THE UNIVERSITY OF SOUTHAMPTON
FACULTY OF HUMANITIES
HISTORY

Reds in Space:

American Perceptions of the Soviet Space Programme from Apollo to Mir 1967-1991

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A Thesis submitted for the degree of Doctor of Philosophy

March 2018

UNIVERSITY OF SOUTHAMPTON

Abstract

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'REDS IN SPACE': AMERICAN PERCEPTIONS OF THE SOVIET SPACE PROGRAMME FROM APOLLO TO MIR 1967-1991

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This thesis reconstructs American perceptions of the Soviet space programme between the climax of the 1960s Moon Race and the USSR's collapse. Whereas previous scholarship has focused on America's stunned introduction to the Soviet programme with the 1957 Sputnik Crisis, this thesis explores the long-term ramifications of a communist presence in outer space, a place frequently characterised as a rejuvenating terrain that it was America's destiny to explore, prospect and settle. America was never alone on this new frontier: it shared use of outer space with its principal geopolitical rival, a collectivist state that articulated its own prophecy of cosmic destiny. This thesis seeks to recapture American perceptions of the Soviet space programme through government documents, contemporary cultural and media material and the personal papers of prominent space experts. It argues that, long after the Apollo lunar landings, American discussion of the Soviet space programme continued to reflect hopes and fears about the future of the superpowers' relationship.

The secrecy that shrouded the Soviet programme nourished a "Shadow Programme" of rumours and speculation about Soviet activities. Duplication and infighting were largely concealed and replaced with images of a frenzied determination to surpass America and seize the space frontier. This image of Soviet determination survived the Moon Race and was only conclusively dispelled with the revelations that emerged from Mikhail Gorbachev's Glasnost transparency campaign. American observers often filled the gaps left by the lack of verifiable information about Soviet space plans with their own prejudices and preconceptions about the USSR. The image of a dedicated and determined Soviet programme was also used by space enthusiasts as a reproach to supposed American inaction and concern about the Soviet space threat intensified during hiatuses in the US crewed spaceflight programme. By illuminating a longer history of American engagement with the communist presence in space, this thesis demonstrates outer space's continued importance as a political terrain. Whether as a decisive battleground for the final confrontation between capitalism and communism, or an optimistic venue for reconciliation and accommodation, outer space continued to play an important role in Cold War rhetoric and strategy.

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Declaration Of Authorship

I, ...declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

'Reds in Space': American Perceptions of the Soviet Space Programme from Apollo to Mir 1967-1991

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this Work has been published before submission.

Signed: .....

Date: .....

Acknowledgements

This thesis was made possible by funding from the Arts and Humanities Research Council's South West and Wales Doctoral Training Partnership, I am profoundly grateful for having been in the privileged position of being able to pursue my research as a full-time occupation. Archival research in the United States was enabled through further financial assistance from the AHRC's International Placement Scheme that allowed me to spend six months at the National Air and Space Museum's Space History Department in Washington DC and a generous travel grant from the Gerald R. Ford Presidential Foundation that allowed me to consult the Ford Library's archival collections.

My research trips were further facilitated by knowledgeable, helpful archivists and librarians from Atlanta to Palo Alto. I am particularly grateful to Steve Garber, Liz Suckow, John Hargenrader and Colin Fries at the NASA Headquarters History Office for their invaluable assistance. My sincere thanks, also, to the staff of the National Air and Space Museum Library and Archives, the Smithsonian Institution Archives, the Library of Congress, the National Archives and Records Administration facility at College Park and the Hoover Institution Archives. The archivists at presidential libraries were extremely helpful as I got to grips with the quirks of each particular archiving and declassification system, so sincere thanks to staff at the Jimmy Carter, Gerald R. Ford, Richard M. Nixon and Ronald Reagan Presidential Libraries. Thanks also to the British Interplanetary Society for the use of their library.

I am profoundly grateful to my supervisor, Professor Kendrick Oliver for his knowledge and his belief in both me and my project. His erudition, good humour and patience always shone through, even on transatlantic Skype calls. I would also like to thank my second supervisor, Professor Campbell Craig, for the unique perspective he brought to this project and his many useful reading recommendations. My deep thanks to Dr Cathleen Lewis for providing me with a warm welcome and invaluable mentorship and guidance during my time at the Smithsonian. The Space History Department was an incredible community to be a part of, albeit briefly, so thanks to Valerie Neal, Michael Neufeld, W. Patrick McCray, Jennifer Levasseur, Margaret Weitekamp, David DeVorkin, Roger Launius, Paul Ceruzzi, Martin Collins and Matthew Shindell for their valuable comments, advice and suggestions. Special thanks are extended to James E. David who was kind enough to not only sit down with me and discuss my project but to share with me some of the declassified documents he obtained through his own research.

Elsewhere, I would like to thank Charles P. Vick of GlobalSecurity.org and Jeffry Manber of Nanoracks for taking time out of their busy schedules to allow me to interview them. My heartfelt thanks, also, to fellow space scholars Dr Brian Jirout and Cameron Hunter for their comradeship and expertise, as well as to Dr Rebecca Holdorph and Dr Alistair Dickins for assistance at a critical

juncture of the PhD. I am also grateful to the organisers and delegates of the AfterImage, HOTCUS and Royal Geographical Society conferences for the opportunity to share my research, a process I always found reinvigorating. Thanks also to Dr Chris Fuller and Dr Christer Petley for their comments in my PhD Upgrade, Dr Andrew Preston who was unfailingly encouraging and enthusiastic supervisor during my MPhil year and to Dr Alex Goodall whose fascinating course on American Anticommunism at York a decade ago stoked my interest in Cold War history.

I count myself extremely lucky for having such supportive, clever and dependable friends, the Mission Control who ensured this cosmonaut never lost touch with Earth, first and foremost amongst them being Isaac Gustafsson-Wood, a loyal friend who is truly one of a kind. In addition to the Southampton postgraduate community and IPS scholars in DC, particular thanks to all at the Burgess Building: Alex Fergusson, Rob Joy, Robbie McGregor, Joseph Higgins and (best newcomer) Abaigh McKee. Thanks also to the following in Southampton: Dr Holly Dunbar, Dr Anne Holdorph, Dr Tim Worth, Dr Eva van Loenen and all at Berkeley Close; and elsewhere: Megan Downey, Chase Johnson, Meghan Walsh and Simbi, Odinn Orn Hilmarsson, Dr Joshua Littlewood, Joe Fitt-Palmer, Maxwell Tyler, Justin Stathers, Shona Jemphrey, Joshua Havers, Dr Ruairi Cullen, Dr Mathias Haeussler, Stefan Wawszczyk, Nick Hawkins, Imogen Goodman and David Callaghan.

Last, but by no means least, I am eternally grateful to my brother James and to my parents, John and Hazel, for their love, encouragement and unwavering support.

Transliteration of Cyrillic Characters

Within the main body of this thesis, the modified Library of Congress without diacritics system recommended by the MHRA style guide is used when transliterating Slavic names. There are several exceptions where the common American transliteration has been used to avoid confusion. Thus, Байконур is rendered as 'Baikonur' rather than the more phonetically correct 'Baykonur', Юрий as 'Yuri' rather than 'Yurii', Королёв as 'Korolev' rather than 'Korolyov' and Циолковский as 'Tsiolkovsky' rather than 'Tsiolkovskii'. Additionally, for book/source titles within the footnotes and bibliography the publisher's transliteration has been used to aid location.

Acronyms and Abbreviations

AAAS – American Association for the Advancement of Science

ABM – Anti-Ballistic Missile

ACDA- Arms Control and Disarmament Agency

ASAT- Anti-Satellite

ASTP- Apollo-Soyuz Test Project

BMD- Ballistic Missile Defence

CIA- Central Intelligence Agency

COMEX- Committee on Exchanges

CPD- Committee on the Present Danger

CPSU- Communist Party of the Soviet Union

CRS- Congressional Research Service

CSCE- Conference on Security and Cooperation in Europe

DEFSMAC- Defence Special Missile and Aerospace Centre

DIA- Defence Intelligence Agency

DoD- Department of Defence

ELINT- Electronic Intelligence

EORSAT- Electronic Intelligence Oceanic Reconnaissance Satellite

ESA- European Space Agency

FOBS- Fractional Orbital Bombardment System

GPU- Gosudarstvennoy Politicheskoye Upravlenie (Государственной Политическое Управление) State Political Directorate – Soviet Military Intelligence Organ

ICBM- Intercontinental Ballistic Missile

IGY- International Geophysical Year

IKI- Institut Kosmicheskikh Isledovanii Sovietskoy Akademii Nauk (Институт Космических Исследований Советской Академии Наук) Space Research Institute of the USSR Academy of Sciences

ISY- International Space Year

JCS- Joint Chiefs of Staff

JDL- Jewish Defence League

JPL- Jet Propulsion Laboratory

JWG- Joint Working Group

KGB- Komitet Gosudarstvennoy Bezopastnosti (Комитет Государственной Безопасности)- Committee of State Security – Soviet Civilian Intelligence Organ

LEO- Low Earth Orbit

MAD- Mutually Assured Destruction

NASA- National Aeronautics and Space Administration

NASM- National Air and Space Museum

NIE- National Intelligence Estimate

NSA- National Security Agency

NSC- National Security Council

NSSM- National Security Study Memorandum

NSSD- National Security Study Directive

NSDD- National Security Decision Directive

OMB- Office of the Management of the Budget

OST- Outer Space Treaty

OTA- Office of Technology Assessment

PD- Presidential Directive

PRC- People's Republic of China

PRM- Presidential Review Memorandum

R&D- Research and Development

RORSAT- Radar Ocean Reconnaissance Satellite

SALT- Strategic Arms Limitation Talks

SDI- Strategic Defence Initiative

SDIO- Strategic Defence Initiative Organisation

SEI- Space Exploration Initiative

SETI- Search for Extra-Terrestrial Intelligence

SSR- Soviet Socialist Republic

STG- Space Task Group

STS- Space Transportation System (Space Shuttle mission designation)

