining launches beginning in 1981 (12 years hence). This led to the first political initiative for a human Mars mission goal for the American space program – a proposal to President Nixon.ⁱⁱⁱ

This paper reviews the political history of the humans to Mars mission goal in NASA. It does not review the technical history^{iv} – the many mission studies conducted by and for NASA over the years. Many of these were *wish fostering the thought*, others were generated as part of program initiatives or budgetary proposals, and others were generated as intellectual exercises of what *could* be done if only.... No attempt is made here to capture or review those technical studies; our focus is only on what has led to serious political consideration of the human Mars goal. Since that goal has in one way or another driven NASA in three of the last four Administrations we hope that it will offer guidance on how to proceed or not with its further consideration. Ironically, we will conclude that none of those three Administrations came close to a real political initiative and that the closest we ever come to a political decision for humans to Mars was in the Reagan Administration, even though they, themselves, didn't really consider it.

The table above (our abstract) summarizes the consideration of a human Mars mission goal in each of the space age Administrations. We note the following:

1. All three human spaceflight programs: Apollo, shuttle, ISS, were approved without reference to Mars.
2. One project, the shuttle, was a *negative* decision – the lowest level option offered and the only option that did not mention Mars(see below).

3. The other two projects, Apollo and the ISS were positive decisions, but they were made independently of benefits or value to the space program.
 - a. Apollo was conducted for geopolitical positioning of the American way of life vs. that of communism.
 - b. The ISS was developed to provide funds to and engagement with Russia (particularly its aerospace and defense industries).
4. The Mars goals enunciated by George H.W. Bush^v, George W. Bush and Barack Obama resulted in no hardware development of serious flight planning for any Mars mission.
 - a. That of George H.W. Bush (the Space Exploration Initiative) resulted in nothing.
 - b. That of George W. Bush^{vi} (Constellation) resulted in a Moon-only project with no Mars component. That project was cancelled.
 - c. That of Barack Obama^{vii} (Journey to Mars) resulted in development of a first step mission to a piece of an asteroid placed in orbit about the Moon. That mission was cancelled.
 - d. All three programs were not sustained beyond the Administrations that proposed them.

Another conclusion that jumps out from this review of the political initiatives is that Mars is hard; and that faced with budget cutbacks or program exigencies, they have fallen back on something easier: the shuttle in the case of the Nixon Administration Space Task Group, and the Moon in the case of both Presidents Bush. Obama's stayed true to Mars but began developing cis-lunar activities in a proving ground that NASA said was necessary before developing flight systems for Mars.^{viii} Getting humans to Mars even in a mature space age is a harder job than was getting humans to the Moon in a new one.

That last statement is a technical conclusion. It seems counter-intuitive to realize that getting to the Moon in 10 years from a cold start with no space program or plan in place was easier than getting to Mars now in (say) 20 years after a half century of developing space systems flying everywhere and having flown five successful missions with eight landers¹ to the Martian surface. But we have not flown humans as far as the Moon, or even beyond low Earth orbit, since Apollo and we have never developed capability for self-sustained human spaceflight for more than a few weeks, let alone for the years that would be necessary for a Mars flight. And the hardest technical

¹ Viking (2), Pathfinder/Sojourner, Mars Exploration Rovers (Spirit, Opportunity), Phoenix, Mars Science Laboratory (Curiosity)

problem, landing on Mars with human-scale vehicles, still remains to be studied. The steps to Mars are many and no program to date has approved even the first one.

As hard as are the technical issues, the political ones are harder. Let's look at the specific initiatives:

Richard Nixon – The Space Task Group

1969 was the year of the first Moon landing – and the year we won the race to the Moon. That may be its forever remembrance (like 1492) but at the time it wasn't the dominant event in our country's political life. That would be the Vietnam War. Its cost in money, in lives and in national psyche dominated the news and the politics of the time. It is hard to believe now, but Apollo was not a broadly popular program even as Americans swelled with pride at its accomplishment.^{ix} Furthermore, Apollo and the race to the Moon was a Kennedy legacy, not even a Johnson one, and certainly not a Nixon one. He had lost the 1960 election to Kennedy and had no connection to the space program or Apollo. Budget pressures were enormous – Lyndon Johnson had pursued "guns and butter," politics trying to pay for both the increasing costs of war and a boldly progressive agenda of social programs. But inflation was now up to 6% and the budget chickens had come to roost. Nixon, continuing the war, was determined to decrease domestic spending. He did not want to dismantle NASA, but neither did he want to give it anything big to follow Apollo.

