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Honours Dissertation

A Step Backwards: Nixon, Détente, and the American Space Program

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Contents

List of Abbreviations

ABM – Anti Ballistic Missile

ASTP – Apollo-Soyuz Test Project

BOB – Bureau of the Budget

CIA – Central Intelligence Agency

CNRC – Canadian National Research Council

DoD – Department of Defense

ELV – Expendable Launch Vehicle

ESA – European Space Agency

ESRO – European Space Research Organisation

ISS – International Space Station

LEO – Low Earth Orbit

MOL – Manned Orbiting Laboratory

MSFC – Marshall Space Flight Centre

NASA – National Aeronautics and Space Administration

NASC – National Aeronautics and Space Council

OMB – Office of Management and Budget

OMS – Office of Manned Spaceflight

OST – Office of Science and Technology

PACEO – President's Advisory Council on Executive Organisation

R&D – Research and Development

SALT I – Strategic Arms Limitation Treaty I

SRB – Solid Rocket Booster

SRQA – Safety, Reliability, and Quality Assurance Engineering

SSME – Space Shuttle Main Engine

STG – Space Task Group

STS – Space Transportation System

TISP – Teacher in Space Project

List of Illustrations

Introduction
"Goodbye Apollo"

"This may be the last time in this century that men will walk on the moon".[1]

Richard Nixon, 1972

During *Apollo 17's* return to Earth in December 1972, Richard Nixon informed the world that *Project Apollo* had concluded. Captain Eugene Cernan recalled that fellow *Apollo 17* astronaut Harrison "Jack" Schmitt reacted angrily to the President's speech: "Whoever wrote that speech blew it with that remark … it was a pure loss of will".[2] Nevertheless, Nixon's forecast did come true, and as of writing this dissertation, no human has returned to the Moon or even travelled beyond Earth's orbit for over fifty years. Although NASA's *Artemis* program aims to send humans back to the Moon in 2024, the frail nature of the manned United States space program since the 1970s is Nixon's ultimate space legacy.

Although not the first president to cut NASA funding, Nixon has come to personify the deterioration of U.S. spaceflight capabilities since *Project Apollo*. Assessment of Nixon's space policy is often centred around the inception of the Space Transportation System (STS), more commonly known as the Space Shuttle. While STS's difficulties hold an inextricable link with what historian Howard McCurdy called an "organisational decline" that has plagued NASA since the end of the Apollo program, it was far from the sole contributor.[3] Indeed, the loss of the Space Shuttle *Challenger* in 1986 emphasised a theme of operational regression that implicated NASA as a participant but not a founder. This dissertation argues that the regression that led to the *Challenger* accident is rooted in the Nixon administration's neglect of

[1] Richard Nixon, "Statement Following Lift-Off from the Moon of the Apollo 17 Lunar Module", in *The American Presidency Project*, (1972) available at [https://www.presidency.ucsb.edu/node/255022], accessed 5/12/2022.
[2] Harrison "Jack" Schmitt Quoted in David Meerman Scott and Richard Jurek, *Marketing the Moon: The Selling of the Apollo Lunar Program* (Massachusetts: MIT Press, 2014), p. 112.
[3] Howard E. McCurdy, "Organizational Decline: NASA and the Life Cycle of Bureaus", *Public Administration Review* 51, no. 4 (1991), p. 310. Available at [https://doi.org/10.2307/976746], accessed 5/12/2022.

NASA's civilian operations, instead prioritising the "signalling" value of space cooperation under the President's flagship policy – détente.[4] Détente was an era of increased diplomacy between the United States and the Soviet Union intended to thaw Cold War tension.[5]

Historians have traditionally considered Nixon's decision to approve the Space Shuttle a policy failure.[6] Indeed, the Nixon administration considered the Space Shuttle's reusability economically viable. However, a thorough understanding of Nixon's space decisions and legacy is lacking. John Logsdon's study, *After Apollo? Richard Nixon and the American Space Program* provides invaluable insight into Nixon's space policy. Logsdon claims it had "a much more lasting impact than John Kennedy's 1961 decision to go to the Moon".[7] Logsdon depicts Nixon as a space oppositionist, arguing that no program was given sufficient attention by his administration (an element of his study I will contest). The standard narrative presented by historians like Logsdon considers NASA's post-Apollo struggles to be a product of budget cuts and a reorganisation of national priorities. However, the role détente played in Nixon's space policy is overlooked in the standard narrative.

The "New Aerospace History" that emerged in the 1980s has acknowledged détente's role in space. It intended to professionalise the study of aerospace topics, departing from the "vehicle-centred, project-focused, scientifically internalist style of space history".[8] Thomas Ellis's study, "Howdy Partner! Space Brotherhood, Détente, and the Symbolism of the 1975 Apollo–Soyuz Test Project", focuses on the strategic

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[4] Alexander MacDonald, *The Long Space Age: The Economic Origins of Space Exploration from Colonial America to the Cold War* (New Haven: Yale University Press, 2017), p. 178.
[5] At the core of détente was the creation of a "structure of peace" which reduced tension and increased communication between the U.S. and Soviet Union. Also, Nixon intended to embrace multipolarity and integrate Chinese relations into détente. "Peace with the Soviet Union principally meant the reduction of the threat of nuclear war". Of course, at the core of this tension was the development of space technology to achieve this. See Henry Kissinger, *White House Years* (Boston: Little Brown, 1979), p. 530. See also Robert D. Schulzinger, "Détente in the Nixon-Ford Years 1969-1976", Melvyn P. Leffler and Odd Arne Westad (eds.), *The Cambridge History of the Cold War: Volume II Crises and Détente* (Cambridge: Cambridge University Press, 2010), pp. 373 – 394. Also see, Jittipat Poonkham, *A Genealogy of Bamboo Diplomacy: The Politics of Thai Détente with Russia and China* (Canberra: ANU Press, 2022), p. 5, available at [http://www.jstor.org/stable/j.ctv28x2bcj.4], accessed 19/4/2023.
[6] John M. Logsdon, "The Space Shuttle Program: A Policy Failure?" *Science* 232, no. 4754 (1986), p. 1099. [http://www.jstor.org/stable/1696261], accessed 1/11/2022.
[7] John M. Logsdon, *After Apollo? Richard Nixon and the American Space Program* (New York, Palgrave Macmillan, 2015), p. 1.
[8] Roger D. Launius, "Review of Realizing the New Aerospace History, by Alexander C. T. Geppert, Matthew H. Hersch, David P. D. Munns, Kendrick Oliver, Phil Tiemeyer, Peter J. Westwick, and William Deverell", *Historical Studies in the Natural Sciences* 44, no. 2 (2014), p. 188, available at [https://doi.org/10.1525/hsns.2014.44.2.187], accessed 8/12/2022.

and symbolic value of the *Apollo-Soyuz Test Project* (ASTP) in advertising U.S. commitment to détente. Despite this being the most comprehensive study of détente in space to date, Ellis focuses - almost exclusively - on the ASTP as a strategy of détente, thus, missing an opportunity to situate the event within Nixon's broader space policy and assess its implications.[9]

This dissertation examines détente's role in Nixon's broader space policy. It will explore the causal link between détente and NASA's political, organisational, and operational decline. The goal is not to invalidate the work of scholars of Nixon's space program but to reframe debates around détente. To what extent did détente supersede NASA's post-Apollo aspirations? Did adherence to détente facilitate NASA's decline?

This dissertation pins détente as the origin of NASA's organisational and operational decline. To adhere to détente was to oppose NASA's bold space projects, most notably, the exploration of Mars. Nixon's lack of commitment to NASA is visible through the abdication of presidential leadership that saw the agency proceed without a national goal and toward building a vehicle with no operational objectives in mind. It argues that Nixon's foreign policy agenda superseded space exploration and that neglecting NASA was a fatal error. Indeed, it resulted in a careless culture within NASA whereby the agency "placed its engineers and managers in an environment where ethical compromise would be the rule, not the exception".[10]

As operational chaos unfolded throughout NASA on the ground, Nixon surrendered the capabilities to leave the immediate vicinity of Low Earth Orbit (LEO). The discontinuation of the *Saturn V* rocket in 1971 put the brakes on NASA's operational capability beyond LEO. NASA only reclaimed the capability of launching beyond Earth orbit on November 16, 2022, with the launch of *Artemis I*. Just shy of the fiftieth anniversary since the final Apollo mission in December 1972, an uncrewed *Orion* capsule performed a fly-by of the Moon and safely returned to Earth.

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[9] Thomas Ellis, "Howdy Partner! Space Brotherhood, Détente, and the Symbolism of the 1975 Apollo–Soyuz Test Project", *Journal of American Studies*, 53, no. 3 (2018), p. 746, available at [https://www.researchgate.net/publication/321823902], accessed 5/12/2022.
[10] Rosa Lynn B. Pinkus et al. *Engineering Ethics: Balancing Cost, Schedule, and Risk - Lessons Learned from the Space Shuttle* (Cambridge: Cambridge University Press, 1997), p. 91.

Figure 1: Ground-level view of the 363-ft tall *Saturn V* on the crawler way (May 20, 1969).

Figure 2: *Artemis I* at Launch Complex 39-B at NASA's Kennedy Space Centre (June 14, 2022).

This dissertation is composed of three thematic chapters. Chapter one examines détente's centrality in Nixon's space program. It will deploy a series of memorandums, speeches, and autobiographical recounts to explain how détente received presidential prioritisation and superseded NASA's proposals. Such sources demonstrate how not only was détente prioritised by Nixon, but how its presence directly undercut NASA's planning process.

Chapter two explores the influence of détente on the erosion of NASA's political privilege. This chapter complicates a straightforward notion of NASA's struggles exclusively centred around budgetary regulation. Nixon revoked NASA's influence in U.S. politics through structural changes to space decision-making. In two of the committees established by Nixon between 1969 and 1972, the Office of Management and Budget (OMB), and the President's Advisory Council on Executive Organisation (PACEO), it is evident that there was a concerted effort to reduce NASA's political influence and keep the space program locked to détente. By examining the approval of the Space Shuttle program in 1972, this chapter will also consider how economic regulation represents just one side of Nixon's rationale for space exploration.

The final chapter focuses on the consequences of Nixon's decision to place détente at the core of his space program for NASA. It examines NASA's organisational and operational decline due to Nixon's policy. This chapter will frame the theme of decline through the design, development, and operations of the Space Shuttle. Also, this chapter will draw connections between Nixon's decisions, NASA's decline, and the Space Shuttle *Challenger* disaster.