USAF- United States Air Force

Introduction | In The Integral's Shadow: A Historiography of American Perceptions of the Soviet Space Programme

'Why do people reach into outer space? To assert their power over space and time.'- Cosmonaut Vitalii Ivanovich Sevastianov, July 1975.[1]

Few books have affected popular perceptions of space travel as much as Tom Wolfe's *The Right Stuff*. First published in 1979, Wolfe's breathless hymn to the technological prowess and old-fashioned masculinity of America's first 'Mercury Seven' astronauts likens its subjects to everything from the pioneering horsemen who lighted out the Old West to the 'single combat warriors' of ancient epic poetry.[2] Of course, Cowboys need Indians and Achilles needs a Hector. Yet, when it came to characterising the Mercury Seven's competitor, the Soviet space programme, Wolfe turned instead to an obscure but deeply emotive work of Russian science fiction: Evgenii Zamiatin's *We*. Zamiatin's lurid vision of machine-age conformity is the prototypical dystopian novel and profoundly influenced George Orwell's *1984*. *We* takes place in The One State: the ultimate totalitarianism where a numbered, brainwashed citizenry toils in ranks to eliminate spontaneity whilst constructing an interplanetary spaceship, 'The Integral', to spread their gospel of order, a nightmarish hybrid of Taylorist regimentation and Leninist technological fetishism, to other worlds.[3] Throughout *The Right Stuff*, Wolfe refers to the Soviet programme as 'The Integral', an entity of stupefying power shrouded in mystery and overseen by a nameless 'Chief Designer'.[4] Luckily, The Integral's reign of terror over the American psyche is mercifully brief, forever one step ahead until it is suddenly exorcised by the bravery of America's 'single combat warriors'. Wolfe contends that by 1963, following the Cuban Missile Crisis and the successful conclusion of the Mercury Program, 'the Cold War was already over'.[5]

Wolfe's exuberant 'New Journalism' used the tools of narrative fiction in order to capture the 'truth' of its chosen subjects and was unafraid of letting uncomfortable facts get in the way of a good story. In order for Wolfe's space cowboys to be able to ride off into the sunset, The Integral had to be vanquished in the third act.[6] However, his summation of the Soviet space programme as

[1] 'Why Go Into Space? An American Asks', *Los Angeles Times,* 21 July 1975, p. C7.
[2] Tom Wolfe, *The Right Stuff* (New York, NY: Picador, 2008).
[3] Evgeny Zamyatin, *We: Translated and With an Introduction by Clarence Brown* (New York, NY: Penguin Books, 1993); see also Patrick Parrinder, 'Imagining The Future: Zamyatin and Wells' *Science Fiction Studies* 1, 1 (1973), pp. 17-26; Susan Layton, 'The Critique of Technology in Early Soviet Literature: The Responses of Zamiatin and Mayakovsky', *Dialectical Anthropology,* 3, 1 (1978), pp. 1-20; Tony Burton, 'Zamyatin's *We* and Postmodernism', *Utopian Studies,* 11, 1 (2000), pp. 66-90.
[4] Wolfe, *The Right Stuff* (2008), pp. 56, 188-9.
[5] Ibid., p. 158.
[6] For criticism on Wolfe 's *The Right Stuff*, see William Atwill, *Fire and Power: The American Space Program as Postmodern Narrative* (Athens, GA: University of Georgia Press, 1994), pp. 91-117; Brian Abel Ragen, *Tom Wolfe: A Critical Companion*. (West Port, CT: Greenwood Press, 2001); Kevin T. McEneaney, *Tom Wolfe's America: Heroes, Pranksters, and Fools* (Westport CT: Prager, 2009); Margaret Lazarus Dean,

an incomprehensible but reassuringly temporally contained threat is often echoed within more sober, scholarly accounts. Typically, the Soviet space programme makes a stunning debut in 1957 with the orbiting of the first artificial satellite, *Sputnik 1*. Aside from occasional discussion of the impressive 'firsts' of the early 1960s Vostok and Voshkhod crewed programmes, the Soviet foe normally slinks quietly offstage in time for America's stunning victory in the Moon Race, the *Apollo 11* lunar landing. Analysing Apollo's political and historical afterlife, Roger Launius argued 'Apollo was born out of Cold War rivalries long gone, and indeed they did not exist much beyond the mid-1960s'.[7] Laudable attempts to broaden space history's field of vision from a myopic focus on the 1960s Moon Race have unfortunately obscured how the communist presence in space continued to affect American society. Soviet satellite launches and cosmonaut flights may not always have been front-page news after the early 1960s, but it is a poor sort of history that only skims front-page headlines. The Cold War most certainly persisted beyond 1963; this thesis will demonstrate that the Integral's shadow lingered long after this date as well.

Using the Moon Race as a starting point rather than a finish line illuminates the background to the crucial relationship that sustains humanity's sole crewed outpost in Earth's orbit: the International Space Station (ISS). To understand the unlikely, and increasingly uneasy, partnership between the United States and the Russian Federation, we cannot skip from the frantic competition of the 1960s space race to Bill Clinton and Boris Yeltsin signing the 1992 US-Russia Cooperative Space Agreement. Instead, we must study the intervening period of fluctuating cooperation, hostility and mistrust, as well as successive attempts to use space exploration as means of building political bridges on Earth.[8] With the 2011 retirement of America's Space Shuttle fleet, astronauts are now cosmonauts. Launched from the same Kazakh steppe as the first cosmonaut, Yuri Gagarin, they travel to the ISS aboard a venerable workhorse of a Russian spacecraft: the Soyuz, 'Union', whose basic design has changed little since Soviet days.[9] In 2014, the Russian Federation's Deputy Prime Minister Dmitri Rogozin responded to the Obama administration's condemnation of Russian intervention in the Ukrainian Civil War by laconically tweeting an image

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'Warriors and Worriers: Risk, Masculinity, and the Anxiety of Individuality in the Literature of American Spaceflight' in *Spacefarers: Images of Astronauts and Cosmonauts in the Heroic Era of Spaceflight*, ed. by Michael J. Neufeld (Washington DC: Smithsonian Institution Scholarly Press, 2013), pp. 209-225.

[7] Roger Launius, 'Perceptions of Apollo: Myth, nostalgia, memory or all of the above?', *Space Policy* 21 (2005), pp. 129-139 (pp. 135, 138).

[8] This thesis uses "Moon Race" to refer to the specific 1960s competition to land a spacefarer on the Moon and "space race" to refer to wider US-Soviet space rivalry. For the Clinton/Yeltsin space agreements and the cooperation that underpinned the construction of the ISS see Susan Eisenhower, *US-Russian Cooperation in Space After the Cold War* (Washington DC: Eisenhower Institute, 2004); Yuri Karash, *The Superpower Odyssey: A Russian Perspective on Space Cooperation* (Reston, VA: American Institute of Aeronautics and Astronautics, 1999); John M. Logsdon, *Together In Orbit: The Origins of International Participation in the Space Station* (Washington DC, NASA History Division, 1998), online via <http://history.nasa.gov/monograph11.pdf>,[accessed 28 February 2018]; James Oberg's *Star-Crossed Orbits: Inside the US-Russian Space Alliance* (London: McGraw-Hill, 2002), deals with this period, though is best treated as a personal reflection rather than an emotionally detached history.

[9] Jeffrey Kluger, 'The Shuttle Has Landed: Welcome to America's *Soyuz* Era' *Time*, 27 July 2011, http://www.time.com/time/health/article/0,8599,2084341,00.html [accessed 28 February 2018].

of a trampoline as an alternative way for NASA's astronauts to commute to the ISS.[10] Rogozin's sarcasm underlined how the ISS' internationalist vision depends on a fragile alliance between former Cold War adversaries, the world's first two space powers.

Since news of Sputnik broke, authors from diverse disciplines and backgrounds have scrutinised the Soviet space programme.[11] Cold War-era accounts grappled with a contemporaneous phenomenon (or problem): the use of space technology for strategic and propaganda purposes by a state claiming ideological hegemony over the global communist movement. Thus, such texts are largely of interest to this project as a valuable corpus of primary material rather than as a source of historiographical perspective or methodology. Although this literature review will focus primarily on material written after 1991, one Cold War-era work continues to dominate the historiography of US-Soviet space competition: Walter A. McDougall's *The Heavens and the Earth*.

McDougall's thesis is that Soviet space successes with the Sputnik and Vostok programmes of the late 1950s and early 1960s induced 'a saltation in the policies of technology'. Sputnik so unsettled the American state that it attempted to beat the Soviets at their own game and in the process became the 'dominant promoter of technological progress'.[12] Like Tom Wolfe, McDougall also invokes the memory of Zamiatin's 'Integral' to describe the Soviet programme as a secretive entity, an embodiment of 'the promethean promise of bolshevism' that chased its goals with a near-psychotic dedication.[13] However, the most remarkable similarity between Wolfe and McDougall's depictions of the Soviet programme is their blasé dismissal of its importance in the post-Voskhod period. Providing no evidence to substantiate such a sweeping generalisation, McDougall claims, falsely, that Soviet space activity went 'almost unnoticed' by the American press in the years after Apollo.[14] Such a cavalier approach to historical truth is forgivable in Wolfe's lively yarn; it is less acceptable in a book spoken of in hushed, reverent tones for the depth and brilliance of its scholarship.