But still there was the question of "where next?" or at least "what next?" for NASA. NASA Administrator Thomas O. Paine, a holdover from the Johnson Administration was lobbying for a bold new destination: Mars. He was a visionary who believed that the big goal would drive all aspects of science and technology for NASA and for the country. George Mueller, the head of the manned (as it was called then) spaceflight program at NASA advocated a reusable space shuttle that could help construct and service a space station that in turn would lead to developing long duration human flight capability for Mars. Nixon convened a Space Task Group under Vice-President Spiro Agnew (the space program is traditionally under the purview of the Vice-President – another sign of its secondary political importance.) The Group naturally included NASA (Paine) the Secretary of the Air Force Robert Seamans, the President's Science Advisor, Lee DuBridge and the head of the Bureau of the Budget, Robert Mayo. Paine was zealous in his advocacy and convinced Agnew to make the big humans to Mars goal the prime recommendation. The final recommendation stated, "As a focus for the

development of new capability, we recommend the United States accept the long-range option or goal of manned planetary exploration with a manned Mars mission before the end of this century as the first target.” (30 years hence). Others were not as enthusiastic and forced inclusion of lesser options, basically those program steps recommended by George Mueller. Nixon wanted no part of a visionary, budget-busting initiative and not surprisingly selected the lowest level option: the space shuttle, with no commitment to follow on missions. Thus ended the first political initiative for humans to Mars. About this option (Option III in the following) the Space Task Report said “Options II and III illustrate a decision to maintain funding initially at recent levels and then gradually increasing. These options are identical with the exception that Option II includes a later decision to launch a manned planetary mission in 1986 and in Option III this decision is deferred. Both options demonstrate the effect of simultaneous development of the Space Transportation System and earth orbital space station module...” Option I was the rejected Mars goal option. Option II “deferred” the Mars goal decision until 1986 (i.e. for 16 years!) and Option III never mentioned it. Also of note is that even the lowest option (III) included building the space shuttle and its destination space station concurrently.^x Nixon selected Option III but very quickly dropped the space station component, leaving NASA building a vehicle without a destination. His Administration also scaled back the shuttle almost as soon as it was approved – giving up the planned fully reusable capability. Also cancelled during this time were the last three missions of the Apollo Program, Apollo 18, 19 and 20.²

Ronald Reagan – A Joint U.S.-U.S.S.R Manned Mars Mission

Ronald Reagan may have been the most pro-space President in U.S. history, although it was never part of his political campaigns. From the outset of his Presidency he believed the space program needed to be revitalized and more strongly supported. His predecessor Jimmy Carter had supported the space shuttle but specifically ruled out any new “high-challenge engineering initiative.” Reagan was open to them – and he was fortunate to become President just as the space shuttle was making its first flights, overcoming the development delays and providing the country with a new sense of space

² The robotic Viking mission was in development during this time and did fly two successful landing missions with launches in 1975. Gerald Ford was President by this time (finishing the term of Nixon after the latter’s resignation). Ford was in no position to be a space visionary, but notably in a congratulatory phone call to then NASA Administrator after the Viking landings he did ask, “What are plans for Viking 3?” Instead of saying something like, “Thank you Mr. President, we do indeed have a vision for Mars including with humans and will submit plans to you,” Fletcher said nothing.

achievement. NASA however realized that without a space station the space shuttle had little purpose. They had been working on space station concepts ever since the Nixon Administration had turned it down a decade earlier. Under Reagan they were emboldened to make a strong pitch to the Administration and Congress to approve a new start for it.