In terms of chronological scope, analysing Nixon's space program in this way allows one to critically analyse the political process through which the post-Apollo space program was formed. Further still, it aids an understanding of the causal connection between Nixon's space policy and the decline of NASA. Nixon scholars convincingly show that he did not see the strategic benefit of space exploration and was anything but a space enthusiast. Also, it is known that the U.S. has, thus far, failed to eclipse the Moon landings. However, we have yet to see a study that examines the role Nixon and his policy of détente played in sinking NASA's capabilities after *Project Apollo*. This study opens up new debates surrounding this historiographical imbalance. Furthermore, in consideration of the fact that lunar exploration is once again hitting the headlines (as a stepping-stone to Mars), this study contributes toward explaining how NASA's inability to return to the Moon until now is a result of a step backwards under Nixon.

Chapter I

Détente in Space: The *Apollo-Soyuz Test Project* and Cold War "Signalling"

NASA's goal: "The preservation of the role of the United States as a leader [and] to demonstrate to a watching world that it is first in the field of technology and science."[11]

John F. Kennedy, 1961

During the Cold War, the United States utilised "signalling" as a critical tenet of its space program. When then-President John F. Kennedy announced *Project Apollo* in his Rice University speech in 1962, he emphasised the "signalling" value of space exploration, stating that America should pursue challenging space endeavours "because they are hard, [and] because that goal will serve to organise and measure the best of our energies and skills".[12] Kennedy believed that landing a man on the Moon would "signal" American supremacy in science and technology. This "signalling" strategy fused foreign policy and space exploration, setting a precedent for an expansive American space program in the 1960s. NASA's chief economist Alexander MacDonald defines the "signalling" concept of space exploration as "through costly action, you can credibly transmit information".[13] Thus, "signalling" was an essential and highly visual method of penetrating the façade of propaganda that had produced information asymmetry during the Cold War.

In 1961, Kennedy's Secretary of Defense Robert McNamara provided a deeper insight into the "signalling" value of space exploration:

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[11] John F. Kennedy, "Address in Los Angeles at a Dinner of the Democratic Party of California", (December 18, 1961), in *The American Presidency Project*, available at [http://www.presidency.ucsb.edu/ws/index.php?pid=8452], accessed 1/2/2023.
[12] John F. Kennedy, "Address at Rice University", (September 12, 1962), available at [https://www.rice.edu/kennedy#:~:text=We%20choose%20to%20go%20to%20the%20moon%20in%20this%20decade,to%20postpone%2C%20and%20one%20which], accessed 23/1/2023.
[13] MacDonald, *The Long Space Age*, p. 178.

> All large-scale space programs require the mobilisation of resources on a national scale. They require the development and successful application of the most advanced technologies. Dramatic achievements in space, therefore, symbolise the technological power and organising capacity of a nation. For reasons such as these, major achievements in space contribute to national prestige. This is true even though the scientific, commercial, or military value of the undertaking may, by ordinary standards, be marginal or economically unjustified.[14]

Indeed, "signalling" superseded other considerations for space exploration. The Moon shot was a large-scale "soft power" effort that sent an unmistakable signal to the Soviet Union of American preeminent technological power.[15] In an article in the *Saturday Evening Post* in 1962, after he had left office, former President Dwight Eisenhower stressed the significance of what he called the "prestige race" with the Soviet Union.[16] Eisenhower emphasised the symbolic value of achieving American hegemony in space.[17] As well as contributing to national prestige, achievements in space typified the true technological and organisational capabilities of the United States during the Cold War. From the beginning, therefore, "signalling" U.S. supremacy was the foundational motivation that drove the direction of the American space program in the 1960s.

This strategy galvanised NASA and, to an extent, flourished until the presidency of Richard Nixon. The space race reached a narrative high point shortly after Nixon entered the White House with the astounding success of the Moon landings in 1969. However, as historian Walter McDougall notes, after *Apollo 11*, there was a "space slump".[18] Historian Joan Hoff suggests that this slump occurred due to the spiralling cost of the Vietnam War, Lyndon B. Johnson's "Great Society" reform, and the social upheaval connected to them.[19] While this certainly played a

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[14] Robert McNamara, "Brief Analysis of Department of Defense Space Program Efforts", (April 25, 1961), Quoted in John M. Logsdon, *Exploring the Unknown: Selected Documents in the History of the U.S. Civilian Space Program*, Vol. 1, (Washington DC: NASA, 1995), P. 424, available at [https://www.google.co.uk/books/edition/Exploring_the_Unknown_Selected_Documents/50Y7AQAAMAAJ?hl=en&gbpv=0], accessed January 23/1/2023.
[15] Logsdon, *After Apollo?*, p. 281.
[16] Dwight D. Eisenhower, "Are We Headed in the Wrong Direction?", *Saturday Evening Post* (August 11, 1962), pp 19-25, available at [https://www.saturdayeveningpost.com/subscribe-to-issue/?issue=19620811], accessed 1/2/2023.
[17] Ibid.
[18] Walter A. McDougall, *The Heavens and the Earth: A Political History of the Space Age* (Baltimore: John Hopkins University Press, 1997), p. 159.
[19] The "Great Society" was a set of social welfare programs launched by Lyndon Johnson between 1964 and 1965. The objective was to eradicate poverty and racial injustice. Though the poverty numbers decreased, it was at a great economic expense to the federal government. See, Joan Hoff, "The

part, another factor merits scholarly attention. Nixon incorporated space policy into détente to signal to the Soviet Union America's commitment to cooperation – a flagrant alteration of the space program's galvanising purpose. By making détente the nucleus of American space policy, the post-Apollo civilian space program mainly experienced budget cuts and a lack of political prioritisation and presidential leadership.

This opening chapter will examine détente's influence on the post-Apollo space program. It will be influenced by pre-established themes in the New Aerospace History's engagement with détente. Jennifer Ross-Nazzal's "Détente on Earth and in Space", Roger Launius' "United States Space Cooperation and Competition", and Thomas Ellis' "Howdy Partner!" have deployed an internalist approach to studying détente in space – consolidating their argument around the ASTP. Thus, they opted not to extrapolate détente onto a broader understanding of the American space program. Indeed, détente's iconography was the symbolic ASTP in 1975; however, a comprehensive understanding of the ramifications of this policy approach for NASA is required to add another layer to this dense area of scholarship.

This chapter answers two questions: Firstly, why did Nixon construct the post-Apollo space program around détente? Secondly, and perhaps more importantly, did adherence to détente cause Nixon to reject almost all of NASA's post-Apollo proposals systematically, or was there another underlying motive? Those two questions are inevitably linked, yet as revealed in the upcoming chapters, the consequences of the answers to those questions were long enduring for NASA and the American space program.

Détente on Earth and in Space

To properly analyse détente's influence on the American space program, one must first understand the policy's fundamentals. In 1972, historian Stanley Hoffmann summed up the period of détente to be:

Presidency, Congress, and the Deceleration of the U.S. Space program in the 1970s", in Roger D. Launius, Howard E. McCurdy (eds.), *Spaceflight and the Myth of Presidential Leadership* (Chicago: University of Illinois Press, 1997), p. 93. See also, Elba K. Brown-Collier, "Johnson's Great Society: Its Legacy in the 1990s." *Review of Social Economy*, vol. 56, no. 3, (1998), pp. 259–76, available at [http://www.jstor.org/stable/29769955.], accessed 3/5/2023.

> Instead of relations of total enmity or total friendship, both inimical to diplomacy, there would again be those fluctuating mixes of common and divergent interest's characteristic of Eighteenth and Nineteenth Century European diplomacy. Ideology would not disappear, but its external effects would be neutralised: different political systems could coexist since beliefs would be disconnected from behaviour through voluntary or necessary restraint.[20]

In practical terms, as historian Dan Caldwell puts it, détente was a framework implemented by the Nixon administration to deal with multiple international problems simultaneously rather than on an "issue-by-issue ad hoc basis".[21] However, Caldwell explains that Nixon's détente was not just about easing tensions. Rather, détente, as Nixon saw it, was a "system-developing process" that would tie the U.S. and the Soviet Union together "in a web of interrelatedness".[22] Thus, Nixon changed the context surrounding space exploration to emphasise cooperation under détente.

Nixon started by manipulating the narrative surrounding the space program to reflect his overriding foreign policy philosophy. During his inaugural address in 1969, the president laid the foundations for a new era of space cooperation: "After a period of confrontation, we are entering an era of negotiation [...] As we explore the reaches of space, let us go to the new worlds together".[23] Indeed, the formative years of Nixon's presidency established a precedent that NASA would reluctantly – and sometimes disastrously – follow in the 1970s and beyond. The decision to decelerate the space program following détente established an era of terminal struggle for NASA's civilian space program that still permeates today.

The prevalence of détente influenced Nixon's entire space policy, and it lingered long after he left office. Indeed, Nixon's decisions precipitated broader themes of decline that would characterise the United States space program afterwards. Thus, it is essential to examine détente not as one facet of Nixonian space policy but through a broader lens. Nixonian détente was a strategy that superseded civilian space proposals and ingrained the Nixon administration as synonymous with

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[20] Stanley Hoffmann, "Will the Balance Balance at Home?", *Foreign Policy*, no. 7 (1972), p. 61, available at [https://doi.org/10.2307/1147754], accessed 17/4/2023.
[21] Dan Caldwell, "Détente in Historical Perspective." *International Studies*, no. 4 (1976), p. 19, available at, [http://www.jstor.org/stable/44234722], accessed 27/1/2023.
[22] Ibid.
[23] Richard Nixon, "Inaugural Address", (January 20, 1969), in *The American Presidency Project*, available at [https://www.presidency.ucsb.edu/documents/inaugural-address-1], accessed 23/2/2023.

the backwards nature of the post-Apollo space program. To do this, first, one must understand why space was such a valuable extension of détente.

What makes Nixon's space policy so unique is that it completely contrasted preceding policy approaches. Before Nixon, a comprehensive space program was approved and adequately supported to help the United States achieve its foreign policy objectives of beating the Soviet Union to the Moon to signal American supremacy. Under Nixon, the space program was decelerated and weaved into détente to send a very different signal to the Soviet Union of American preparedness to cooperate and not antagonise its Cold War competitor. Throughout his presidency, Nixon maintained his position on space exploration and remained invariably linked to international cooperation. Nixon called space an "unparalleled field for cooperation among nations".[24] This was because of the publicity space pursuits aroused. In 1972, the president reiterated the practical benefit of friendship between the United States and the Soviet Union that would be accelerated when a "Russian cosmonaut and an American astronaut will shake hands in space".[25] Space, Nixon intended, would serve as an arena where America could showcase the promise of détente.

The Apollo-Soyuz Test Project

The use of space as a visual symbol of détente occurred with the *Apollo-Soyuz Test Project* (ASTP) in July 1975. The ASTP was the first crewed international space mission that saw the United States *Apollo* spacecraft dock with a Soviet *Soyuz* capsule.