Whilst *The Heavens and the Earth* is justly praised as a pioneering work, the prestige of its Pulitzer Prize must not obscure insights gained from the opening of Cold War archives and more nuanced

[10] Dmitri Rogozin, 'After analysing the sanctions against our space industry I suggest the US delivers its astronauts to the ISS (cont.)' 29 April, 2014 <https://twitter.com/drogozin/status/461167801835991040>, [accessed 28 February 2018].
[11] Nicholas Daniloff's *The Kremlin and the Cosmos* (New York, NY: Alfred A. Knopf, 1972), is a well researched example of the journalistic summaries of Soviet space programme; As we shall see, the Senate Committee on Aeronautical and Space Sciences' report (authored by Dr Charles Sheldon II), *Soviet Space Programs 1971-1975* (Washington DC: US Government Printing Office, 1976), is a good example of an appraisal by a government-employed experts.
[12] Walter A. McDougall, *The Heavens and the Earth: A Political History of the Space Age* (Baltimore Maryland, MD: The John Hopkins University Press, 1997), p. 451.
[13] Ibid., p. 294.
[14] McDougall, *The Heavens and the* Earth (1997), pp. 422, 430; McDougall cites James Oberg's *Red Star in Orbit* (London, Harrap, 1981), and The Senate Committee on Aeronautical and Space Sciences *Soviet Space Programs 1971-1975* (1976), both of which testify to continuing political and press interest in Soviet space exploration in the post-Apollo period.

subsequent enquiries into American scientific-governmental relations. John Logsdon and Julia Richers have both criticised McDougall for 'the fact that the political rhetoric of the Cold War left some traces in his writing', and his depiction of 'sneering' cosmonauts as unthinking puppets of communist ideologues is now particularly glaring.[15] In her recent history of Cold War science and technology, *Competing with the Soviets*, Audra Wolfe was more circumspect about the longevity of the Federal Government's post-Sputnik domination of American research and development (R&D). She characterises the US Apollo program as 'the last hurrah' of a Cold War government-directed R&D approach that was already an 'anachronism' by the 1969 Moon landings, let alone during the Reaganite 1980s when *The Heavens and the Earth* was published. Even McDougall himself would later reflect that his concept of a 'saltation' may have been an overstatement in light of subsequent trends.[16] Remaining wholly in thrall to McDougall's conclusions more than thirty years after their first publication signifies intellectual stagnation. It is better to consider McDougall as beginning a conversation on the Soviet space programme's effect on American society, rather than to accord him the final word on what exactly that effect was.

When it comes to post-Cold War study of the Soviet space programme, the gold standard remains Asif Siddiqi's groundbreaking, two-part history *The Sputnik Challenge* and *The Soviet Space Race with Apollo*. Capitalising on Western researchers' newfound access to Russian archives, Siddiqi deploys extensive declassified evidence whilst skilfully weaving together political and technical strands to relate how bitter competition between rival factions of the Soviet military-industrial complex frustrated rocket engineers' dreams of 'storming the heavens'. Siddiqi bemoaned a literature that engaged with his subject solely as a catalyst to US action, discussing *Sputnik 1* or Yuri Gagarin only as part of a chain of cause and effect that eventually brought Neil Armstrong to the Moon.[17] Discussing the English language historiography of the Soviet's N1 lunar rocket, a costly programme which endured a tortuous development process before its cancellation in the early 1970s, Siddiqi observed a tendency to 'see Soviet successes in space (such as Sputnik) as contingent and Soviet failures (such as the N1) as inevitable'.[18] Study of the Soviet programme's impact has largely followed McDougall's lead and centred on the White House's response to the

[15] John M. Logsdon, *John F. Kennedy and the Race to the Moon* (Basingstoke: Palgrave, 2010), p. 234; Julia Richers, *'Space is the place! Writing about Soviet space exploration*' in *Soviet Space Culture: Cosmic Enthusiasm in Socialist Societies*, ed. by Eva Maurer, Julia Richers, Monica Rüthers and Carmen Scheide, (Basingstoke: Palgrave Macmillan 2011), p. 13; McDougall, *The Heavens and the Earth* (1997), p. 455; Roger Launius depicts McDougall as having fostered Space History's 'Conservative' bent, 'Interpreting the Moon Landings: Project Apollo and the Historians', *History and Technology*, 22, 3 (2006), pp. 225-255 (pp. 230-231).

[16] Audra Wolfe, *Competing with the Soviets: Science, Technology and the State in Cold War America* (Baltimore, MD: The John Hopkins University Press, 2013), pp. 90,103-4; Walter A. McDougall, 'Introduction: Was Sputnik Really A Saltation?' in *Reconsidering Sputnik: Forty Years Since the Soviet Satellite* ed. by Roger D. Launius, John M. Logsdon, Robert W. Smith (Amsterdam, Harwood, 2000).

[17] Asif Siddiqi, *Sputnik and the Soviet Space Challenge* (Gainesville, FL: University Press of Florida, 2003), p. XV.

[18] Siddiqi, *The Soviet Space Race with Apollo,* (2000), p. 859.

'Sputnik Crisis': the shock and anxiety caused by the Soviets' launch of the first artificial satellite. *Sputnik 1's* phenomenal media impact and galvanising effect on American space policy makes everything that followed with the possible exception of the early Vostok crewed flights seem anticlimactic by comparison.[19] The Soviet Union's role as a doomed adversary, a tragic foil to American ingenuity and daring is natural when one begins at Sputnik, conscious of *Apollo 11* looming as a deterministic endpoint.

The 1967-1972 Apollo era was a pivotal moment in the cultural and political reception of space exploration. McDougall used the term 'Space Slump' to describe the precipitous decline in public engagement with space exploration that occurred in America whilst the Apollo programme was ongoing.[20] Investigations into the causes and course of the Space Slump frequently indentify the alienating effect of NASA's dry, jargon-filled rhetoric as a crucial factor for why Americans became disenchanted with space. Tribbe's *No Requiem for the Space Age* searches for the reasons for this disenchantment by commendably incorporating counterculture voices into the Apollo-era narrative. Tribbe argues that Apollo occurred just as American culture was undergoing a profound philosophical shift away from NASA's brand of technocratic rationalism and towards a 'neo-romanticism'.[21] NASA's rhetorical obsession with the Soviet space challenge is frequently identified as evidence of the agency's increasing inability to offer a compelling spiritual and emotional rationale for its expensive extraterrestrial jaunts. Indeed, NASA's unheeded warnings about Soviet space activities are one of the rare occasions where aerospace historians discuss post-'Heroic era' American perceptions of the Soviet programme.[22] However, the characterisation of NASA as trapped in a Cold War time warp has been exaggerated; Kendrick Oliver has pointedly critiqued space historians' tendency to unrealistically depict NASA as a monolith quarantined from the rapidly changing society around it.[23] Space exploration never quite managed to recapture its widespread popularity, but the space slump's influence should not be overstated. Space technology continued to be synonymous with the future within political rhetoric, billions of

[19] For the impact of the Vostok programme on US space policy see Logsdon, *John F. Kennedy and the Race to the Moon* (2010).
[20] McDougall, *The Heavens and the Earth* (1997), pp. 422, 430.
[21] Matthew D. Tribbe, *No Requiem for the Space Age: The Apollo Moon Landings in American Culture* (New York, NY: Oxford University Press, 2014), p. 159.
[22] Tribbe, *No Requiem for the Space Age* pp. 19,30; Mark E. Byrnes *Politics and Space: Image Making by NASA* (Westport, CT: Praeger, 1994), pp. 3, 73; W. D. Kay, *Defining NASA : The Historical Debate Over the Agency's Mission* (New York, NY: State University of New York, 2005), p.103; Variations on this argument are also put forward in works as diverse as T. A. Heppenheimer's engineering-focused popular history, *Countdown: A History of Space Flight* (New York, NY: John Wiley & Sons, 1997), pp. 240-1; Gerard DeGroot's controversial anti-NASA jeremiad, *Dark Side of the Moon: The Magnificent Madness of the American Lunar Quest* (London : Vintage, 2008), p. 266; and Matthew Hersch's labour history of the Astronaut as a specialised profession, *Inventing the American Astronaut* (New York: Palgrave Macmillan, 2012), p. 134.
[23] Kendrick Oliver, *To Touch the Face of God: The Sacred, the Profane, and the American Space Program, 1957-75*, (Baltimore, MD: John Hopkins University Press, 2013), p. 5.

dollars were set aside to fund military and civilian space programmes and a tenacious and vocal 'Pro-Space Movement' emerged hoping to restore NASA to its lost splendour.[24]

The literature's crowded focus on the Sputnik 'panic' and presidential response has obscured a longer history of American engagement with Soviet space activity. The USSR lost the Moon Race but the post-Apollo period arguably saw the Soviet space programme come of age. Mostly setting aside the 'spectaculars' of the Khrushchev era, the Soviets focused on developing a heavy-lift rocket vehicle, the Energia, and gradually refining their Low Earth Orbit (LEO) space stations, steadily pushing back the barriers of human endurance with ever-longer missions.[25] There has been minimal analysis of how Americans reacted to the Soviet space activities that took place alongside the Apollo programme, including the tragic catastrophes of the *Soyuz 1* and *Soyuz 11* missions.[26] How were Soviet robotic planetary and lunar missions perceived? How was the Soviets' growing confidence in occupying LEO during the years 1976-1981 discussed at a time when the US astronaut corps was grounded as it waited for the Shuttle? Did Soviet propaganda's poetic and transcendental conception of space exploration resonate with a nation increasingly alienated by its own space programme's arid, jargon-ridden rhetoric?