Almost all of Reagan's advisors opposed the NASA initiative, but Reagan was an optimist and in 1984 Reagan overruled them all and made it part of his State of the Union speech.^{xi xii} He said, "A space station will permit quantum leaps in our research in science, communications, and in metals and lifesaving medicines which could be manufactured only in space. We want our friends to help us meet these challenges and share in their benefits."^{xiii} Notably, he said nothing about Mars or any exploratory goal. And he only "invited" international cooperation – that is, he did not tie the initiative to any international or geopolitical purpose. It was (in his words, at least) just for science – something that severely weakened its political consideration.³

Reagan had two space initiatives: one was the space station for NASA, the other (far bigger) was the Strategic Defense Initiative for the Department of Defense. It became known as Star Wars. He described his SDI vision in a speech the year before: "What if free people could live secure in the knowledge that their security did not rest upon the threat of instant U.S. retaliation to deter a Soviet attack; that we could intercept and destroy strategic ballistic missiles before they reached our own soil or that of our allies?...I am directing a comprehensive and intensive effort to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles."^{xiv} Ironically, it was the Defense initiative that led to a Humans to Mars proposal, not the civil, NASA initiative.

Star Wars was controversial from the git-go. Those opposing Defense budget increases and expensive weapons program objected. But substantial opposition came from the scientific community skeptical about the reality of the objective: building a shield that could protect the country with near 100% reliability from thousands of nuclear payloads was seen by them as a pipe dream – an expensive one. Furthermore it appeared to be in direct contradiction of both the anti-ballistic missile (ABM) treaty⁴ and a major change to the hitherto cornerstone of U.S. Defense Policy, that of Mutually Assured Destruction (relying on offensive retaliation, not defensive protection). Nonetheless, SDI was very important to

³ In fact, the Reagan Administration space station development never progressed beyond paper studies. Without the geopolitical purpose, it did not do much better under his successor George H.W. Bush, who also did not tie the space station to an exploration goal – not even to his Space Exploration Initiative (see below). It was not until the Clinton Administration tied it to financing post-Cold War Russian engagement that the International Space Station became a reality.

⁴ A point recognized by President Reagan in his speech when he cited the ABM treaty and years later by President George W. Bush when he pulled the U.S. out the treaty.

Reagan – despite and because of (simultaneously) his abhorrence of nuclear weapons. His vision wasn't more weapons in space, his vision was rendering nuclear weapons impotent. This is not the place to debate whether SDI really would have reduced the threat of nuclear weapons, suffice it to say that most of the scientific community and certainly the Russians did not see it that way. This is important for us because it led both to the promotion of joint U.S. – U.S.S.R. manned (as it was then termed) Mars mission and to its ultimate failure.

Star Wars was proposed in 1983, during a time when Reagan called the Soviet Union the "evil empire," and frigid, hostile relations existed between the two countries. But just as Reagan's second term as President started, a sort-of revolution occurred in the Soviet Union: Mikhail Gorbachev succeeded three aging, stagnant Soviet leaders and began "perestroika" – a reconstruction of Soviet society toward liberalization, openness, democracy and peace. Reagan was inaugurated in January 1985, Gorbachev took over leadership in March, 1985 and by November 1985 the two were meeting in their first summit in Geneva, Switzerland. The two leaders developed a warm and respectful relationship, not so much as a result of policy but more as a result of their personalities and visions. Reagan wanted to end the threat of nuclear weapons; Gorbachev too, but also he was driven by the desire to reduce defense spending and deal with the teetering Russian economy. These personal motivations dominated the relationship between the two and the strategy at the four summits they held. The Soviets hated SDI because they saw it driving a new arms race with new spending on a weapons program the exact opposite of theirs (which was focused on overwhelming numbers and power of rockets). The Americans loved SDI for almost the same reason because it was a new high-technology approach that the Soviets could not keep up with. It was Gorbachev's economy concern vs. Reagan's nuclear arms race concern.^{xv}