[24] "Foreign policy of United States", (1972), Government Papers, *The National Archives, Kew*, p. 67, available at [http://www.archivesdirect.amdigital.co.uk/Documents/Details/FCO 82_180], accessed 1/12/2022.
[25] Richard Nixon, “Radio Address on Foreign Policy”, (November 4, 1972), in *The American Presidency Project*, available at [http://www.presidency.ucsb.edu/ws/?pid=3692], accessed 27/2/2023.

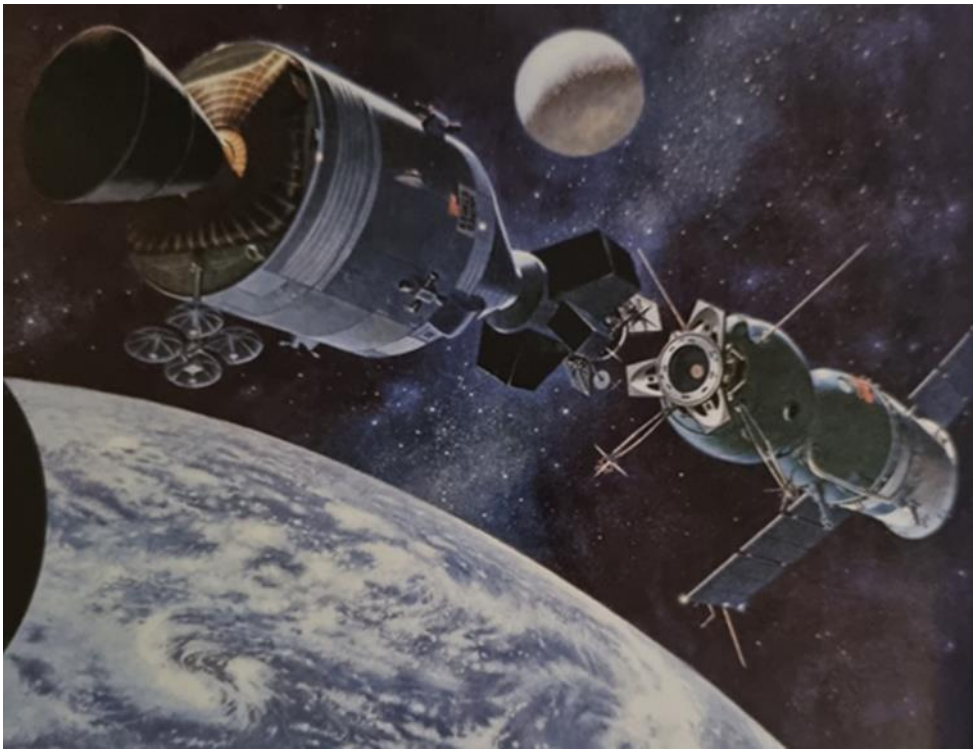

Figure 3: Concept art showing the *Apollo-Soyuz* rendezvous and docking in space.

An intense media and marketing campaign accompanied the ASTP to present a united image of the United States and the Soviet Union. *Apollo-Soyuz* branded products appeared on supermarket shelves throughout the U.S., demonstrating an alliance through space exploration.

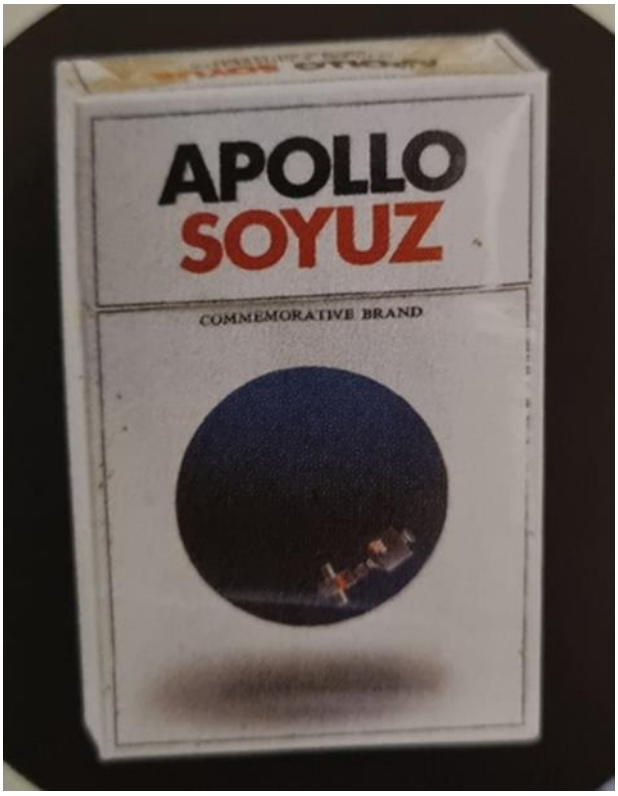

Figure 4: *Apollo-Soyuz* cigarettes manufactured as part of joint venture between U.S. cigarette manufacturer Phillip Morris and the Soviet Yava cigarette factory.

The mission's technical purpose was to test the compatibility of orbital rendezvous and docking systems; however, its foundational and fundamental purpose was to exhibit the promise of détente and U.S.–Soviet cooperation on Earth and in Space. Despite taking place after Nixon had resigned over the Watergate scandal, the roots of this joint mission lay firmly in his rhetoric and determination to build the space program around cooperation and then present it to the world.

For the most part, *Apollo 11* characterised Nixon's first year, but during this time, he started orchestrating what he intended to be his space legacy, the ASTP. Indeed, one of Nixon's first decisions regarding space was to have well-respected *Apollo 8* Commander Frank Borman, as part of his trip to Russia in early July 1969, sound out the possibility of space cooperation.[26] In his autobiography, Borman recalls how Nixon deployed him as an "opening wedge" for a joint mission.[27] The speediness of Nixon in setting up such a meeting reveals his prioritisation of a joint space venture. Sounding out a joint mission was, as Borman notes, "the most

[26] Logsdon, *After Apollo?*, p. 86.
[27] Frank Borman with Robert J. Serling, *Countdown: An Autobiography* (New York: Silver Arrow Books, 1988), p. 237.

important aspect of my visit".[28] Borman also found Nixon "totally sincere and absolutely dedicated" to détente.[29] Nixon's eagerness to sound out Soviet reciprocity for the mission that would become the ASTP indicates that the primary concern for Nixon in space was "signalling" the practical promise of détente and, as Thomas Ellis puts it, establishing a US-Soviet "space brotherhood" that "transcended ideological boundaries".[30]

The importance of open dialogue and cooperation was not lost on the Nixon administration, who were cautious of antagonising the Soviet Union. Nixon's Chief of Staff Harry R. Haldeman noted in his private diary on July 14, 1969, that after a meeting with Frank Borman following his positive meeting with the Soviets regarding the ASTP, Borman advised against playing the national anthem with the placement of an American flag on the moon because of the "possible adverse reaction about over-nationalism".[31] That would undermine the early efforts to organise a joint mission. Instead, to amplify America's commitment to the ASTP, Nixon sent NASA director Thomas Paine and a NASA delegation to Moscow for face-to-face meetings with the Soviet Academy of Sciences to discuss the technicalities of the proposed mission.[32] Of course, to situate the ASTP at the core of NASA operations was to deviate from NASA's plans during this period. Nixon eroded all hopes of a bold program by positioning détente and space cooperation at the centre of NASA's post-Apollo space program.

The ASTP epitomises the first backwards step of the American space program. The mission brought the curtain down on the space race and, at the same time, (although not at all obvious at the time) marked the end of NASA's hopes for a "fast-paced space effort".[33] Thus, eradicating the conditions and context for the rapid technological innovation synonymous with NASA in the 1960s. The Moon shot was more than a political smokescreen; it had a transformative global impact on

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[28] Borman, *Countdown*, p. 237.
[29] Ibid.
[30] Thomas Ellis, "Why Can't We Be Friends?" The 1975 Apollo-Soyuz Test Project as a Flawed Blueprint for US-Soviet Cooperation, p. 4, available at [https://www.academia.edu/33943788/_Why_Cant_We_Be_Friends_The_1975_Apollo_Soyuz_Test_Project_as_a_Flawed_Blueprint_for_US_Soviet_Cooperation], accessed 2/12/2022.
[31] Harry R. Haldeman, *The Haldeman Diaries: Inside the Nixon White House* (New York: Berkley Books, 1995), pp, 85-86, available at [https://archive.org/details/haldemandiaries00hrha/page/84/mode/2up], accessed 30/1/2023.
[32] Ellis, "Why Can't We Be Friends?", p. 5.
[33] Logsdon, *After Apollo?*, p. 125.

technological and scientific innovation. However, the ASTP, as MacDonald notes, "featured no fundamentally new operational or technological knowledge".[34] The intended signal the ASTP transmitted was that America was committed to détente and space cooperation. However, at the same time, it signalled that in the spirit of cooperation America was putting the brakes on its rapid scientific and technological expansion that had made *Project Apollo* possible. The chair of the House Space Committee, Olin Teague, conceded that the ASTP was "strictly a political, psychological effort".[35] In this view, the signalling theory provides insight into the conditions surrounding the decision-making process of the post-Apollo space program.

NASA's Ambitions Fall on Deaf Ears

Upon entering the White House, Nixon cancelled the remaining three Apollo missions, *Apollo 18, 19*, and *20*. The president was also in favour of cancelling *Apollo 16* and *17* and had to be dissuaded by the OMB director Casper Weinberger who warned Nixon of the risks of signalling that the U.S. space program had concluded:

> It [cancelling *Apollo 16* and *17*] would be confirming a belief that I fear is gaining credence both at home and abroad: That our best days are behind us, that we are turning inward, and starting to give up our super-power status.[36]

Weinberger understood the importance of space to the nation, and that stopping would signal that America was abandoning its hegemony. Weinberger's intervention captures the clash between prestige and cooperation during the Nixon presidency. While Nixon conceded that cancelling *Apollo 16* and *17* was unwise, his written response, "OK" was, as Logsdon notes, symbolic of his disinterest in nationalistic space missions.[37] Logsdon further assesses Nixon's space policy as he notes that space was not very high on the president's policy agenda; "I do not give a damn about space. I am not one of those space cadets".[38] Although this is useful, I would nuance his assessment. Space was not very high on Nixon's policy agenda unless it reflected or enhanced détente. Nixon demonstrated his intent to establish a

[34] MacDonald, *The Long Space Age*, p. 192.
[35] Olin Teague quoted in Ibid, p. 193.
[36] Casper Weinberger, "Memorandum for the President: Future of NASA", (August 12, 1971), available at [https://www.thespacereview.com/archive/535.pdf], accessed 20/1/2023.
[37] Logsdon, *After Apollo?*, p. 287.
[38] Conversation 10, Tape 471 (March 24, 1971), *Richard Nixon Presidential Library* (RNPL), in Ibid, p. 284.

joint mission early into his presidency but did not demonstrate the same commitment to NASA's independent project proposals.