These questions have gone unanswered because of the literature's reluctance to engage with the Soviet programme outside of the more easily understood Sputnik-Vostok era; where a neat line of cause and effect can be traced between *Sputnik 1*'s tinny beep and President John F. Kennedy's stirring pledge that the US would land a man on the Moon by the end of the decade. With a shift in chronological focus, a period that encompasses the flowering and fracturing of detente during the 1970s, the renewal of hostile rhetoric during the 'second Cold War' of the early 1980s and the upheavals caused by the chaotic reforms of Mikhail Gorbachev's Glasnost (openness) and Perestroika (restructuring) policies stretches ahead of us. The Cold War persisted for a quarter of a century after the Mercury Seven completed their missions. Outer space continued to be a crucial Cold War terrain. The 'rocket-rattling' of the Sputnik-Vostok period when Soviet space exploits were perceived as an existential threat may have receded, but the Soviet presence in space remained, and Americans continued to contend with that presence.

<u>The New Aerospace History and 'The Imagination'</u>

As a study of space technology's political and cultural ramifications, this thesis situates itself firmly within the literature that calls itself the 'New Aerospace History'. This movement followed an earlier effort by aviation historians to redefine their field during the 1980s. Joseph Corn's 1983

[24] Robert Michaud, *Reaching for the High Frontier: The American Pro-Space Movement, 1972-84* (New York, NY: Praeger, 1986).
[25] Brian Harvey, *Russia in Space: The Failed Frontier?* (Chichester: Springer Praxis, 2001), pp. 21-22; Siddiqi, *The Soviet Space Race with Apollo* (2003), pp. 839-41.
[26] The *Soyuz 11* tragedy is explored in Grujica S. Ivanovic's thoughtful and thorough *Salyut: The First Space Station: Triumph and Tragedy* (Chichester: Springer Praxis, 2008).

history of America's infatuation with aviation technology *The Winged Gospel* breathed new life into stale subjects by examining the cultural ramifications of technological innovation.[27] Surveying space history when New Aerospace History's approach was beginning to bear fruit, Roger Launius described this literature as 'intrinsically committed to relating the subject to larger issues of society, politics, and culture'. Launius commended what he termed 'the vital centre' for its 'more sophisticated view of the science, technology, and individual project' and for '[moving] beyond a fetish for the artefact'.[28] This literature repudiates the narrow technology-centric approach taken by previous literature on space exploration, pejoratively labelled the 'Huntsville School' for its hagiographical depiction of rocket designers of the Marshall Spaceflight Centre in Huntsville, Alabama.[29] In contrast to the Huntsville School's hackneyed mythologizing and pedantic antiquarianism, edited collections like Bell and Parker's *Space Travel and Culture*, and Neufeld's *Spacefarers: Images of Astronauts and Cosmonauts in the Heroic Era of Spaceflight* critically engage with the historical currents that have sustained and constrained humanity's exploration of the cosmos.[30] The New Aerospace History is a much more crowded and vibrant marketplace than when Launius surveyed it at the turn of the century. Two complementary literatures now analyse the societal impact of both the American and Soviet space programmes.

Howard E. McCurdy's *Space and the American Imagination* represents the New Aerospace History at its best. This ambitious overview ranges from unpacking the rhetorical association of space with the 19th century Western Frontier, to exploring how dreams of space stations and space commercialisation helped shape US space policy.[31] Launius asserted McCurdy had 'demarked an important area of consideration' by focusing less on how America went into space, than why it did so, and how doing so affected society.[32] McCurdy contends that, 'imagination and culture affect reality'; the American public was prepared for space exploration because a 'culture shift preceded the arrival of the space programme'. A concerted campaign by space popularisers, a diverse movement including science fiction authors, futurists and aeronautical engineers, had prepared the American public for the imminent reality of space travel before it occurred. The American

[27] Joseph Corn, *The Winged Gospel: America's Romance with Aviation, 1900-1950* (New York, NY: Oxford University Press, 1983), pp. vii-ix, Corn discusses space exploration as a potential successor to America's earlier aviation enthusiasm pp. 142-7.
[28] Roger D. Launius, 'The Historical Dimension of Space Exploration: Reflections and Possibilities,' *Space Policy,* 16 (2000), pp. 23–38 (p. 23).
[29] For criticism of the failings of the historical approach taken by the 'Huntsville School', a term originated in Rip Bulkeley's *The Sputnik Crisis and Early United States Space Policy* (Bloomington, IN: Indiana University Press, 1991), see: Launius, 'The Historical Dimension of Space Exploration' (2000), pp. 24-26; Michael J. Neufeld, 'Creating a Memory of the German Rocket Program for the Cold War' in *Remembering The Space Age (NASA SP-2008-4703)*, ed. by Stephen J. Dick, (Washington DC, NASA History Division, 2008), pp. 71-87, Neufeld identifies Frederick I. Ordway III and Mitchell R. Sharpe's *The Rocket Team* (New York: Thomas Y. Crowell, 1979) as a typical example of the "Huntsville School" approach.
[30] *Space Travel and Culture: From Apollo to Space Tourism* ed. by David F. Bell, and Martin Parker, (Oxford: Wiley-Blackwell, 2009); *Spacefarers:* ed. by Neufeld, (2013).
[31] Howard E. McCurdy, *Space and the American Imagination* 2nd Edition (Baltimore, MD: John Hopkins University Press, 2011).
[32] Launius, 'The Historical Dimension of Space Exploration' (2000), p. 34.

space programme had to bend to conform to this pre-existing image of space exploration; and when it failed to so, disenchantment often followed.[33] The concept of a singular 'American imagination' does risk homogenising how Americans reacted to space exploration during the 1950s and 1960s. Given their nation's cultural and racial diversity and the fractiousness of post-war social divisions, to assume that Americans reacted in a unitary way to any given phenomena would be extremely presumptuous. Nevertheless, the 'imagination' as a concept that unites cultural production and political discourse within a single holistic category, remains crucial to this thesis, which seeks to understand the cultural and political imprint that Soviet space activities left on American society.

This raises the question of how this thesis will engage with perception's relationship to reality. In their study of internal and external perceptions of the Soviet Union, Shlapentokh, Shiraev and Carroll draw a distinction between objective reality and the subjective realm of perception and interpretation. Interestingly, they use the example of the Soviet military's control of the USSR's space programme as an example of that objective reality: a concrete fact that existed quite apart from the debate about the nature of Soviet communism that raged in the West and simmered in samizdat.[34] By drawing this distinction, they proceed from a methodological standpoint influenced by Peter Berger and Thomas Luckmann's influential *The Social Construction of Reality*, which they summarised as positing 'one objective reality- many subjective realities'.[35] McCurdy, who also acknowledged a debt to Berger and Luckmann, argued that individuals' 'subjective views ... shape the institutions and policies that make up objective reality. Imagination is the engine that drives this process.'[36] The influential symbolic anthropologist Clifford Geertz characterised ideologies as maps through which individuals and groups navigate social realities; 'whether, in any particular case, the map is accurate ...is a separate question'.[37] The American imagination is a spacious enough terrain to accommodate multiple, potentially conflicting manifestations of the Soviet space presence. These imaginative characterisations may have been informed by, but they are not synonymous with, the physical launch-pads, rockets, research institutes, control centres and cosmonaut training facilities of the Soviet programme.

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[33] McCurdy, *Space and the American Imagination* (2011), p. 311-14, 19; Valerie Neal's recent book *Spaceflight in the Shuttle Era and Beyond: Redefining Humanity's Purpose in Space* (New Haven, CT: Yale University Press, 2017), builds on McCurdy's argument by arguing that the concept of spaceflight was itself a rhetorical construction, an 'imaginary' akin to an ideology or belief system, see pp. 8-9.

[34] Vladimir Shlapentokh, Eric Shiraev and Eero Carroll, *The Soviet Union: Internal and External Perspectives*, (Basingstoke: Palgrave Macmillan, 2009), p. X.

[35] Shlapentokh, Shiraev and Carroll, *The Soviet Union* (2009), p. 7; Describing their task, Berger and Luckmann argue 'an adequate understanding of the reality 'sui generis' of society requires an inquiry into the manner in which this reality is constructed.', Peter Bergman and Thomas Luckmann, *The Social Construction of Reality: A Treatise in the Sociology of Knowledge* (Harmondsworth, Penguin Books, 1979), p. 30.

[36] McCurdy, *Space and the American Imagination,* p. 311.

[37] Clifford Geertz, 'Ideology as a Cultural System' in Geertz, *The Interpretation of Cultures: Selected Essays* (London: Hutchinson, 1975), p. 220.

Analysis of American 'Space Culture' has focused temporally on the Mercury and Apollo programmes of the 1960s and early 1970s, using the 1969 *Apollo 11* lunar landing in particular, as a lens through which to examine other elements of 'The American Century'.[38] Margaret Weitekamp's *Right Stuff, Wrong Sex,* its title subverting Wolfe's paean to masculine derring-do, explored the gender implications of NASA's 'Manned' space programme, detailing the agency's discomfort with the female body and its resistance to incorporating women into its space program.[39] Robert Poole's *Earthrise* studied how photographs of the whole Earth taken by Apollo astronauts affected emerging political and environmental discourses, focusing attention back onto the home planet's fragility rather than outward towards the vast space frontier.[40] W. Patrick McCray has used unconventional protagonists to broaden the scope of histories of the space age. *Keep Watching the Skies!* illuminated the global networks of amateur satellite watchers that emerged after Sputnik and *The Visioneers* examined the utopian dreams of space colonies and nanotechnology that emerged from the surprisingly practical minds of scientist-engineers Professor Gerard K. O'Neill and Eric Drexler.[41] These works, along with Oliver's *To Touch the Face of God* and Matthew Tribbe's *No Requiem for Apollo* all investigate the deeper meanings of the 'Space Age' by examining it alongside concurrent social, political and cultural phenomena.[42]

This thesis has also been indelibly influenced by De Witt Douglas Kilgore's *Astrofuturism*. Kilgore interrogates widespread American assumptions about space exploration and argues that these can never be entirely divorced from the traumatic racial dynamics of American society. Kilgore avoids the pitfalls of McCurdy's homogenising description of an 'American' imagination by detailing how white America's post-War anxieties shaped dreams of space exploration, a persistent discourse that he terms 'Astrofuturism'. Kilgore argues Astrofuturism arose from the 'euro-American preoccupation with imperial exploration and utopian speculation' and was defined by its locating America's future in outer space: a limitless reincarnation of the Western Frontier.[43] Space *was* the future, a rejuvenating terrain of millenarian importance; 'the space frontier represents for the astrofuturists the landscape in which the human condition can

[38] Alexander Geppert argues the term 'Astroculture' is more precise than space culture and avoids 'inviting conceptual misunderstandings from other fields like urban studies or entire disciplines such as geography.' At the risk of infuriating stray urban studies scholars, I will persist in using space culture for purely personal, stylistic reasons. Geppert, 'European Astrofuturism, Cosmic Provincialism' in *Imagining Outer Space: European Astroculture in the Twentieth Century* ed. by Geppert (Basingstoke: Palgrave Macmillan, 2012), p. 8.