After the 1985 summit the two sides maneuvered to position themselves as leaders of ending the arms race and reducing nuclear weapons. Both Reagan and Gorbachev had to deal with their internal military-industrial complexes, which included many players distrustful of the other side or even with vested interests in increasing nuclear and missile weapons. It took 11 months to follow up the Geneva summit, and even then it was a scaled-down, low-key event in remote Reykjavik Iceland, in October, 1986. But the meeting was a fast-paced one: held only 30 days after Gorbachev proposed the time and place, in facilities that were sparse and therefore facilitated personal meetings between the two leaders. As the meeting neared its end, without any substantive new agreements, the two men met privately to share their desire for a world of no nuclear weapons. Apparently they were on the verge of such an agreement^{xvi} when the Star Wars issue loomed up as the roadblock. Even when Gorbachev backed down and accepted a SDI research program with laboratory (but no space) testing, Reagan would not yield – he insisted that space testing of weapons was peaceful.^{xvii} In their private meeting the two leaders came very close to an historic no more nuclear weapons agreement,

but Reagan overestimated the value of Star Wars as a defensive weapon and Gorbachev overestimated it as a threat. Thus there was no agreement, something I will argue would have led to the geopolitical rationale for a joint Soviet-American Mars mission.

Both the American and Soviet advisors and bureaucratic officials, not to mention their military-industrial complexes, were appalled by the private meeting near-agreement. They walked back the positions of the two leaders so that by the time of their next summit, their idealistic no nuclear weapons position was off-the-table.^{xviii}

The U.S.-U.S.S.R. agreement to cooperate in space was a vestige of the Nixon era seeking détente with the Soviet Union. Initiated in 1972 as a five year, renewable, agreement in the aftermath of Apollo and the Moon Race it resulted in the two nations conducting joint missions in Earth orbit – the Apollo-Soyuz mission. Apollo was of course the American moon capsule, Soyuz was the Russian crew capsule intended for their Moon mission but now directed to support Earth orbital flights including development of a space station. The Soviet invasion of Afghanistan in 1979 led to a breakdown in relations between the two countries. The cooperative space agreement was a casualty, not renewed in 1982, as of course were the Olympics – the Moscow games boycotted by the U.S. in 1980 and the Los Angeles games by the Soviets in 1984. U.S.-Soviet cooperation in space was inhibited in the 1980s by government policies forbidding contacts and cooperation.^{xix}

There was another dynamic at play in the space programs of the two countries at that time – the disparity between the active Soviet planetary exploration program and the nearly moribund one in the U.S. The Soviets had just obtained the first pictures of the surface of Venus with a sophisticated synthetic aperture radar, a military technology that caught U.S. observers by surprise. Then they redirected their planned Venus balloon atmospheric mission to fly-by Venus and intercept Halley's Comet – a stunning first of both orbital dynamics and mission planning. The Soviets led a world-wide armada of spacecraft to Halley's Comet – missions from the European Space Agency and Japan joined theirs; but there was no U.S. mission. The Russians had a Mars program with planned missions to orbit Mars and land on Phobos and another to deliver a rover (and/or balloon) to land on Mars. The U.S. had no program. The Reagan Administration in 1981 proposed to cancel the planetary exploration program altogether and explicitly rejected any mission to Halley's Comet.^{5 xx} The U.S. was also hamstrung by the tragic space shuttle Challenger accident in 1986. Naturally American scientist began to turn to the Soviet Union, seeking opportunities to fly payloads and participate in their active exploration program. As the American planetary program withered, the Soviet

⁵ This may seem inconsistent with Reagan's pro-space vision and support for the shuttle and space station. But they were "manned" programs which unfortunately at that time was all that interested the politicians or aerospace industry. Rather than being inconsistent it was directly casual – space money was needed for the manned program and in their view, science space ventures could wait.

program, heralding the Gorbachev revolution of perestroika and glasnost, began to open up.