One such proposal swiftly rejected by the Nixon administration was an expedition to Mars. Renowned rocket scientist Wernher Von Braun urged NASA to continue to pursue an aggressive space program. In his view, the most fitting destination was Mars, which he cautiously forecasted for 1982.[39] Indeed, the colonisation of Mars was long alluring to NASA; however, as Von Braun acknowledged, it was a financially and technologically intensive project that may be out of reach.[40] Indeed, NASA's budget had been reducing year-on-year since 1965. However, it had always remained sufficient to preserve the success of Apollo.[41] A Mars program would have required an enormous financial commitment from the Nixon Administration.

Upon entrance to the White House, Nixon ordered a review of NASA's post-Apollo operations – the Space Task Group (STG) conducted this review. *The New York Times* called the STG report "a blurred vision of the future" because it suggested Nixon announce projects for the distant future instead of the present.[42] The STG report, as Logsdon notes, was a blow to NASA's Mars plan that NASA director Thomas Paine had personally nurtured since his first meeting with Nixon in February 1969.[43] The proposed cost of a Mars mission (essential to stress here that the empirical data used to calculate the economic and technological cost was unrealistic) was around $7-10 billion by the end of the 1970s, levelling out at $5 billion in the 1980s.[44] Indeed, the STG was concerned over the economic cost of such a vast undertaking. As such, their recommendation was to declare a Mars mission "before the end of the century," thus removing Nixon's responsibility of overseeing the technicalities of such a mission.[45] However, Nixon himself had no interest in a Mars mission. As important as the economics of a Mars mission were about the

[39] Wernher Von Braun. "AFTER APOLLO, WHAT?", *The Science Teacher* 36, no. 6 (September 6, 1969), p. 24, available at [http://www.jstor.org/stable/24151316], accessed 27/1/2023.
[40] Ibid.
[41] Hoff, "The Presidency", p. 92.
[42] John Noble Wilford, "Soft Deadline for a Trip to Mars" *The New York Times* (September 21, 1969), in Logsdon, *After Apollo?*, p. 82.
[43] Logsdon, *After Apollo?,* p. 55.
[44] Leonard Garment, *Crazy Rhythm: My Journey from Brooklyn, Jazz, and Wall Street to Nixon's White House, Watergate, and beyond…* (New York: Random House, 1997), p. 152.
[45] "The Post-Apollo Space Program: Directions for the Future", (September 1969), in Logsdon, *Exploring the Unknown*, pp.522-43.

financial uncertainty in America at the turn of the decade, there is one largely absent assessment of the rejection of Mars – the signalling factor.

If the United States were to pursue a resource-intensive and massive economic and nationalistic goal, it would directly undercut Nixon's policy of détente and signal that America intended to press on with a vast nationalistic space program. Thus, Nixon had at least two reasons to discard Mars; it was economically unjustifiable due to the situation at home (Vietnam and a weak economy), and its very financial and operational vastness was unjustifiable under détente and a turn away from nationalistic space pursuits. Historian Andrew Jenks notes that extensive programs could "hasten the demise of détente".[46] When viewed through the lens of détente, the rejection of Mars as America's leading post-Apollo space project is seen differently – to preserve the promise of cooperation.

A Mars Mission was one of many proposals that NASA put forward. Mars was the culmination of a large project that started with a large orbital station that would be routinely accessible via a reusable Space Shuttle. The decision to discontinue production of *the Saturn V* complicated matters regarding an orbital station since it was the only vehicle capable of transporting heavy cargo to a high orbit. Instead, a smaller station – Skylab – was approved as it was cheap since it could be built from repurposed Apollo hardware.[47] The Cancellation of the *Saturn V* has its roots at the end of Lyndon Johnson's presidency, whereby initial discussions of scaling back the U.S. space effort occurred. This notion prompted the then-director James Webb to leave NASA in the run-up to Nixon's presidency, lamenting that the United States risked "surrendering its pre-eminence in space".[48] Nixon did not see the strategic value of procuring more *Saturn V's* when there was nowhere to launch. For the most part, commitment to détente saw the U.S. decide not to build on the national

[46] Andrew L. Jenks, *Collaboration in Space and the Search for Peace on Earth* (London: Anthem Press, 2021), p. 33.
[47] Skylab features more prominently in Chapter three though it is worth noting here that Skylab was intended as a steppingstone for a permanent human presence in space through NASA's Shuttle-Station plan. However, in 1970 NASA gave up on the pursuit of a simultaneous Shuttle and large space station development as it was made clear that the Nixon administration would not permit such an economically intensive program. The Space Station "exited the stage" in 1970 with Associate Administrator for Manned Space Flight Dale Myers calling the development of a space station at this stage "dead-ended". Thus, Skylab would be the only orbital outpost launched to space rather than the first test. See Logsdon, *After Apollo?* pp, 117-21. See Also, Robert Lohman, "Memorandum to Deputy Director Space Station Task Force: Shuttle-Sized Station Modules" (April 1, 1970).
[48] "Preliminary History of NASA, 1963-1969", (January 15, 1969), in Logsdon, *Exploring the Unknown*, p. 495.

investment in the capabilities that made *Project Apollo* successful. Thus, space cooperation and détente cast a shadow over the post-Apollo program. Although the ASTP did not feature in the STG report or discussions regarding NASA's budget and operations, the ASTP and détente were permanent undercurrents that indirectly and sometimes directly undercut NASA's independent objectives. The ASTP received presidential prioritisation and was Nixon's primary, if not only, space concern.

A Contextual shift?

In conclusion, the decision to prioritise the ASTP over NASA's trio of projects is representative of the cultural shift initiated by the Nixon administration between 1969 and 1972. Not only would NASA not receive the same levels of discretion as in the 1960s, but the rejection of a long-term goal also placed the agency in a precarious position. Scholars of Nixon's space policy have glossed over the implications of détente for the immediate and long-term future of NASA. Thematic discussions have, although one-dimensionally, discussed détente in space; historians like Joan Hoff, Thomas Ellis and Andrew Jenks have often failed to implicate détente as the starting point from which the American space program took its first step backwards. Be as it may, Nixon's space policy is undeniably unique, with the foundational motivations from which the American space program had been propelled to the forefront of the nation being reversed.

Indeed, though we may assess, as John Logsdon does, that the post-Apollo space program was formed in a different contextual climate to Kennedy's, we must not underestimate Nixon's and détente's role in changing that context. As an influence, détente has been understated in accounts of the source of America's decline in space. The presidential prioritisation that the ASTP received over NASA's independent programs demonstrates that détente was the primary focus of Nixon's space policy. Coupled with a personal disinterest in space exploration, the American space program – aside from signalling the promise of détente – was excluded from the political centre.

Chapter II

Nixon and Space Decision-Making: Revoking NASA's Political Privilege

By 1970, NASA had had its Mars plan rejected, hopes of increased production of the *Saturn V* dashed, and a large orbital station returned to a preliminary study status.[49] Simultaneously, Nixon's 1970 Space Statement represented a turning point in the history of the U.S. space program. Nixon did not commit NASA to an outstanding target for the 1970s. Worse, Nixon reduced the priority of NASA and announced that "space expenditures must take their proper place within a rigorous system of national priorities".[50] Thus, the 1970 Space Statement established a precedent that NASA's days of operating outside of the continuous competition for government resources were over.[51] Instead of providing a definitive program or outstanding goal, Nixon's Space Statement set six loose objectives:

- We should continue to explore the Moon.
- We should move ahead with the exploration of the planets; we will eventually send men to explore the planet Mars.
- We should work to reduce the cost of space operations.
- We should seek to extend man's capability to live and work in space.
- We should hasten and expand the practical applications of space technology.
- We should encourage greater international cooperation in space.[52]

According to Logsdon, the core of the statement "treated space as an investment in the future".[53] Although the STG called for "new goals that make sense of the seventies", Nixon did not announce such goals.[54] Indeed, the statement developed a central theme of deceleration synonymous with the budget cuts and practical and

[49] Logsdon, *After Apollo?*, p. 120.
[50] Richard Nixon, "Statement About the Future of the United States Space Program", (March 7, 1970), in *The American Presidency Project*, available at [www.presidency.ucsb.edu/ws/?pid=2903], accessed 6/2/2023.
[51] Logsdon, *After Apollo?*, p. 115.
[52] Richard Nixon, "Statement About the Future of the United States Space Program".
[53] Logsdon, *After Apollo?*, p. 115.
[54] Ibid.

political headaches NASA experienced during the 1970s. However, détente's influence on this deceleration is often overlooked in assessments of NASA's political struggles between 1970 and 1972. In the months that followed the space statement, the Nixon administration revoked NASA's political privilege and drove the agency out of the political centre.

This chapter explains how and why this happened. It will reference four significant committees Nixon initiated between 1970-72. Nixon reorganised space decision-making to ensure it remained fused with détente – a decision that heavily influenced the relationship between NASA and Washington. That relationship is best characterised by mutual distrust, personal disinterest (on the part of the president), and political ostracisation (on the part of NASA). Eventually, this led to NASA's political, organisational, and operational decline, which chapter three will closely examine.

New Structures for Space Decision-Making

On April 15, 1969, the President's Advisory Council on Executive Organisation (PACEO) was established. Headed by Roy Ash, it became known as the Ash Council.[55] Between 1969 and 1971, the Ash Council recommended significant changes to the structures for space decisions due to the disruption surrounding the 1971 budget. Since Nixon's inauguration, NASA had tried to influence the White House to fund a trio of projects, a Space Shuttle, a large Space Station, and a Mars mission. The president and the Ash Council went about centralising space decision-making to Nixon's inner circle in response to the disruption this generated surrounding the budget. Thus, they closed many communication lines to restrict direct access to the president. This reorganisation of communication lines typified Nixon's desire to distance himself from the complicated process of overseeing NASA's next steps. Vice President Spiro Agnew warned the president that his new structures blocked cabinet members and agency officials from meeting with him. Logsdon notes that "this is precisely what Nixon had in mind" – to prevent space advocates from influencing the direction of the American space program.[56]

[55] Logsdon, *After Apollo?*, p. 115.
[56] Ibid. p. 132.

The Ash Council became an integral part of the Nixon administration and, more importantly, a source of resistance to NASA. Despite Nixon's advocacy for restructuring space decisions, the Ash Council almost certainly defined its parameters. Through the president's decisions and the committees established between 1969 and 1971, détente significantly influenced on the restructuring of space decision-making.