[39] Margaret Weitekamp, *Right Stuff, Wrong Sex: America's First Women in Space Program* (Baltimore, MD: John Hopkins University Press, 2004), Weitekamp explores American reaction to pioneering female cosmonaut Valentina Tereshkova on pp. 157-64.

[40] Robert Poole, *Earthrise: How Man First Saw The Earth* (London: Yale University Press, 2008).

[41] W. Patrick McCray, *Keep Watching the Skies!: The Story of Operation Moonwatch and the Dawn of the Space Age* (Princeton NJ: Princeton University Press, 2008), *Visioneers: How a Group of Elite Scientists Pursued Space Colonies, Nanotechnologies, and a Limitless Future* (Princeton, NJ: Princeton University Press, 2012).

[42] Oliver, *To Touch the Face of God*, (2013); Tribbe, *No Requiem for the Space Age* (2014).

[43] DeWitt Douglas Kilgore, *Astrofuturism: Science, Race and Visions of Utopia in Space* (Philadelphia: University of Pennsylvania Press, MA: 2003), p.1.

improve.'[44] Despite its cosmic rhetoric, Kilgore characterises Cold War Astrofuturism as an un-ambitious utopia when it came to racial progress. America's spacefaring future merely perpetuated the status quo of white domination into infinity.[45] Kilgore's work is absolutely crucial to this thesis because it provides a useful term that encapsulates a particular optimistic, expectant and nationalistic style that suffuses much American discourse on space exploration. Many of this thesis' characters were unabashed adherents of the escapist ideology that Kilgore describes.

An avowedly socialist space programme articulating its own narrative of cosmic destiny raised profound questions for American astrofuturists. The Soviet space programme represented a tectonic collision between two imaginative landscapes: the terrain of the future and a country that seemed to be irrevocably stuck in the past. For many Americans, the Soviet Union was a country 'imprisoned by its history', a benighted land whose people were congenitally habituated towards grinding oppression; the communist system merely the latest manifestation of a timeless Russian tyranny.[46] Sputnik was so incongruous because a nation perceived as a secretive and quasi-medieval despotism had no place opening the way to this futuristic frontier. This thesis builds on Kilgore's work by exploring how astrofuturists reconciled this communist presence in a terrain they regarded as an optimistic and uniquely American sanctuary.

Soviet Space Culture

On the other side of the Cold War divide, a second literature seeks to understand the 'cosmic enthusiasm' that swept the Soviet Bloc. Exemplified by the edited collections *Soviet Space Culture* and *Into the Cosmos*, it has also used space exploration as a lens through which to examine wider historical questions.[47] The USSR's space programme becomes a means of exploring crucial aspects of Soviet society such as the role of secrecy in political culture, the imbalances caused by a command economy that favoured military procurement over civilian consumer spending and propaganda use of scientific accomplishments as a means of ideological legitimisation. This literature has developed an extremely useful concept of 'Soviet space culture' that encompasses both propaganda narratives and cultural production, such as science fiction books and films and cosmonaut biographies as well as reporting on the Soviet space programme's individual components (cosmonauts, space stations, satellites and scientific personnel). Study of Soviet space culture has coalesced around several focal subjects: the philosophical and cultural origins of

[44] Ibid., pp. 3-5.
[45] Ibid., pp. 222-3
[46] Dina Fainberg, 'Reports from 'Eternal Russia': The Soviet Travelogues of American Foreign Correspondents, 1965–1985' Russia in American Literature Conference, British Library, London, 13 July 2017; the inherently 'Russian' characteristics of Soviet totalitarianism was an argument vigorously propounded by conservative sovietologist Richard Pipes, see David Engerman, *Watching the Enemy: The Rise and Fall of America's Soviet Experts* (Oxford: Oxford University Press, 2009), pp. 273-84.
[47] *Soviet Space Culture: Cosmic Enthusiasm in Socialist Societies* ed. by Eva Maurer, Julia Richers, Monica Rüthers and Carmen Scheide, (Basingstoke: Palgrave Macmillan, 2011); *Into the Cosmos: Space Exploration and Soviet Culture* ed. by James T Andrews and Asif Siddiqi, (Pittsburgh, PA: University of Pittsburgh Press, 2011)

cosmic enthusiasm, the Soviet state's use of cosmonauts as propaganda exemplars and, finally, the distorting impact of secrecy on Soviet space culture.

Studies of Soviet space culture's roots articulate a more nuanced view of Soviet programme's provenance than as a simple manifestation of Leninism's 'promethean promise'. Asif Siddiqi's *The Red Rocket's Glare,* which explores pre-sputnik manifestations of Soviet 'cosmic enthusiasm', demonstrates that the scientific and philosophical culture of Imperial Russia and the cultural 'space fad' of the 1920s were as much a formative influence on Soviet space culture as Marxism-Leninism's veneration of science and technology.[48] A crucial pre-revolutionary ingredient of cosmic enthusiasm was the esoteric philosophy of 'Cosmism', extensively analysed in George M. Young's treatise *The Russian Cosmists.* Young describes Cosmism as a heady blend of utopian pseudoscience and Christian mysticism; for the cosmist philosopher Nikolai Fedorov, space exploration and colonisation was a necessary afterthought to the transcendental 'Common Task': the triumph over death and the resurrection of every soul that had ever lived.[49] Young, Siddiqi and Michael Hagermeister have illuminated an important aspect of Soviet space culture's heritage by detailing how cosmist ideas profoundly influenced the worldview of Konstantin Tsiolkovsky, the pioneering Russian rocket theorist venerated as the 'Grandfather of Cosmonautics'.[50] The lasting influence of cosmism's mystical utopianism raises the crucial question of whether American observers noticed the persistence of this transcendental element within Soviet space culture.

A second strand of the literature on cosmic enthusiasm examines Soviet society through the lives and propaganda personas of the cosmonauts. Andrew Jenks' recent biography of Yuri Gagarin, *The Cosmonaut Who Couldn't Stop Smiling,* focuses on how the first cosmonaut struggled under the pressures of his unique role. Jenks has described Gagarin as a 'truthful deceiver' for the way he reconciled his personality and beliefs with his proscribed role as paragon of socialism.[51] Elsewhere, Iina Kohonen has scrutinised the propaganda messages encoded within the staging of domestic scenes in photographic depictions of cosmonauts' home lives. Slava Gerovitch's analysis of Soviet space 'mythologies' uses cosmonauts, the humans at the centre of complex man-machine systems, to explore the utopian hopes that communist planners pinned on the emerging

[48] Asif Siddiqi, *The Red Rocket's Glare: Spaceflight and the Soviet Imagination* (Cambridge: Cambridge University Press, 2010).
[49] George M. Young, *The Russian Cosmists: The Esoteric Futurism of Nikolai Fedorov and His Followers* (Oxford: Oxford University Press, 2012).
[50] Michael Hagermeister, 'The Conquest of Space and the Bliss of Atoms: Konstantin Tsiolkovsky' in *Soviet Space Culture* ed. by Maurer, Richers, Ruethers and Scheide (2011), pp. 27-41.
[51] Andrew Jenks, *The Cosmonaut Who Couldn't Stop Smiling: The Life and Legend of Yuri Gagarin* (DeKalb, IL: Northern Illinois University Press, 2014); 'Yuri Gagarin: The Sincere Deceiver,' in *Into the Cosmos: Soviet Culture and Space Exploration* (2011), pp. 107-133.

field of cybernetics.[52] Aside from comparisons of astronauts and cosmonauts' depiction in Soviet and American propaganda magazines, or their reception in non-aligned Yugoslavia, the extensive literature on the political roles Soviet spacefarers played has focused primarily on their reception within the USSR.[53] Cosmonauts are unique gateways through which to understand Western perceptions of the Soviet Union and its space programme but their reception in the West remains poorly understood. Exceptions are Gurbir Singh's factually detailed but analytically shallow history of Gagarin's visit to Britain, and Darren Jorgensen's insightful essay on the image of cosmonauts in post-Cold War blockbusters such as *Space Cowboys* and *Armageddon*.[54] However, as neither author contends with how the cosmonauts were perceived within the only other state capable of independently sending humans into the space during the Cold War, a critical gap remains within this otherwise vibrant literature.