The Planetary Society (led by Carl Sagan, Bruce Murray and myself) made international cooperation a major objective, both to enhance the opportunities for increased planetary exploration and as an end to advance the geopolitical significance of the space program. In 1984 we organized a private meeting of American and Soviet planetary scientists to discuss ways to cooperate.^{xxi} In 1986 we provided public and media access to the Soviet Venus-Halley mission, the first time a Soviet mission had been conducted in public. Also in 1986 we employed the emerging technology of video-conferencing to provide a three hour conference among influential leaders in both countries. That was condensed to a one-hour Public Broadcasting TV Special, *Together to Mars*.^{xxii} The participants discussed openly the newly emerging opportunity for a joint Human to Mars mission as a peaceful initiative to ease Cold War tensions and as an alternative to military rivalry.^{xxiii}

During this same time, U.S. Senator Spark Matsunaga, principally with his staff assistant, Harvey Myerson, began developing an initiative for an International Space Year^{xxiv} which included the objective of a joint Soviet-American Mars mission.^{xxv} The Senator's interest was not in space, it was instead in creating a peaceful engagement of the superpowers as an alternative to military actions. A collation of space science advocates on the one hand and international cooperation advocates on the other began to build toward the political goal of a joint human mission to Mars. With Reagan and Gorbachev now actively negotiating arms reductions and sharing a vision of international cooperation the advocates believed they might now have a receptive audience. Reagan and Gorbachev held two summits within six months – December 1987 in Washington, May 1988 in Moscow. As noted, these summits walked back the heady goal of abolishing nuclear weapons that Reagan and Gorbachev had at Reykjavik but they did result in the Strategic Arms Reduction Treaty (START) more limited but still very important step in arms reduction. The two leaders never could resolve their SDI positions – Reagan insisted on continuing its development up to and including space testing. Gorbachev caved on the issue of its development, but only to the point of going along with research and laboratory testing, insisting on no space weapons and no space testing. Had that difference been overcome, there seems to have been a good chance the Mars mission might have made it into policy as a peaceful alternative for space cooperation. Reagan's team might have used it as a proof of the space cooperation they were proposing even with SDI, and Gorbachev's team wanted it as an alternative to SDI.

The political breadth of a joint Mars mission goal to reach the international agenda was demonstrated by The Planetary Society in its "Mars Declaration." Gathering over 100,000 signatures including with notables from the political, military, social,

cultural, academic and industrial worlds,⁶ it was published in a full-page advertisement in the Washington Post in the days just prior to the Moscow summit.^{xxvi} We hoped to influence positive consideration at the summit. But, all that was said there was, “they [Reagan, Gorbachev] also agreed to expand exchanges of space science data and of scientists, to enhance the scientific benefit that can be derived from the two countries’ space research missions. They noted scientific missions to the Moon and Mars as areas of possible bilateral and international cooperation.”^{xxvii} Was it actually discussed at the summit? A post-summit memorandum of the leaders’ conversation states that Gorbachev “wished to give the President his proposal for joint statement language on Mars... preparation and implementation of a manned mission to Mars.”^{xxviii} Gorbachev had signaled that a joint American-soviet Mars mission was indeed in his 1988 summit plans.^{xxix}

Roald Sagdeev (who was a science advisor to Gorbachev on the 1987 and 1988 Soviet summit delegations) tells an anecdote that further documents Gorbachev’s agenda: when President Reagan visited the Kremlin during that 1988 summit trip, Gorbachev remarked, as they passed by relics of great Czarist projects, that the current Soviets had the capability for another great project: a joint human mission to Mars. But Reagan did not take the bait.^{xxx} The intransigent positions on SDI may have prevented the joint Mars mission consideration.⁷

This is as close as humans to Mars has ever come to serving a geopolitical purpose.