One of the earliest recommendations was the creation of the Office of Management and Budget (OMB), which would serve to oversee "how we do it [budgetary regulation] and how well we do it".[57] The OMB replaced the Bureau of the Budget (BOB) in 1970, and the president expanded the organisation's charter to encompass federal agencies' regulation and performance evaluation. This was a considerable problem for NASA because Nixon hand-picked the directors, effectively linking his political priorities to budgetary decisions.[58] Integrating détente into budgetary matters was a blow to NASA director Thomas Paine, who advocated for increased funding.[59] Of course, a factor of détente was the commitment to what historian Phil Williams called "a peace dividend" with the Soviet Union, which meant a reduction in defence spending, which was invariably attached to spaceflight.[60] In this view, the OMB became a prism through which all financial considerations had to pass to ensure the maximum benefit to the president's political priorities. NASA had continued to push for a bold program and met resistance due to the new spending limitations. At least in principle, the OMB prevented NASA's advances toward an Apollo-scale program (détente's antithesis) and exercising an influence on the president.

The OMB's new budget system increased tensions surrounding NASA's funding, leading to a problematic relationship between NASA and Washington. Thus, the tension between the OMB and NASA was the axis of space policy debates between 1969 and 1972. Nixon and the OMB were both inherently opposed to an ambitious space program. The OMB remains one of Nixon's most significant

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[57] Richard Nixon, "Message to the Congress Transmitting Reorganization Plan 2 of 1970" (March 12, 1970), in *The American Presidency Project*, available at [http://www.presidency.ucsb.edu/ws/?pid=2907], accessed 6/2/2023.
[58] Ibid.
[59] Thomas Paine, "Memorandum for the President: Request for Appointment to Review Our Long-Range Future in Space" (July 9, 1970), in Logsdon, *After Apollo?*, p. 132.
[60] Phil Williams, "Detente and US Domestic Politics." *International Affairs*, no. 3 (1985), p. 434, available at [https://doi.org/10.2307/2618662], accessed 20/2/2023.

management changes, affecting the space program directly. The OMB are so powerful that, since 1973, only the Central Intelligence Agency (CIA) and the Department of Defense (DoD) have successfully managed to challenge its budget control.[61] As Hoff notes, NASA was unaware of the significance of the structural changes to space decision-making.[62] After James Webb resigned in 1968, NASA struggled to "play" the game of political volleyball in Washington to preserve its influence.[63] Indeed, Paine appealed the harsh budgets only to be denied conclusively by Congress and not supported by Vice President Agnew. Thus, NASA had to accept cuts to its annual budgets in 1970 and 1971.[64]

Worse, after an agreement was reluctantly met, the Nixon administration cut a further 2.5% from the 1970 budget, reducing the agency's budget to a mere $3.3 billion.[65] Also, there were projected cutbacks in Research and Development (R&D) spending between 1970-72, marking the deceleration of American scientific and technological innovation.[66] The additional cuts to the budget were the final blow for Thomas Paine, who resigned in September 1970.[67] The budget cuts meant that there could be no development of the proposed Space Station or reusable spacecraft in 1970-71, and the repurposing of Apollo hardware shrank to the use of one single Skylab.[68] It also meant that NASA could not announce any new automated projects. In other words, space technology was perceived as "a means, not as an end in itself".[69] Such constraints prompted the remark from Paine's successor James Fletcher that "a deal from the OMB is no deal at all".[70] Here, Fletcher captures the distrust between NASA and Washington politics. This was exacerbated, Fletcher said,

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[61] Logsdon, *After Apollo?,* p. 133.
[62] Hoff, "The Presidency", p. 102.
[63] Ibid.
[64] Paine advocated for a budget of $4.25 billion, but NASA only received $3.349 billion in 1970 and a proposal for $3.53 billion in 1971. See, Hoff "The Presidency", p. 105.
[65] Ibid.
[66] John Walsh, "72 Budget: Nixon Proposes Modest Increases for Science." *Science* 171, no. 3970 (1971), p. 460, available at [http://www.jstor.org/stable/1731255], accessed 2/12/2022.
[67] On July 28, 1970, Paine handed his letter of resignation to the president effective September 15. Even after he handed in his resignation, Pain continued to urge Nixon to pursue an ambitious space program. On August 10, he requested a meeting for Nixon to discuss the future of manned spaceflight; "NASA's projection of man's future in space to the year 2000", but the president opted to wait for Paine's successor and the meeting never occurred. See Logsdon, *After Apollo?*, pp 131 – 139.
[68] McDougall, *The Heavens and the Earth*, p. 421.
[69] John Logsdon, "Opportunities for Policy Historians: The Evolution of the U.S. Civilian Space Program", *A Spacefaring People* (Washington D.C: NASA, 1985), pp 101-2.
[70] James C. Fletcher Interview by John Logsdon, (September 21, 1977), in, Hoff, "The Presidency", p. 107.

by too few "pro-space" members on the appropriations committees.[71] The first director of the OMB, George Schultz, and his deputy, Casper Weinberger, had a significant role in the direction of the post-Apollo space program because the OMB was the "president's principal arm for his managerial functions".[72] For instance, Schultz and Weinberger advised the president against cancelling the final two scheduled Apollo missions but advocated against new space projects. Ultimately, the OMB significantly influenced space decisions more than NASA.

There is evidence that the Ash Council and the OMB intended to diminish NASA's influence on space decisions through their recommendation to terminate the National Aeronautics and Space Council (NASC). The NASC, chaired by the vice president, was composed of the head of NASA, the secretaries of Defense and State and the chairman of the Atomic Energy Commission.[73] The charter of the Space Council was to advise the president on space policy and strategy. As part of the president's reshuffle, the Ash Council suggested that the Office of Science and Technology (OST) and the OMB could share the role of the NASC. In 1969, Vice President Agnew selected respected *Apollo 8* astronaut Bill Anders as the NASC's new Executive, hoping to revitalise the Council.[74] That said, Agnew was not an avid space enthusiast, and the influence of the Council on the 1971 budget was limited.[75] This lack of enthusiasm from the NASC was exacerbated by the White House reshuffle, which constricted the role of space enthusiasts.

As it turned out, Nixon decided to keep the NASC in 1970. This decision was primarily influenced by Ehrlichman, who advised that dismantling the NASC would "end the space program".[76] Ehrlichman was one of a few space advocates who had maintained his access to the president and spoke on behalf of NASA. Nixon did not want to be the president that ended the space program, nor did he want to expand it. Thus, the Space Council continued but was excluded from discussing NASA's

[71] Fletcher Interview by Logsdon.
[72] Nixon, "Message to the Congress Transmitting Reorganization Plan 2 of 1970".
[73] Logsdon, *After Apollo?,* pp. 135-6.
[74] Logsdon, *After Apollo?*, pp. 135-6.
[75] Ibid.
[76] John Ehrlichman, "Memorandum for Arnold Weber: Office of Management and Budget", (December 15, 1970), in Ibid.

immediate future.[77] Nixon's reshuffle achieved what it had intended. The post-Apollo space program was directed by politicians loyal to Nixon and his policy of détente.

To ensure NASA could not influence an Apollo-scale program, Nixon placed space oppositionists in places of direct influence on the policy formulation process. Most notably, Lee DuBridge resigned in mid-1970 after his role as Science Advisor had been severely hampered by the OMB budget cuts and lack of access to the president.[78] He was replaced by Edward David, whom the *New York Times* reported was "very sceptical of the man-in-space program".[79] By the start of 1971, Nixon had transitioned NASA into a new era. One by one, the Nixon administration replaced space advocates with space oppositionists and sceptics. Jason Callahan argues that NASA was not rewarded for the success of *Project Apollo*.[80] Instead, the agency was the victim of a policy-initiated contextual shift that placed spaceflight on the backseat unless it demonstrated or enhanced détente.

During this time, space enthusiasts like John Ehrlichman had difficulty setting the course for the U.S. space program to resemble the Paine's proposals in 1969. This was because Nixon had strung out the scales of influence during his reorganisation. Thus, space enthusiasts such as Ehrlichman struggled to strike a relationship with sceptics such as Nixon's science advisor Edward David and the OST on technical space issues since defining space policy and programs were increasingly complex because of the growing influence of new committees in managing space decisions.[81]

Consolidating Cooperation

As the president revoked NASA's influence and curtailed the plans for a bold post-Apollo program, he sought to develop space cooperation. In 1970, Nixon established an ad hoc interagency group headed by the Deputy Director of NASA's international programs, Arnold W. Frutkin, to oversee space cooperation.[82] As NASA

[77] Haldeman, *The Haldeman Diaries*, p. 247.
[78] Logsdon, *After Apollo?,* p. 135.
[79] "President's New Science Advisor", *The New York Times*, (September 15, 1970), p. 26.
[80] Jason Callahan, "How Richard Nixon Changed NASA", *The Planetary Society*, (October 4, 2014), available at [https://www.planetary.org/articles/20141003-how-richard-nixon-changed-nasa], accessed 20/2/2023.
[81] Logsdon, *After Apollo?,* p. 133.
[82] Ibid, p. 134.

struggled to regain political leverage, in 1971 and 1972, the ASTP made progress. The 1972 Moscow summit heralded the initiation of détente between America and the Soviet Union with the signing of the Anti-Ballistic Missile (ABM) Treaty and the first Strategic Arms Limitation Treaty (SALT I).[83]

On May 24, 1972, Nixon and Soviet statesman Alexei Kosygin brokered an official agreement on the *Apollo-Soyuz Test Project*.[84] After Frank Borman's trip to Russia in 1969, years of negotiation and planning between the two Cold War powers finally paid off, and the mission was planned for 1975. Building on the premise established in chapter one, Nixon directed the cooperative part of the space program as it mirrored détente. For the most part, Nixon abdicated responsibility for the post-Apollo space program but stepped in when necessary to ensure the success of the ASTP.

Approving the Space Shuttle

On January 5, 1972, in a statement seemingly atypical of the Nixon administration, the president announced that the United States had committed to developing a "reusable space transportation system", the Space Shuttle.[85]

[83] John B. Rhinelander, "THE ABM TREATY – PAST, PRESENT AND FUTURE (PART I)." *Journal of Conflict & Security Law* 6, no. 1 (2001) p. 91, available at [http://www.jstor.org/stable/26294360], accessed 24/2/2023.
[84] Teasel Muir-Harmony, *The Space Race and American Foreign Relations* (2017), available at [https://doi.org/10.1093/acrefore/9780199329175.013.274], accessed 27/2/2023.
[85] Richard Nixon, "Statement Announcing Decision to Proceed with Development of the Space Shuttle". (January 5, 1972), in *The American Presidency Project*, available at [https://www.presidency.ucsb.edu/node/254934], accessed 27/3/2023.

Figure 5: Space Shuttle *Columbia's* Maiden Launch from Launch Pad 39-A at the Kennedy Space Centre (April 12, 1981).