Asif Siddiqi's work on the secrecy that surrounded the Soviet programme, once again, leads the way. His essay on the *Glavlit* censorship bureau, 'Cosmic Contradictions', described how the cloak of secrecy concealing the Soviet programme's inner workings and plans for the future eventually created 'a chasm between what was actually happening and what was being told about it.'[55] He also contends that Mikhail Gorbachev's Glasnost, 'Openness', policies during the 1980s led to the fracturing of the heroic, official narrative of Soviet cosmonauts and the 'privatisation of memory' in the post-Soviet Russian Federation.[56] Soviet secrecy had important international implications, Michael J. Allen's *Live from the Moon* argued the juxtaposition between NASA's openness and Soviet secrecy recalled a central Cold War dichotomy, and was a way 'in which the relationship between the superpowers became codified'.[57] American perceptions of the Soviet programme were shaped by this secrecy. These perceptions were, more accurately, the study of two overlapping entities. In addition to the flights that actually occurred, the technical-organizational

[52] Iina Kohonen, 'The Heroic and the Ordinary: Photographic Representations of Soviet Cosmonauts in the Early 1960s' in *Soviet Space Culture* ed. by Maurer, Richers, Rüthers and Scheide (2011), pp. 103-121; Slava Gerovitch, *Soviet Space Mythologies: Public Images, Private Memories and the Making of a Cultural Identity* (Pittsburgh, PA: University of Pittsburgh Press, 2015).

[53] Trevor S. Rockwell, 'They May Remake Our Image of Mankind: Representations of Cosmonauts and Astronauts in Soviet and American Propaganda Magazines, 1961-1981' in *Spacefarers* ed. by Neufeld (2013); Radina Vucetic, 'Soviet Cosmonauts and American Astronauts in Yugoslavia: Who did the Yugoslavs love more' in *Soviet Space Culture* ed. by Richers, Rüthers and Scheide, (2011), pp. 188-205.

[54] Gurbir Singh, *Yuri Gagarin in London and Manchester: A Smile that Changed the World?* (Manchester: AstrotalkUK Publications, 2011); Darren Jorgensen, 'States of Weightlessness: Cosmonauts in Film and Television', *Science Fiction Film and Television*, 2, 2, (2009), pp. 204-225; My MPhil dissertation explored the American image of the cosmonaut in detail, See Thomas Ellis, 'The Cosmonaut in the American Imagination: 1961-1975' (Unpublished MPhil Thesis, University of Cambridge, 2012) available online via https://www.academia.edu/9439919/_The_Cosmonaut_in_the_American_Imagination_1961-1975_ [accessed 28 February 2018].

[55] Asif Siddiqi, 'Cosmic Contradictions: Popular Enthusiasm and Secrecy in the Soviet Space Program' in *Into the Cosmos: Space Exploration and Soviet Culture* ed. by James T. Andrews and Asif Siddiqi (Pittsburgh, PA: University of Pittsburgh Press, 2011), pp. 47-77.

[56] Asif Siddiqi, 'Privatising Memories: The Soviet Space Program in Museums and Memoirs' in *Showcasing Space* ed. by Martin Collins and Douglas Millard, (London: NMSI Trading, 2005), p. 99.

[57] Michael Allen, *Live from the Moon: Film, Television and the Space Race* (London: IB Taurus, 2009), p. xii.

apparatus that existed and the Soviet scientists, engineers and cosmonauts that Americans met or observed, was a parallel 'Shadow Programme': a protean fog of rumours and speculation over Soviet intentions and capabilities that emerged from Soviet secrecy. This thesis builds on the exciting literature on Soviet space culture by exploring how the Soviet space programme and its ideology were interpreted, evaluated and contested in a society that differed markedly from the socialist states of the Eastern Bloc.

Cold War Alterity and Global Space History

By exploring how one spacefaring nation reacted to the space activities performed by its chief ideological rival, this thesis is also about the relationship between those two countries. Edward Said's hugely influential theory of alterity has proven irresistible to those studying a period where the rhetorical construction of a Manichean divide between Western Democracy and Eastern Communism was a central political reality. Culinane and Ryan and Heonik Kwon, amongst others, argue that just as Said's European Orientalists defined themselves in juxtaposition to an oriental other, during the Cold War 'the United States identified itself in contrast to the Communist threat'.[58] Competition in space was no exception to this tendency. Michael A. Smith's insightful essay 'Selling the Moon', which depicted the space programmes of the 1960s as colossal advertising campaigns for US and Soviet ideology argued that the space race was 'consummately other-related'.[59] David E. Nye makes a similar argument in *The American Technological Sublime*, which described the uniquely American veneration of huge technological projects: the transcontinental railroad, skyscrapers, hydroelectric dams, and, most significantly for our purposes, the Apollo Programme. Nye asserts, 'The technological sublime is not absolute but comparative'. The exhilarating mantra of observers of the *Apollo 11* launch '"You've got to say America's first."... carried with it, of course, an implicit comparison with the Soviet Union.'[60] Analysing American perceptions of Soviet space activities not only clarifies the relationship between nationalism and space exploration, it also illuminates how America defined its own activities and purpose in space through the construction of a Soviet other.

At this point the pressing question of whether another study of the two 'space race' superpowers is surplus to requirement rears its head. Is it not time to explore how the nations of the Non-Aligned Movement, or how the emerging space powers of France, Japan and China fit into the picture? In recent years, space historians have criticised the field's narrow geographical, hierarchical focus on the Cold War Superpowers. This charge recalls the battle-cry of Odd Arne

[58] Edward Said, *Orientalism* (London: Penguin, 2003), Michael Patrick Cullinane and David Ryan, 'Introduction' in *US Foreign Policy and the Other* ed. by Michael Patrick Cullinane and David Ryan (New York, Berghahn, 2015), p. 2; Heonik Kwon, *The Other Cold War*, (New York, NY: Columbia University Press, 2010), p.67.

[59] Michael A. Smith, 'Selling the Moon: The. U.S. Manned Space Program and the Triumph of Commodity Scientism' in *The Culture of Consumption: Critical Essays in American History, 1880-1980* ed. by Richard Wightman Fox and T. J. Jackson Lears (New York, NY: Pantheon Books, 1983), pp. 177-236 (pp. 177, 200).

[60] David E. Nye, *The American Technological Sublime* (Cambridge MA: MIT Press, 1994), p. 241.

Westad's *The Global Cold War,* which chastised existing historiography for overlooking the nations, insurgencies and revolutionary movements of the Third World.[61] In an essay tellingly subtitled 'Towards a Global Space History', Asif Siddiqi drew on Westad's thesis to criticise the 'reactive' and 'unidirectional' way his own *Challenge to Apollo* and William Burrows' *This New Ocean* had depicted interaction between Soviet and US space programs.[62] Siddiqi recommended a more nuanced perspective on technology transfer, playing down nationalist narratives by shifting historical focus 'from nations to *communities*...'Identification' to *identities*, and from moments to processes'.[63] Rather than slamming the door to study of the superpowers' programmes on a new generation of space historians, Siddiqi was arguing for the need for a new approach to these familiar subjects. Hopefully, any valid concerns about retreading stale ground will be ameliorated upon consideration of this thesis' temporal focus and its approach to the issue of space cooperation.

Focusing on the Cold War superpowers does not preclude a transnational approach of the sort exemplified by the work of Matthew Evangelista, who highlighted the agency and impact of 'transnational actors' such as scientists, citizens' diplomacy groups, charitable organisations and peace activists.[64] Such an approach can help illuminate superpower cooperation, as John Krige proved in his analysis of US-French space cooperation that argued that although Cold War nations used science to 'enhance national pride', large scale scientific projects were still part of an international development process propelled by the 'transnational flow of people and ideas' rather than being hermetically sealed by national borders.[65] Historians of space cooperation must tread carefully. Matthew von Bencke's *The Politics of Space* focuses solely on high-level US-Soviet intergovernmental agreements, obscuring in the process smaller-scale, less-visible scientific cooperation that continued throughout the Cold War tension of the early 1980s.[66] This is not the

[61] Odd A. Westad, *The Global Cold War: Third World Interventions and the Making of Our Times* (Cambridge, Cambridge University Press, 2007).
[62] Asif A. Siddiqi, 'Competing Technologies, National(ist),Narratives, and Universal Claims: Toward a Global History of Space Exploration' *Technology and Culture*, 51, 2, (2010), pp. 425-443 (pp. 440-443).
[63] Ibid., p. 438.
[64] See Matthew Evangelista, *Unarmed Forces: The Transnational Movement to End the Cold War* (Ithaca, NY: Cornell University Press, 2002), and Evangelista, 'Transnational Organizations and the Cold War' in *The Cambridge History of the Cold War*, Vol. 3, ed. by Melvyn P. Leffler and Odd Arne Westad, (Cambridge: Cambridge University Press, 2010), pp. 400-421;The role of scientists in particular has been explored by Kai-Henrick Barth though he focuses on seismologists and the establishment of bilateral nuclear test monitoring agreements, see 'Catalysts of Change: Scientists as Transnational Arms Control Advocates in the 1980s' *Osiris*, 2nd Series, 21, (2006), pp. 182-206.
[65] John Krige, 'Some Concluding Remarks' in *Science and Technology in the Global Cold War* ed. by Naomi Oreskes and John Krige, (Cambridge, MIT Press, 2014) pp. 348-9.
[66] Matthew Von Bencke, '*The Politics of Space: A History of US/Soviet/Russian Competition and Cooperation in Space* (Boulder, CO: Westview Press, 1997); For histories of US-Soviet space cooperation that incorporate these less obtrusive exchanges, see Angelina Long-Callahan's 'Sustaining Soviet American collaboration: 1957-1989' in *NASA in the World: Fifty Years of International Collaboration in Space* ed. by John Krige, Angelina Long Callahan and Ashok Maharaj, (New York, NY: Palgrave Macmillan, 2013) and Joan Johnson-Freese's dated but still insightful *Changing Patterns of International Cooperation in Space* (Malabar, FL: Orbit books, 1990).

only potential pitfall. Whilst Yuri Karash successfully incorporates low-key scientific exchanges into *The Superpower Odyssey*'s narrative, he consistently mischaracterises US media pronouncements as synonymous with American 'public opinion'.[67] This thesis will explore exchanges between the two space cultures through specific instances of transnational contact between bureaucrats, space scientists and peace activists in both nations. It acknowledges that media discussion of cooperation is, at best, another reflection of elite perceptions rather than an expression of the general population's thoughts.