George H.W. Bush – The Space Exploration Initiative

On July 20, 1989, commemorating the 20th anniversary of the Apollo 11 landing on the Moon, President Bush announced, “... a long-range continuing commitment. First, for the coming decade, for the 1990s, Space Station Freedom⁸, our critical next step in all our space endeavors. And next, for the next century, back to the Moon, back to the future, and this time, back to stay. And then a journey into tomorrow, a journey to another planet, a manned mission to Mars. Each mission should and will lay the groundwork for the next.”^{xxxi} He was deliberately invoking a Kennedy-like tone and setting Kennedy-like goal for back to the Moon and on to Mars. A National Space Council was reconstituted under Vice-

⁶ The diversity of the initial signatories of the Declaration was striking, including: liberals and conservatives; Democrats and Republicans; high-ranking Army, Navy, Air Force and Marine officers, and leaders of peace groups; astronauts and religious leaders; politicians and poets; Nobel Laureates and football coaches; ambassadors, university presidents and former presidential science advisors; former Cabinet and sub-cabinet officers; leaders of industry and labor; and every Administrator of the National Aeronautics and Space Administration since its founding, except for the [then] present incumbent.

⁷ I have found no documentation or discussion whether President Reagan ever responded to this proposal, or whether an American position on it was ever prepared. I await John Logsdon’s forthcoming book on Reagan’s space policies to see if there is an answer.

⁸ “Freedom” was the initial name given to the Space Station by the Reagan Administration, a counter-point to the Russian station named Mir (Peace or World). But “Freedom” morphed into the International Space Station when the two countries merged their human space programs.

President Dan Quayle and through them NASA was tasked to perform a 90-day (!) study of what would be required to carry out this mandate. NASA at first termed the program, the Human Exploration Initiative.^{xxxii}

Subsequently the program was promoted at Mission from Planet Earth and then finally the Space Exploration Initiative. Despite these several formulations the program never gained political traction nor significant Congressional funding. The program was criticized with having insufficient rationale and tagged with a \$300-\$500 billion cost.^{xxxiii} The political failure of SEI is generally attributed to the very high cost estimates, totally inconsistent with existing budget plans and projections, and to an internecine warfare between the National Space Council and NASA about the basic approach to developing the initiative.^{xxxiv}⁹ These factors did contribute to the failure of the initiative but they are secondary to the primary cause – the lack of political rationale for SEI. This was strongly and presciently pointed out by the Blue Ribbon Discussion Group brought in by the Space Council to review SEI's 90 day study in Nov. 1989¹⁰, which concluded, "Without a more compelling justification for the initiative, the administration would be unlikely to gain long-term public and congressional support for the undertaking."^{xxxv}

This is the heart of it: a human Mars goal is so big that to sustain it requires a compelling geopolitical rationale transcending any transient political or national objective and certainly transcending any aerospace or science purpose. In fact (as was borne out in SEI and in later human exploration goal proposals) any major human space project requires a geopolitical rationale.

SEI began withering away first with the lack of budget support in the Bush Administration, then with the rather widespread criticism from reviewers like the Office of Technology Assessment, the National Research Council and the Blue Ribbon Discussion Group, then with the National Space Council forcing NASA Administrator Dick Truly's resignation (and replacing him with Dan Goldin) and finally with Bush's loss of the 1992 election to Bill Clinton.

Bill Clinton – The International Space Station

As Bill Clinton took office in January 1993, the development of Space Station Freedom, proposed by President Reagan, supported by President Bush and featured as the first step in the latter's Space Exploration Initiative, was in deep trouble. It had suffered several redesigns and major increases in its cost estimate. Congressional support was weak – the House Appropriations Committee recommended its cancellation and in June 1993 was barely

⁹ Basically NASA developed a plan characterized as "business as usual," requiring a huge increase in budget. The Space Council was seeking approaches based on new technologies, new ways of doing business with reduced costs and broader public-private participation.

¹⁰ The Group included notables such as Sen. (and former Apollo astronaut) Harrison Schmitt, Edward Teller, former Apollo 11 astronaut Michael Collins, former NASA Administrator Thomas Paine and Planetary Society President Carl Sagan and Vice-President, Laurel Wilkening.

approved by the House – with a one vote margin.^{xxxvi} Unlike both his immediate two predecessors, Bill Clinton as President had no apparent interest in a major space exploration goal for the country. But like them, he had a great interest in engaging the Russian military-industrial complex in a major aerospace project.