The primary selling point of the Space Shuttle was its cost-effectiveness. Since Nixon had prioritised cutting Defence spending and "taking the astronomical cost out of astronautics", the Space Shuttle program had to reduce the operational cost of space access.[86] NASA had to build a considerably cheaper vehicle than the Expendable Launch Vehicles (ELV) used throughout the 1960s. The launch cost of the expendable *Saturn V* rocket was approximately $1000 per pound.[87] In 1969, the head of the Office of Manned Space Flight (OMS), George Mueller, calculated that a reusable STS could achieve routine launches for a much lower cost – as little as $5

[86] Nixon, "Statement Announcing Decision to Proceed with Development of the Space Shuttle".
[87] Pinkus et al, *Engineering Ethics*, p. 100.

per pound.[88] NASA had to sell the Shuttle concept to Congress to convince the space sceptics of the economic value of the program. The Space Shuttle, most importantly, would be achievable under the 1970s reduced budgets that were cut again in 1972 to a mere $3.1 billion.[89] Despite the proposed economic utility, the president was still not inclined to support the development of an STS in 1971. The OMB, a sticky opponent for NASA, continued to hold the space program and the president to resolute budgetary discipline irrespective of technological considerations.

However, the crucial difference in Nixon's motivation to push through the Space Shuttle Program came from NASA changing tactics and tapping into his obsession with geopolitical symbolism. It is helpful to recall the "signalling" theory to understand the role of symbolism in spaceflight. Indeed, Nixon had signalled that international cooperation was the cornerstone of the future of human spaceflight by scaling back vast nationalistic space pursuits in favour of establishing global networks of space collaboration. In 1969, the president said he would take "positive, concrete steps toward internationalising man's epic venture into space".[90] Thus, a crucial tenet of Nixon's space policy reflected détente and the commitment to building a new geopolitical paradigm that now extended to space. The Space Shuttle provided a way for Nixon to end the bilateral space launch monopoly shared by the U.S. and Soviet Union. Simultaneously, the Space Shuttle would provide the U.S. with the means to lead the era of internationalised space efforts. Nixon was primarily interested in the symbolism connected to international spaceflight as he commented, "Symbolism is what I want. Nothing more".[91] Thus, NASA proposed that the Shuttle could aid Nixon's desire to internationalise spaceflight.

Expanding international involvement in the United States human spaceflight program was Nixon's "pet idea".[92] The idea involved flying non-U.S. astronauts on American spacecraft and encouraging international participants to develop space technology. Undoubtedly Nixon's persistence on this topic was influenced by its symbolic value to détente. As early as January 28, 1969, Nixon prompted the idea of

[88] George E. Mueller, "The New Future for Manned Spacecraft Development", *Astronautics and Aeronautics* (March 1969), pp. 24-32, Ibid, pp 100-1.
[89] Logsdon, *After Apollo?,* p. 146.
[90] Richard Nixon, "Address Before the 24th General Assembly of the United Nations" (September 18, 1969), in *The American Presidency Project*, available at [http://www.presidency.ucsb.edu/ws/?pid=2236], accessed March 28, 2023.
[91] Conversation 23, Tape 455, (February 22, 1971), RNPL in *Logsdon, After Apollo?,* p. 198.
[92] Logsdon, *After Apollo?*, p. 289.

"participation of foreign astronauts in the U.S. program" to Secretary of State Henry Kissinger.[93] Nixon intended to open the door to increased international cooperation through this idea. Therefore, NASA persisted in attempts to connect the STS to the expansion of international collaboration in spaceflight.

As early as 1969, NASA invited the Canadian Aerospace Company SPAR Aerospace to build technology for future United States spacecraft.[94] Then, in 1973, NASA contacted the European Space Research Organisation (ESRO), now European Space Agency (ESA), to offer involvement in developing the Space Shuttle.[95] The ESRO developed Spacelab - the reusable laboratory that could fit into the Space Shuttle's cargo bay.[96] Spacelab enabled astronauts to experiment in microgravity and geocentric orbit. In 1975, the Canadian National Research Council (CNRC) were contracted to construct the Shuttle Remote Manipulator System (SRMS), aptly named Canadarm.[97] Indeed, the Space Shuttle program had been intended as an international space venture.

[93] Henry Kissinger, "Memorandum for the President: Reply to Letter from Senator Fulbright on Space Cooperation and Proposed Interagency Study" (January 28, 1969), in Ibid, p. 110.
[94] Lydia Dotto, *A Heritage of Excellence: 25 Years at Spar Aerospace Limited* (Ontario: Spar Aerospace, 1992), pp. 41-42
[95] John Walsh, "NASA and ESRO: A European Payload for the Space Shuttle." *Science* 182, no. 4112 (1973), pp. 562-3, available at [http://www.jstor.org/stable/1737768], accessed 2/2/2023.
[96] Ibid.
[97] Brian Wilks, *Browsing Science Research at the Federal Level in Canada: History, Research Activities, and Publications* (Toronto: University of Toronto Press, 2004), p. 117, available at [https://doi.org/10.3138/9781442671607], accessed 3/4/2023.

Figure 6: Canadarm in Operation on Space Shuttle *Endeavour's* mission STS-72 (January 11-20, 1996).

By 1971, international proposals had become a "bottom line" in NASA's shuttle argument.[98] This tactic succeeded when the president approved the Shuttle program, and the role of international symbolism cannot be overlooked in this decision. The president displayed leadership in pushing the Space Shuttle Program through Congress once it mirrored détente.

This chapter has portrayed the centrality of détente in Nixon's policy over NASA's political influence and the approval of the space shuttle program. Détente was the prism that the post-Apollo space program had to pass through. The examples of the committees established to ensure that the post-Apollo space program did not work at counter purposes to détente's objectives reveal its political importance trumped NASA's. NASA tapping into détente symbolism to push through the space shuttle in 1971 shows its centrality in space considerations. Although this dissertation could only analyse a handful of the committees Nixon established to oversee the

[98] Logsdon, *After Apollo?,* p. 289.

détente into the U.S. Space program, more examples mirror this rationale. Thus, the intersection between détente and space policy debates between 1969 and 1972 is worthy of further scholarly inquiry.

Chapter III

"An Accident Rooted in History": *Challenger*, Nixon, and NASA's Organisational Decline

"Flight controllers here looking very carefully at the situation, obviously a major malfunction".[99]

Steve Nesbitt (NASA Public Affairs Officer), 1986

On January 28, 1986, the United States space program suffered the worst tragedy in the history of human spaceflight. Just seventy-three seconds into launch, the Space Shuttle *Challenger* exploded, claiming the lives of seven American astronauts, including the first civilian astronaut Christa McAuliffe.[100] After the accident, then-president Ronald Reagan grounded the Space Shuttle fleet while a presidential committee conducted an extensive inquest into NASA's operations.

[99] CNN news coverage (January 28, 1986), available at [https://www.youtube.com/watch?v=Ync0f4e4tS4], accessed 3/4/2023.

[100] Christa McAuliffe was the first participant of the Teacher in Space Project (TISP), which intended to inspire students and increase interest in mathematics, science, and spaceflight. The program was cancelled in 1990 following the death of McAuliffe, see Roger D. Launius, *The History of Space Exploration: Discoveries from the Ancient World to the Extra-terrestrial Future* (London: Thames & Hudson, 2018), pp, 226-7.

Figure 7: Crew portrait of *Challenger* Astronauts. Front Left to Right: astronauts Mike Smith, Dick Scobee, and Ron McNair. Back, Left to Right: astronaut Ellison Onizuka, teacher-in-space Christa McAuliffe, payload specialist Greg Jarvis, and astronaut Judy Resnik.

The Rogers Commission Report, written by the presidential committee investigating the accident, found that the primary cause of the explosion was a failure in the O-Ring sealings in the aft field joint on one of the Shuttle's Solid Rocket Boosters (SRB).[101] This failure was attributed to a design flaw, as cold weather could compromise O-Ring performance on a launch day. More damning, however, was the report's finding that both NASA and its SRB contractor Morton Thiokol knew from as early as 1977 of a fundamental flaw in the O-Ring design and the potential for catastrophe. Thus, the Rogers Commission Report concluded that the *Challenger* accident was "rooted in history".[102]

When Morton Thiokol won the SRB contract in 1973, the Rogers Commission Report found that its preliminary design had not bested its competitors, Lockheed,

[101] "Report to the President by the Presidential Commission on the Space Shuttle Challenger Accident" (June 6, 1986), p. 73., available at [https://sma.nasa.gov/SignificantIncidents/assets/rogers_commission_report.pdf], accessed 27/3/2023.
[102] Ibid.

Aerojet, and United Technologies.[103] The deciding influence was the economic factor. Due to the constraints placed upon the agency through Nixon's actions between 1969 and 1972, the agency had to find the cheapest way to keep flying.[104]

The *Challenger* accident placed NASA's operations under intense scrutiny. The Rogers Commission recognised that NASA's safety culture and management structure was insufficient and that the agency's "reliability and quality assurance activities" had considerably deteriorated.[105] This chapter discusses the root of this decline, as NASA's operational environment was collateral damage in Nixon's reorganisation of the U.S. space program. Although the Nixon administration cannot be attributed any direct wrongdoing in the *Challenger* accident, it is essential to remember that it was under Nixon that the American Space Program experienced a contextual, political, and economic shift that fundamentally shaped the agency's character. Indeed, Nixon's official approval of the Space Shuttle occurred during budget cuts and an overall downsizing of the aerospace industry. Combined with the political ostracisation of NASA, those factors snowballed into a cultural and organisational regression within the agency whereby "ethical compromise became the rule, not the exception".[106] Therefore, there is a causal connection between the Nixon administration, NASA's organisational decline, and the *Challenger* tragedy.

This chapter attributes the agency's decline to the president's poor commitment to spaceflight and oversight of the requirements for such a major technological undertaking as the Space Shuttle. In a conversation with congressional liaison Clark MacGregor in 1971, Nixon revealed his underlying stance on NASA's operations, "I do not give a damn about space. I am not one of those space cadets".[107] The president's apathy toward space exploration amplifies themes I have addressed in previous chapters. In such dire remarks, which were not uncommon, we can see a begrudging acceptance that "spaceflight was here to stay".[108] Indeed, beneath Nixon's indifference to space was an acceptance that the U.S. space program must continue

[103] "Report to the President by the Presidential Commission on the Space Shuttle Challenger Accident", p. 73.
[104] Pat Duggins, *Final Countdown: NASA and the End of the Space Shuttle Program* (Florida: University of Florida Press, 2009), pp 86-7.
[105] "Report to the President by the Presidential Commission on the Space Shuttle Challenger Accident", p. 162.
[106] Pinkus et al, *Engineering Ethics*, p. 91.
[107] Conversation 10, Tape 471 (March 24, 1971), in RNPL, in Logsdon, *After Apollo?*, p. 180.
[108] Nixon, "Space Statement".

even if it was just "for the sake of it".[109] However, the president dodged an inconvenient truism that the prerequisite for a successful space program was a hands-on presidential approach. Undoubtedly, per his restructure of space decision-making, the opposite occurred. Nixon distanced himself from the U.S. space program instead of exercising his influence on it (unless it had strategic value to his foreign policy).