Finally, it must be stressed that this is a study of perceptions, of how people see the world rather than reality itself. Castigating these perceptions for failing to conform with our own supposedly more nuanced perspective is inappropriate. The period covered by this thesis did see the emergence of Japanese, Chinese, French and Indian space programmes, as well as the formation of the European Space Agency. Still, during the first thirty years of the space age, the two Cold War superpowers dominated the world of space exploration. Introducing a recent collection of essays examining space exploration's place in the Western European imagination, Alexander Geppert admitted that 'Since 1945, Western Europe's contribution to the physical exploration of outer space has been peripheral and, for many years, a secondary priority at best.'[68] Between 1967 and 1991, the Soviet space programme accounted for the vast majority of satellite launches and continued to remain a global centre of space science and technology development.[69] This fact did not go unnoticed by politicians, bureaucrats and journalists in the USSR's rival superpower. The development of space technology may have been a global process involving transnational collaboration, but this is not necessarily how matters appeared within Cold War America where space exploration's international dimension was often seen through nationalistic prisms of 'leadership' and technology transfer.

Source Base and Thesis Structure

This thesis reconstructs American perceptions of the Soviet space programme through archival documents bolstered with contemporary press and cultural material. Perceptions are ephemeral. Oral history is an excellent tool for studying space policy decision-making processes or the quotidian experiences of the US and Soviet space communities but recollections will always be

[67] Karash, 'The Superpower Odyssey' (1999), for examples see pp. 112-3,119, 200-1; a similar overreliance on the *New York Times* mars Neal's *Spaceflight in the Shuttle Era and Beyond* (2017).
[68] Geppert, 'European Astrofuturism, Cosmic Provincialism' in *Imagining Outer Space*, ed. by Geppert, (2012) p. 9.
[69] The Soviet Union dominated tables of satellite launches and payloads put into orbit up until the late 1980s. This was largely due to a launch strategy that differed from the American approach of relying on a few sophisticated, long-lived satellites. Soviet satellites had a shorter lifespan and were constructed from mass produced components. See Brian Harvey, *The New Russian Space Programme: From Competition to Collaboration* (Chichester: Springer Praxis, 1996) pp. 141, 212.

affected by hindsight.[70] For this project that means knowledge of the USSR's eventual collapse and subsequent revelations about the Soviet space effort's true scope and direction. This thesis has made the deliberate decision to use oral history interviews sparingly in order to better capture how America's space community reacted to the communist presence in space when there was no end to the Cold War, or the Soviet censorship regime, in sight.

Documents from NASA, the National Security Council and the State Department illuminate the perceptions of high-level policymakers. Equally important, though, are the NASA bureaucrats who participated in US-Soviet cooperative working groups, peace activists who attempted to harness space cooperation's imaginative power and American astronauts who believed they shared a deep kinship with their Soviet counterparts. Another important group for this thesis are the dedicated observers of the Soviet programme who practiced the unique art of 'cosmokremlinology' which blended technology analysis with traditional Sovietology. These space sovietologists included both government-employed experts with access to classified information and freelancers who turned their interest in Soviet space affairs into a career. A final important group for this thesis is space enthusiasts from across the political spectrum whose unwavering belief in the space frontier's promise bucked the space slump trend. This project's subjects may not reflect the groundswell of American public opinion, but even if there were a rigorous method for discerning that vanished zeitgeist, their stories would remain compelling. It necessarily examines elites and specialists who were engaged in or with space exploration and its political consequences. These groups and individuals are this story's protagonists; it is through their eyes that we will view the Soviet space programme.

To summarise, this thesis is not another tour of presidential reaction to the Soviet space triumphs of the late 1950s and early 1960s. Instead, it analyses how Soviet space activities, as well as plans, propaganda and associated cultural products were perceived by policymakers, activists and commentators within the United States, the USSR's rival superpower and principal space competitor. It seeks to create an organic bridge between the two vibrant, complementary literatures on Soviet and American space cultures. In addition to reconstructing the depiction of the Soviet programme presented to policymakers by the US intelligence community and space experts, it also explores the broader imprint left by Soviet space activities on American political culture. Its analysis of cooperation includes schemes that failed to reach fruition as well as

[70] NASA's History Office at its DC Headquarters maintains a voluminous archive of oral history testimony, details of which can be found online via NASA Headquarters History Office Oral History Collection, Revised 11/21/16 https://history.nasa.gov/hqinventory.pdf; individual centres such as the Johnson Space Centre maintain their own oral history programmes, some of which are available to view online https://www.jsc.nasa.gov/history/oral_histories/oral_histories.htm; for the Soviet programme; Slava Gerovitch's *Voices of the Soviet Space Program: Cosmonauts, Soldiers, and Engineers Who Took the USSR into Space*.', (New York, NY: Palgrave Macmillan: 2014), collects testimony from a fascinating cross-section of the Soviet programme, see also John Rea's *Roads to Space: An Oral History of the Soviet Space Program* (New York, NY: McGraw-Hill, 1995).

engaging with the cultural and rhetorical afterlife of the joint US-Soviet 1975 Apollo-Soyuz Test Project (ASTP). To reconstruct these perceptions it will rely on archival documents rather than the retrospective 'war stories' of veterans of the Cold War space race.

Tom Wolfe's narrative ended in 1963 with The Integral vanquished; mine begins in 1967 with the space race, and the Cold War, as extant problems. 1967 was a watershed year for space exploration. In addition to the *Apollo 1* and *Soyuz 1* tragedies, which prompted introspection and recrimination within both superpower space programmes, it also saw the UN Outer Space Treaty come into force, which specifically forbade placing weapons of mass destruction in space. Furthermore, the Soviet space programme faced the late 1960s having lost two of its key personalities. In January 1966, its anonymous guiding force, 'Chief Designer' Sergei Korolev whose identity had been a state secret, died during what should have been a routine operation. In March 1968, it lost its public face when Yuri Gagarin, Cosmonaut Number One, was killed in a plane crash. The posthumous revelation of Korolev's identity and the sudden death of its charismatic champion mark an important break with the 'heroic' era of the Vostok and Voskhod programmes. My first chapter begins in 1967, using the career of the Congressional Research Service's Dr Charles S. Sheldon II to explore the world of the 'Cosmokremlinologists', dedicated observers of Soviet space affairs who attempted to demystify the Soviet programme during the height of the Moon Race. After introducing Sheldon and his discipline, this chapter moves on to explore the image of the Soviet competitor, whether that be fictitious cosmonaut or robotic lunar rover, against the backdrop of the American Apollo triumph.

Chapter Two focuses on US-Soviet space cooperation during the era of detente, centring on the prelude to, and poorly understood afterlife of, the 1975 Apollo-Soyuz Test Project (ASTP), the cooperative mission that saw American and Soviet spacecraft dock in orbit and exchange crewmembers. This chapter will evaluate the ASTP's success as a symbol of detente, rather than castigating it for the ultimate failure of that policy, or concentrating on its debatable value as an engineering exercise. Chapter Three focuses on the 1975-1981 hiatus in US crewed spaceflight, a pivotal period for perceptions of the Soviet space programme. It examines how space detente collapsed as superpower relations worsened and American anxiety about the USSR's space station programme and anti-satellite (ASAT) weapons tests grew. As well as exploring how the Ford and Carter administrations reacted to a seemingly resurgent Soviet space programme, this chapter discusses how Soviet space propaganda influenced American space colonisation advocates such as Professor Gerard K. O'Neill and the L5 Society.

Worries about a Soviet challenge to America's 'space leadership' led to a re-emergence of Sputnik-era 'Space Control' discourses as detente was eclipsed by the 'second Cold War'. This thesis' final two chapters explore how proponents and opponents of space control enlisted the Soviet space programme in their rhetoric. Chapter Four explores the resurrection of space control

ideology, arguing that fears of Soviet space activity were deployed to justify President Reagan's ballistic missile defence research programme: the Strategic Defence Initiative (SDI), popularly known as 'Star Wars'. Chapter Five focuses on SDI's opponents, describing how they used visions of joint US-Soviet missions to Mars to challenge the militaristic space control fantasies that sustained Reagan's Star Wars vision. Analysis of this 'Mars Together' movement is an important addition to the literature on space's place in the American imagination, reconstructing an idea that was overshadowed by the Soviet Union's rapid collapse. Finally, this thesis concludes by considering the peculiar position that America-bound emissaries of the Soviet space programme found themselves in during the USSR's final days. A future of commercial cooperation and collaboration beckoned but the end of the Communist Party's grip on power did not entirely erase Cold War suspicions. After summarising the thesis' findings, this section concludes by offering some potential avenues for further study.

Chapter One | 'An Operatic Version of Reality': Perceptions of the Soviet Competitor during the Apollo Era'

'I hope that the so-called 'space race' really is a race. I hope that Russia keeps on crowding us in space: I hope that we keep on crowding Russia- and that China wastes no time in crowding both of us. Mankind needs this competition...' –Robert Heinlein, September 1972.[1]

On 24 October 1969, cosmonauts Georgii Timofeyevich Beregovoi and Konstantin Petrovich Feoktistov undertook one of the strangest missions the Soviet Union had yet asked of its heroic space explorers. Both men were spaceflight pioneers: Feoktistov was an 'amazingly obstinate' spacecraft designer who had been the first engineer in space when he flew on the three-man *Voskhod 1* mission of 1964. Beregovoi was a steelworker turned military pilot, a decorated veteran of the Great Patriotic War who had been forty seven years old at the time of his 1968 *Soyuz 3* flight, making him the oldest man to have flown in space.[2] Today their itinerary included a 'Flight to the Moon', an excursion aboard 'Rocket Jets' and exploratory foray in a special submarine vehicle. October 1969 was not the glorious culmination of twelve years of Soviet space exploration; the alien world that Feoktistov and Beregovoi had travelled to was Anaheim, California. Rather than exploring the lunar surface, they were visiting Disneyland's space themed attractions as part of a high-profile tour of the United States.[3] Feoktistov and Beregovoi's American adventure occurred mere months after the Moon Race's crescendo with the *Apollo 11* lunar landing. This thesis begins in a period which often forms the temporal outer limit of the space age to signal that it will not be a familiar retread of 1960s space rivalry.[4] Instead of cataloguing what precisely the American intelligence community knew about particular Soviet space tests and failures, this chapter analyses the dominant cultural and political US images of its competitor in the prelude to, and aftermath of, America's lunar triumph.