Bringing Russia into the Space Station (already an international project with U.S. leadership, involving Europe, Japan and Canada) began under George H.W. Bush just as the Soviet Union collapsed. They were motivated by a need to help keep the Russian aerospace industry viable and not selling out to nations and rogue elements that might be hostile to the West (particularly Iran.) Bush started cooperation in the U.S. and Russian human spaceflight programs with a commitment to fly each other's' astronauts and to dock the U.S. space shuttle with the Russian Mir space station.^{xxxvii}

Engaging the Russians with post-Cold War cooperative, peaceful projects was important to the Clinton Administration. It began as they prepared for the Clinton-Yeltsin summit in April 1993 where the idea of merging the two nations' human spaceflight programs was discussed. By September the Russia was formally invited as a full partner into the newly named and about to be newly designed International Space Station.^{xxxviii} The results were dramatic: (i) increased popular interest in human space flight accompanying the shuttle-Mir dockings; (ii) reduction in U.S. costs and technical requirements by incorporating Russian space modules and transportation into the design; (iii) increased political support as a result of the international purpose added to the rationale – the House vote one year after the one vote margin, passed the space station by over 100 votes; and (iv) a wide-ranging series of strategic and space cooperation agreements continuing through the 1990s.^{xxxix}

It is not the point here to describe all of this space cooperation or to delve any more deeply into the ISS development. We are concerned here strictly with the political history of the human to Mars mission goal. Mars played no part in the Clinton Administration space policy.¹¹ In fact, humans to Mars was a negative in the Clinton Administration. They cancelled space station capabilities required for long-duration Mars missions (such as a planned centrifuge and closed loop ecological life support) and went along with a Congressional resolution banning the spending of funds on human Mars mission development. The space station is cited only to underline the

¹¹ Except of robotic (science) Mars missions – largely due to non-political initiatives of NASA Administrator Dan Goldin, who restructured a “cheaper, faster, better” Mars program following the loss of the Mars Observer in 1993.

emphasis of the central theme of this paper: human spaceflight initiatives require an overriding geopolitical purpose in their rationale. The space station would never have been built without it.

George W. Bush - Constellation

George W. Bush was being plagued by “the vision thing,” a perceived lack of vision for a President, as he readied his campaign for a second term in 2004¹². His proposal to “return to the Moon by 2020... with the goal of living and working there for increasingly extended periods of time,”^{xi} seemed to many to be a response to that – to show a sense of vision.^{xli} In fact, it was quickly named, “Vision for Space Exploration.” A greater motivation, however, was to react to the loss of the Columbia space shuttle, and the lives of its seven astronauts, with a renewed commitment to space exploration. The announcement came just 11 months after the Columbia tragedy and only two weeks after the exciting landing of the Mars Exploration Rover, Spirit. The project to implement the Vision was Constellation – with a new launch vehicle (Ares) and set the lunar goal for landings by 2020. No significant Mars objectives were set and the Mars goal was only mentioned as something eventual.^{xlii}

The project was well underway but suffered both the usual cost estimate increases and much more unusual significant program delays. Within 5 years (in 2009) after a critical review by a commission headed by Lockheed Martin Chairman, Norm Augustine^{xliii}, in which the program was deemed “unsustainable,” with a lunar mission not possible before 2028 and an actual landing totally uncertain, the program was cancelled by the Obama Administration. As with his father’s SEI Program 15 years earlier, the “back to the Moon,” program declaration was followed by increasing costs, decreasing budgets and program delays. But most of all it lacked a sustainable (domestic or international) political rationale. It died within the Administration in which it was created.