Designing the Space Shuttle

To better understand the position of NASA during this preliminary phase of the shuttle planning, it is helpful to quote a memorandum that OMB Deputy Director Casper Weinberger sent to Nixon in late 1971 as the president was consolidating his shuttle decision. That memorandum details the "real merit" of the Space Shuttle.[110] This merit was two-fold – The cost-effectiveness of the vehicle and its strategic use for the internationalisation of America's space operations. In the aftermath of that memo, the decision was to approve the Space Shuttle program, but Nixon opted not to select a specific shuttle design concept.[111]

This emphasises the argument established in chapter two that Nixon had acquitted himself of responsibility over the intricate details of space decision-making. Consequently, an interagency rivalry erupted over which Shuttle design was best appropriate. The contention surrounding the shuttle design phase heightened tension between NASA and the OMB. George Low stated that the Shuttle should aim to "capture the majority of the payloads that will be flown in the 1980s".[112] Thus, the primary area of dispute was over the size and scope of the Shuttle with that in mind. To appeal to the DoD, NASA had to expand the size of the payload bay, with Low estimating a 14 x 45' payload bay capable of carrying 45,000 pounds.[113] During this time, the OMB recommended a smaller vehicle of 10 x 30' with a carrying capacity of 30,000 pounds.[114] The OMB's stranglehold on NASA's budget meant they had to fight considerably to preserve a larger orbiter. NASA administrator Fletcher was

[109] Conversation 11, Tape 498 (May 13, 1971), RNPL in Logsdon, *After Apollo?*, p. 180.
[110] Casper Weinberger, "Memorandum for the President, Future of NASA", in Logsdon, *After Apollo?,* p. 188.
[111] Logsdon, *After Apollo?,* p. 211.
[112] George Low quoted in Ibid, p. 256.
[113] Ibid.
[114] Ibid.

adamant that an even larger Shuttle was most appropriate. NASA wanted a 15 x 60' payload bay with a 65,000 carrying capacity.[115] This was because NASA wanted the Shuttle to be able to carry compartments of a future large space station to orbit and for that, they needed the largest Shuttle. Simultaneously, the 15 x 60' Shuttle could satisfy all potential payloads for NASA, the DoD, and Air Force, to name but a few with a stake in the space program.

What influence did Nixon have on the design of the space Shuttle? John Logsdon investigated that very question but could not conclusively determine his role. In a 1983 interview, John Ehrlichman explained that Nixon was the final arbitrator for Shuttle decisions; however, Logsdon expresses concern with Ehrlichman's answer because there is no concrete evidence of Nixon's direct involvement with the planning phase of the Shuttle.[116] Thus, Logsdon speculates that Ehrlichman's claim could refer to Nixon's decision to approve a Space Shuttle on December 3, 1971.[117] Nevertheless, the role of Nixon in the design phase of the Shuttle is an area that could benefit from further research.

What is evident, though, is that the absence of a set goal for the Space Shuttle Program created the necessity for NASA to procure as many launch contracts as possible. This strategy meant that NASA had to compromise on its preferred design every step of the way to appease support.[118] However, the tension between NASA and the OMB meant that at all costs, NASA sought approval of any design bar the OMB's. By January 3, NASA had secured presidential approval for the 15 x 60' Shuttle design because it enabled NASA to fly all payloads on the Shuttle, thus, preserving Nixon's decision to cancel the development of ELVs and preserve the budget cuts. Former Secretary of the Air Force Robert C. Seamans Jr. was at odds with that decision because the Shuttle could not launch without a crew. He criticised "why put astronauts at risk to launch unmanned satellites".[119] Also, the controversy regarding design and the decision to build the larger vehicle altered the developmental requirements of the vehicle.

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[115] Letter from James Fletcher to Casper Weinberger (December 29, 1971), in Logsdon, *Exploring the Unknown*, pp, 245-9.
[116] Logsdon, *After Apollo?*, p. 263.
[117] Ibid.
[118] Pinkus et al, *Engineering Ethics*, p. 97.
[119] Robert C. Seamans Jr. Interview by Pat Duggins (June 2005), in Duggins, *Final Countdown*, p. 41.

Developing the Space Shuttle

Central to the Space Shuttle's development, Chief engineer at the Marshall Space Flight Centre (MSFC), Jerry Thompson, noted was "major advancements in propulsion technology".[120] This was because the vehicle would have to perform at a higher level and for longer than the *J-2* engine that powered the *Saturn V*.[121] Thus, the development of the Space Shuttle Main Engines (SSME) was the definitive component of the vehicle. Adelbart Tischler reported that the reusability aspect of the Space Shuttle "posed serious technological problems".[122] It was exacerbated by the requirement for the SSMEs to produce 109% more than their original thrust.[123] Despite the issues, NASA's associate administrator for the Space Shuttle Program, Dale Myers, reassured the president that measures were in place to maintain innovation while staying under budget.[124] Indeed, the program did stay under budget for the remainder of Nixon's presidency, to the detriment of the vehicle.

The primary issue with the production of the SSME was the lifetime of the components within the engine, according to Rosa Pinkus, that were prone to erosion due to the immense heat and stress placed upon them during ignition.[125] These issues limited the lifespan of the engine. Pinkus also notes that this was a known engineering problem, yet NASA deemphasised a materials evaluation to ensure the program did not exceed cost and timeframe.[126] Throughout the STS development, NASA prioritised development costs over operational costs and viability to stay within the budget.

Although internationalisation played a definitive role in influencing Nixon's approval of the Space Shuttle, the program's primary source of support from Congress was the inexpensive cost of the program. Thus, financial imperative trumped technological necessity. Indeed, the budget set by the Nixon administration was inadequate to support such a vast and technologically intensive program. The

[120] Jerry Thompson, "Shuttle: The Approach to Propulsion Technology", *Astronautics and Aeronautics* (February 9, 1971), p. 64, in Pinkus et al, *Engineering Ethics*, p.102.
[121] Thompson, "Shuttle", p. 64.
[122] Adelbart O. Tischler, "Space Shuttle", *Astronautics and Aeronautics* (February 9, 1971), p. 24, in Pinkus et al, *Engineering Ethics*, p. 103.
[123] Ibid.
[124] Ibid.
[125] Ibid, p. 101.
[126] Ibid.

budget cuts placed NASA in a precarious position. As their operations became constrained, they started to cut corners. In 1977, the first significant issues arose with the SSMEs, and four engine failures occurred during testing. Therefore, the intended 1978 launch date was scrapped by NASA.[127]

The agency persisted with all-up testing through economic considerations rather than engineering ones. Indeed, all-up testing used during *Project Apollo* slashed developmental costs to the detriment of operational costs.[128] More importantly, all-up testing continually balanced safety issues with performance and, in the 1970s, budgets. Thus, NASA performed a trade-off between performance, risk, safety, cost, and schedules. Sylvia Fries, the former director of NASA's History Office, explained the context of building the Shuttle.

> Safety, reliability, and quality assurance engineering (SRQA)... are involved at each phase of manned spacecraft's development and operations: developing specifications, evaluation of bidders' proposals, definition and preliminary design, production and operations.... Throughout these phases, trade-offs have necessarily had to be made between performance, cost, and schedule on the one hand and optimum standards of safety, performance, and quality on the other. These trade-offs constitute the measures of risk for each program's many elements.[129]

Skylab and NASA's Operational Decline

Despite the risks taken by NASA in the early development of the Space Shuttle, Nixon's poor space planning, combined with NASA's operational issues, compounded in the spectacular failure to save Skylab. Skylab was the first United States orbital space station launched in 1973. Skylab was approved after the Manned Orbiting Laboratory (MOL) was cancelled by the Nixon administration in 1969 in favour of building a small station from *Apollo-Saturn* hardware.[130] Thus, the upper stage of the *Saturn V* rocket was fitted out with a crew compartment, docking adaptors, a telescope mount, and other essential facilities.[131]

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[127] Pinkus et al, *Engineering Ethics*, p. 103.
[128] Ibid, p. 98.
[129] Sylvia Fries quoted in Ibid, p. 102.
[130] The Air Force proposed the Manned Orbiting Laboratory (MOL) in 1965. The proposal was to use a *Titan II* rocket to launch the laboratory into a polar orbit for reconnaissance purposes. Polar orbit is useful for surveillance purposes because each day, as the earth rotates below it, the entire surface is visible. See Iain Nicolson, *Sputnik to Space Shuttle: 25 Years of the Space Age* (London: Sidgwick & Jackson, 1982), p. 159.
[131] Ibid.

Figure 8: The Skylab Orbital Station photographed by the crew of *Skylab 2* – the first manned mission to the station (June 1973).

Indeed, it was significantly damaged during launch when a piece of micrometeorite shield broke off and tore off a solar panel.[132] The micrometeorite shield was designed to protect Skylab from intense solar exposure. To prevent the station from being crippled, it had to be remotely tilted away from the sun. Although this worked to maintain the station, it drastically reduced the capability of essential internal systems. The crew of *Skylab 2* in 1973 managed to build a makeshift sunshield, therefore preserving the station's use.[133]

The Skylab space station is often overlooked in assessments of Nixon's space program because it was unremarkable compared to the station that NASA had proposed in 1969. Yet it is a useful frame to see the first operational consequence of the problematic Shuttle program. Concurrently, Skylab was only crewed three times and not after 1974. NASA had to direct all funds to the STS program to ensure

[132] Nicolson, *Sputnik to Space Shuttle*, p. 160.
[133] Ibid.

completion. Indeed, NASA intended the Shuttle to be completed in time to save Skylab from a rapidly decaying orbit.

However, by 1979, the Shuttle had hit a dead end developmentally. The program was underfunded and behind schedule, so NASA had to descend Skylab into the atmosphere over a remote part of the Indian Ocean as there was no way to boost its orbit and save it. However, Skylab broke apart during re-entry, scattering debris across Western Australia.[134] This received negative news coverage and international criticism due to the dangers it posed to life and property.[135]

The state of the United States space program by the end of the 1970s vindicates arguments that America took a step backwards in space under Nixon. The nature of this backward step is most notable in five key areas.

- The conclusion of the Apollo program and lunar exploration.
- The discontinuation of the *Saturn V* rocket (without a reliable replacement), thus leaving the U.S. utterly reliant on the Shuttle
- The economic and technological difficulties of the Space Shuttle's development resulted from budget cuts.
- Skylab was the only U.S. orbital station that NASA could not crew after 1974 nor save in 1979.
- There were no U.S. astronaut launches between 1975 and 1981 (the Soviets established a permanent presence in orbit during this time).