Barack Obama – Journey to Mars

The Augustine Commission report left the incoming Obama Administration with little choice except to cancel Constellation. It could hardly endorse the unsustainable program of a predecessor nor continue it without any confidence in a flight program. Two months after the formal cancellation of Constellation, President Obama set out a new space plan, one that was to invest in the heavy-lift launch vehicle technology needed for humans to Mars, with human spaceflight goals of an asteroid mission in the mid-2020s, orbit Mars by the mid-2030s and finally followed by a human landing on Mars that he said, “I expect to be around to see it.”^{xliv} The

¹²¹²¹²¹²¹² Bush won his first term election by a razor-thin Supreme Court-challenged election in 2001 over Al Gore. It would be fun for Mars enthusiasts to pursue an alternate history of Gore winning that election. Gore had been Chair of the House authorizing committee for the space program, as a brief Presidential candidate in 1988 endorsed the joint Soviet-American Human Mars Mission goal, and under Clinton led the Gore-Chernomyrdin space cooperation negotiations and agreement. Might there have been a Gore-Putin Mars mission agreement?

asteroid interim objective became controversial when it was misinterpreted as an alternate goal of human space even though it was also part of the Constellation program in the same way – as an interim step for development of the interplanetary crew flight capability.^{xlv}

In Oct. 2016, President Obama doubled down on Mars, writing in a CNN Op-Ed, “We have set a clear goal vital to the next chapter of America's story in space: sending humans to Mars by the 2030s and returning them safely to Earth, with the ultimate ambition to one day remain there for an extended time.”^{xlvi} This is the first time a President personally set humans to Mars as a goal, with a timetable. But saying it, did not make it so.

NASA implemented the program under the name, Journey to Mars – emphasizing the human to Mars goal.^{xlvii} However the program had the same weakness of the two Presidents Bush human space goals – its political rationale was weak and narrow. The Asteroid Redirect Mission which would have enabled the human visit to an asteroid (albeit only a boulder from a larger asteroid) was immediately cancelled by the incoming Trump Administration and what next happens with the Journey or human Mars mission goal is unclear.

Trump – Back to Back to the Moon

On Dec 11, 2017, President Trump issued a new space policy^{xlviii} declaring, “It marks a first step in returning American astronauts to the Moon for the first time since 1972, for long-term exploration and use. This time, we will not only plant our flag and leave our footprints -- we will establish a foundation for an eventual mission to Mars, and perhaps someday, to many worlds beyond.” Currently this is only a statement of intent – no timetable or program plan is yet defined. It is a repeat of his two Republican predecessors’ policy, “back to the Moon, this time to stay.” Whether this time it is sustainable remains to be seen. Its political rationale (other than being anti-Obama) is not clear.

Conclusion

All human space flight initiatives since Apollo, except the International Space Station (ISS) lacked geopolitical purpose. All, except the space station, failed. The ISS had such a purpose– engage the post-Cold War Russian aerospace industry. The shuttle was not an initiative – it was the negative space decision after Nixon rejected all of the other initiatives. SEI, Constellation and Journey to Mars were domestic initiatives, not only without geopolitical rationale but even without a strong national purpose. None of them survived the Administrations that proposed them. Reagan’s space station did survive after his Administration, but only when it was given a geopolitical rationale by his successors. Thus my conclusion: Humans to Mars will never happen without serving a geopolitical purpose, i.e. without a geopolitical rationale. Reagan’s summits with Gorbachev with the goal of nuclear disarmament almost led to a Human to Mars space initiative. Because that us a

sustainable geopolitical rationale, I conclude that is the closest we have ever come to starting a human to Mars mission development.

Back to the Moon, does have a geopolitical rationale – serving Europe, Japan maybe Russia and maybe China with their human space flight goal of duplicating the American achievement of nearly 50 years ago. But is relegating the U.S. to a service role for other nations a sufficient and sustainable geopolitical rationale for our human space program?

There is another opening: as was the case during the Cold War, the world right now seems in urgent need of international cooperation. The Paris Climate Change agreement is an example. Such cooperation is out of vogue now in the U.S., our government is currently anti-treaties, anti-immigration, anti-U.N., pro-weapons and pro-belligerence; “America first.” But governments change and strong ideological ones usually breed strong counter-reactions and we can expect a new movement of international cooperation with interest in finding a great project that can bring peoples and nations together. Just as we said in The Mars Declaration 30 years ago: ...“we share a common vision of Mars as a historic, constructive objective for the technological ambitions of the human species over the next few decades.”^{xlix}

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