This deterioration in operational capabilities emphasises the theme of organisational decline that was initiated (albeit accidentally) by Nixon's rapid reorganisation of the space program. Robert W. Smith's *The Space Telescope: A Study of NASA, Science, Technology, and Politics* included a fascinating study into the interaction between NASA and Congress. Smith commented on the necessity of looking critically at the political process that births federally funded space projects.

Applying that methodology to Nixon reveals that the STS was politically feasible but technologically risky. More consideration should have been applied to the long-term effects of the Space Shuttle program even after it ran into developmental issues.[136] To satisfy the political feasibility of the project, NASA

[134] Launius, *The History of Space Exploration*, p. 213.
[135] Richard D. Lyons "Skylab Controllers in Effort to Steer Falling Craft Into the Indian Ocean", *The New York Times* (July 11, 1979), available at [https://www.nytimes.com/1979/07/11/archives/skylab-controllers-in-effort-to-steer-falling-craft-into-the-indian.htm], accessed 24/4/2023.
[136] Robert W. Smith, *The Space Telescope: A Study of NASA, Science, Technology, and Politics* (Cambridge: Cambridge University Press, 1989), p. 288.

encouraged its contractors, including Morton Thiokol, who built the SRBs, to adopt a high-risk success-oriented approach.[137] This was the only way NASA could satisfy both the cost and timeframe of the program. Indeed, one can trace the tight parameters of the project to the president who approved the program in the first place.

NASA's Organisational Decline

As Nixon downsized NASA as an organisation, this also affected the broader American aerospace industry. Howard McCurdy's study into the state of the aerospace industry after 1969 implicates Nixon as the root of NASA's organisational decline for various reasons. First, overall NASA hiring fell from 8700 a year in 1963 to 264 in 1972.[138] Secondly, NASA's "revolving door" policy was hampered by a 15% staff turnover decline in the 1960s to a 5% turnover in the 1970s.[139] NASA's revolving door policy kept turnover at a solid amount to keep the working environment cutting edge. The overriding reason for this decline is that by failing to announce a new national space project, Nixon downsized the aerospace industry due to a drop in demand for new technology. As a result, the average age of NASA employees increased, directly correlating with a decline in the working environment.[140] McCurdy emphasises the "creeping bureaucracy" of the U.S. government that tightened NASA And swiftly regulated its operations.[141] This amplifies themes I have already addressed that adherence to détente meant that NASA considerations had to pass through its checks and the new structures that systematically thwarted NASA's political influence and its operational capabilities.

Therefore, the space shuttle program is a valuable frame for the causal connection between Nixon and the decline of the American space program. Operationally, the Space Shuttle failed to satisfy its leading goals, cost-effectiveness, and routine space access. Secondly, and more importantly, NASA as an organisation saw a considerable downturn in its employment, funding, and political allies which compounded in a deterioration of its organisational culture and capabilities. Safety

[137] Pinkus et al, *Engineering Ethics*, pp 102-3.
[138] McCurdy, “Organisational Decline” p. 310.
[139] Ibid.
[140] Ibid.
[141] Ibid.

was secondary to budget considerations for the agency that worked tirelessly to maintain the limited support it had for its program. Also, innovation in launch capabilities took a step backwards. From 1975-81, there were zero human spaceflight attempts from the United States, and from 1972 to the present day, no human has launched beyond LEO. Nixon's decision to decelerate the space program and weave it into détente not only meant that the U.S. could not build on the massive innovation in deep space launch developed in Project Apollo but that cutting budgets and focusing on the internationalisation of spaceflight, NASA's only project was the Space Shuttle. Despite being a technological marvel, then-NASA Administrator Mike Griffin said in 2010, "What the space shuttle does is stunning, but it is stunningly less than what was predicted".[142] The STS exemplifies the step backwards of the American space program initiated by Nixon.

Far from just being the next "big ticket" NASA project and the first post-Apollo program, the Space Shuttle defined popular reflections of the American space program for an entire generation. The Space Shuttle program had a fundamental impact on the character of the American space program. Much to be said of the Shuttle's development extends beyond the Nixon administration. However, the problems the Space Shuttle program endured reflect the most apparent consequences of Nixon putting the brakes on the American space program under détente. The consequence of compromise at every level of the design and development squeezed NASA into a position of terminal operational regression. Thus, the Space Shuttle remains a notorious example of a poor political commitment to a major technological undertaking. In this view, the Space Shuttle development was not the catalyst for NASA's decline but its definitive event.

[142] Michael D. Griffin, "The Legacy of the Space Shuttle", in Wayne Hale and Helen R. Lane (eds), *Wings in Orbit: Scientific and Engineering Legacies of the Space Shuttle 1971-2010* (Florida: NASA, 2010), p. 514, available at [https://www.google.co.uk/books/edition/Wings_in_Orbit/aEZo8dHqJbIC?hl=en&gbpv=1&kptab=getbook], accessed 4/4/2023.

Conclusion
Nixon's Space Legacy

Nixon's space legacy reached a defining moment with the explosion of the Space Shuttle *Challenger* in January 1986.[143] The accident shattered the illusion of careful policy approaches under Nixon who approved the Space Shuttle program. Writing in the Aftermath of the *Challenger* accident in July 1986, James Fletcher, NASA administrator between 1971 and 1977, noted that the roots of the accident were to be found in the Nixon administration.[144]

This dissertation has demonstrated that NASA lost its presidential mandate to operate outside of the competition for government resources under Nixon. Also, NASA was no longer granted routine access to the president. Instead, the agency became the victim of the reorganisation of space decision-making in the White House, which established oppositionist committees that foiled NASA's political influence. Such ostracisation compounded with budget cuts into an organisational regression for the agency. Therefore, the struggles NASA endured after *Apollo 11* were not the result of pre-existing internal problems: it was generated by the upper echelons of power in the Nixon administration and its adherence to détente.

Nixon's space policy established three precedents:

- To centralise détente in space - transitioning the U.S. space program from competition to cooperation through a commitment to collaborative international pursuits and a rejection of nationalistic space pursuits.
- To reduce the ambitions of the U.S. space program by not setting an outstanding post-Apollo goal and simultaneously restricting NASA's political influence.
- To slash NASA's budgets, before building the Space Shuttle on a ludicrously low budget – placing NASA under heightened pressure. Such pressure facilitated corner-cutting and safety oversight.

Although Ronald Reagan ripped up the policy of détente in the 1980s and thrust the U.S. into a new Cold War offensive, space cooperation did remain an "unparalleled field for cooperation among nations".[145] In 1997, the assembly of the

[143] Allan J. McDonald, and James R. Hansen, *Truth, Lies, and O-Rings: Inside the Space Shuttle Challenger Disaster* (Florida, University of Florida Press, 2012), p, 1.
[144] James C. Fletcher, "Space Shuttle Development", *Science*, 233, no. 4761 (July 18, 1986), p. 263, available at [http://www.jstor.org/stable/1697560], accessed January 20, 2023.
[145] "Foreign policy of United States", (1972).

international space station (ISS) begun and has since proven a valuable outpost for global scientific efforts. On the other hand, because of the precarious constraints placed upon NASA by Nixon, the agencies organisational problems developed deep roots. In 1986 and 2003, the Space Shuttle demonstrated its operational frailty with the *Challenger* and *Columbia* tragedies.[146] In both cases, inquests found that both disasters were attributable to a deterioration of NASA's safety culture and operations. Such deterioration is attributable to presidential oversight of the requirements for a space program.

This dissertation has also demonstrated that the foundational ethos of Nixon's space program was the symbolic possibilities of détente in space. Détente's influence on Nixon's space policy could benefit from further scholarly research, particularly its connection to NASA's organisational decline that mirrored its integration into the heart of U.S. politics. There is a solid amount of scholarship on the economic conditions of the Nixon presidency that undoubtedly influenced his space decisions – particularly his resistance to an expansive space program, but not on his foreign policy ambitions in space. The evidence is suggestive that détente influenced the decision to reject a Mars mission, which NASA envisioned as the appropriate next step for human space exploration.

Indeed, Nixon's prioritised the short-term benefits that the integration of détente in spaceflight provided his foreign policy. Thus, a further avenue of research that could benefit this scholarly enquiry is to analyse the Nixon administration's assessment of the long-term future of the American space program vis-à-vis long-term détente objectives. More research into the connection between détente, NASA, and public engagement with space exploration would perhaps uncover additional layers of Nixon's motivations that this dissertation has not been able to. Indeed, public engagement was a consideration of policy formation under Nixon, and situating public engagement, especially considering Vietnam and Civil Rights tension, could provide another layer to this topic.

[146] On February 1, 2003, the Space Shuttle *Columbia* disintegrated during re-entry into Earth's atmosphere killing all seven astronauts on board. The accident was caused by damage to *Columbia's* heat shield during take-off. The investigation into the disaster found NASA's safety and operational culture to blame. In the aftermath, then-President George W. Bush initiated the first steps toward the retirement of the Space Shuttle. See Duggins, *Final Countdown*, pp 163-196.

Moreover, Logsdon's assessment that Nixon's space legacy is more enduring than Kennedy's has been vindicated by the frail nature of the modern-day U.S. space program.[147] Indeed, it is not clear what the remedy is to the current predicament since NASA remains on the periphery of U.S. politics. More striking is the negative trend of the United States Space capabilities since 1972. After the heights of *Project Apollo* and the lunar landings, the Space Shuttle could only reach LOE. Then after the Shuttle was retired in 2011, the U.S. could not launch astronauts from America, instead paying Russia to fly on their ever-reliable *Soyuz* spacecraft.[148] Now, in 2023, U.S. astronauts are transported to the ISS via the private company – SpaceX.

Apollo 12 astronaut Charles "Pete" Conrad's observation of NASA's post-Apollo operations is telling, "After *Apollo 11* we sort of fell off a cliff".[149] Indeed, the backwards nature of U.S. space program since *Project Apollo* is Richard Nixon's ultimate space legacy.

[147] Logsdon, *After Apollo?,* p. 1.
[148] Between 2013 and 2017, NASA paid $70.7 million per seat on Russia's *Soyuz* space capsules. NASA hoped to have their own operations up and running by 2015, however, Congress failed to fund a Commercial Crew. Eventually NASA returned to the ISS from the U.S. mainland through SpaceX's *Dragon* Capsule, but not after the agency had paid approximately $424 million for six *Soyuz* seats. See Mike Wall, "NASA to Pay $70 Million a seat to Fly Astronauts on Russian Spacecraft", *Space.com* (April 30, 2013), available at [https://www.space.com/20897-nasa-russia-astronaut-launches-2017.html], accessed 2/5/2023.
[149] Charles "Pete" Conrad Jr. Interview by Duggins (1994), in Duggins, *Final Countdown*, p. 225.

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