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[1] 'Conversation with Robert Heinlein', *CUA Magazine*, December 1972, clipping in Record Number: 006789 'Impact: Science Fiction (Through 1979)', National Aeronautics and Space Administration Headquarters, History Office, Washington, DC, (Hereafter NASA History Office).

[2] For Biographical information see Gordon Hooper's dated, but remarkably thorough, *The Soviet Cosmonaut Team: A Comprehensive Guide to the Men and Women of the Soviet Manned Space Programme* (Woodbridge: GRH Publications, 1986), pp. 133-4, 155-6; on Feoktistov's career and 'obstinacy' see Colin French and Frances Burgess*, Into That Silent Sea: Trailblazers of the Space Era, 1961-1965,* (London: University of Nebraska Press, 2007) p. 333-5.

[3] Keith O. Lynch to Lee Crampsey 'Soviet Cosmonaut's Visit to the United States- October 20 to November 4, 1969', Memorandum with attached itineraries and security logs, 4 November 1969, Folder: USSR: Visit Of The Cosmonauts- 1969, Office of the Under Secretary of Administration Office of Security, Entry P 105, Record Group 59, General Records of the Department of State; National Archives and Records Administration (NARA), College Park MD.

[4] Kendrick Oliver discusses the temporal limits of the space age, which has been variously demarked as concluding in 1972, 1975 or not at all, *To Touch the Face of God* (2013), pp. 3-5, 171-2.

Cosmonauts shared the courage and clean-cut good looks of their astronaut colleagues but hailed from an entirely different political culture. They were the stars of the Soviet space propaganda that space journalist Loudon Wainwright II called 'an operatic version of reality' where socialist heroes quoted poetry in space and dedicated their flights to communism.[5] For the journalists covering their tour, the cosmonauts held a double allure as living men who had returned from the forbidding void of space who also offered a tantalising glimpse at another shadowy world: the secrecy-shrouded Soviet space programme. Diplomatic tours were a crucial component of the cosmonaut's role as spokesperson for the Soviet Union. Officially Feoktistov and Beregovoi had been invited to repay the compliment following Astronaut Frank Borman's extremely successful visit to the USSR earlier that year; unofficially, welcoming the cosmonauts to America was part of the Nixon administration's effort to wring as much diplomatic capital from the Moon landing as possible. This charm offensive had seen both the *Apollo* crew and President Nixon undertake gruelling world tours, global victory laps (codenamed 'Giant Step' and 'Moonglow' respectively) to bask in post-Apollo acclaim.[6] The cosmonauts' tour itinerary was carefully choreographed to project an image of American vitality, openness and above all, pluralism.

The cosmonauts' visit to Disneyland bore distinct echoes of Premier Khrushchev's 1959 American tour, where the media had delighted in juxtaposing a living symbol of Soviet power with incongruous Americana, most notably a Hollywood chorus line that was exceedingly decadent by Soviet standards.[7] At Disneyland, the cosmonauts were presented with commemorative wristwatches by their hosts, 'Disneyland's Astronauts' Mickey Mouse and Goofy; Pilot Cosmonaut Feoktistov was photographed being cajoled into donning a 'Mousketeer' hat by a mischievously grinning Beregovoi, a twice-anointed Hero of the Soviet Union.[8] Beneath the jollity was a powerful political message that referenced Apollo's connections to the deeply held American dream of space commercialisation: 'the promise of economic benefits' from space technology. Howard E. McCurdy argues this vision was directly descended from the 'Commodity Scientism' discourse that emerged following the Great Depression which sought to insulate capitalism from socialism's

[5] Loudon Wainwright II, 'An Operatic Version of Reality', *Harper's Magazine*, November 1971, p. 138.
[6] For the cosmonauts' visit as a response to Borman's see Henry A. Kissinger to Richard M. Nixon, 'Memorandum for the President: Your Meeting With Soviet Cosmonauts, Tuesday October 21, 12:30 PM', Memorandum, October 20, 1969, Folder: USSR I.V Aug-Oct 1969 1 of 2, Box 710, Europe USSR, National Security Country Files, Richard Nixon Presidential Library, Yorba Linda CA (hereafter 'Nixon Library'); For Moonglow and Giant Step see Teasel Muir-Harmony *Project Apollo, Cold War Diplomacy and the Framing of Global Interdependence* (unpublished PhD dissertation, Massachusetts Institute of Technology, 2014), particularly chapters four and five pp. 141-209.
[7] Peter Carlson's *K Blows Top: A Cold War Comic Interlude Staring Nikita Khrushchev, America's Most Unlikely Tourist'* (New York, NY: Public Affairs, 2009), is crammed with such instances. Khrushchev visits a Hollywood sound stage on pp. 161-164.
[8] 'Disneyland Visitors' *The Washington Post*, 25 October 1969, p. A3; for the cosmonaut's Disneyland itinerary see: Lynch to Crampsey 'Soviet Cosmonaut's Visit to the United States- October 20 to November 4, 1969', 4 November 1969, Folder: USSR: Visit Of The Cosmonauts- 1969, Office of the Under Secretary of Administration Office of Security, Entry P 105, Record Group 59; NARA.

ideological challenge through linking mass consumerism with technological progress.[9] Images of the Soviet visitors 'lightening up' in a temple to the good-natured hedonism of American consumerism domesticated them, undercutting their propaganda role as proof of communism's inevitable triumph.

If stops at Disneyland, San Francisco Zoo, the Grand Canyon and Colonial Williamsburg showcased Americans at play, the cosmonauts' itinerary also demonstrated that the USA was a society that *worked*. Trips to the Houston Manned Spacecraft Centre (for a more demanding spacecraft simulation) and the General Motors Technical Centre in Warren, MI proved that America could conquer the cosmos and sustain a dazzling consumer economy.[10] From San Francisco to Virginia, the tour's geographical scope sought to encapsulate America's diversity. A visit to the Amish communities of Lancaster, Pennsylvania, where the Soviet men of tomorrow would have met the God-fearing luddites of yesterday, was ultimately cancelled to allow the exhausted visitors a chance to rest before they flew back to the USSR.[11] Had it gone ahead, this encounter would have illustrated that whilst the USSR gave its citizens little choice about living in the future exemplified by the cosmonauts, America, conversely, was an open, pluralistic democracy capable of encompassing both the Amish and Neil Armstrong.

Feoktistov and Beregovoi were remarkably well received. Nixon had been warned that meeting with the Cosmonauts might send the wrong signal ahead of an important speech on the situation in Vietnam. Nixon met with them anyway.[12] The sole politically contentious incident on the trip was a small, peaceful protest in San Francisco against the Soviet government's repression of its Jewish community. Yet even the protesters' petition hailed the cosmonauts as 'courageous and skilful men...brilliant explorers' before contrasting their bravery with the Soviet regime's squalid record of anti-Semitism.[13] Reaction to the cosmonauts was defined by curiosity, not just about their personal experiences in space, but also about how the Soviet Union would respond to the *Apollo 11* lunar landing. The fact they were even visiting the West at all prompted speculation

[9] Howard E. McCurdy, *Space and the American Imagination* 2nd Edition (Baltimore, MD: John Hopkins University Press, 2011), pp. 269, 276-7; Walt Disney was a prominent figure in the spreading of the astrofuturist gospel in his 1950s television collaborations with rocket designer Wernher von Braun, see Kilgore *Astrofuturism* (2003), pp. 57-9.
[10] For the visit to Houston see 'Houston Flies Russians 'To Moon'', *The Boston Globe*, 23 October 1969, p. 2.
[11] Lynch to Crampsey 'Soviet Cosmonaut's Visit to the United States- October 20 to November 4, 1969', 4 November 1969, Folder: USSR: Visit Of The Cosmonauts- 1969, Office of the Under Secretary of Administration Office of Security, Box 40, Entry P 105, RG 59, NARA; Additional information including correspondence relating to the Colonial Williamsburg visit can be found in Folder: Soviet Affairs Entry A1 34110-D National Aeronautics and Space Council: Office Files of Executive Secretary William A. Anders 1969-1973, Record Group 220 Temporary Committees, Commissions and Boards, NARA.
[12] Dwight L. Chapmen to H. R. Haldeman, 'Soviet Cosmonauts', Memorandum, Folder OS 3 Space Flight 10/1/1971-[10/1/1971-12/31/1972] White House Central Subject Files, Outer Space 3, Nixon Library.
[13] 'Petition To The Cosmonauts By The Soviet Jewry Action Group', Folder: USSR: Visit Of The Cosmonauts-1969, Office of the Under Secretary of Administration Office of Security, Box 40, Entry P 105, RG 59,NACP

that cooperation might finally succeed competition.[14] The cosmonauts repeated the official Soviet line that space stations were the future, prompting frustrated articles over the vagueness of Soviet plans that asked 'What about the Moon for instance?'[15] The truth about the Soviet programme remained elusive, even when Americans found themselves face to face with its ambassadors.

Understandably, Apollo dominates the English-language historiography of space travel. The implications of humans walking on another celestial body, and the engineering and political challenges surmounted to get them there, are understandably engrossing.[16] The Apollo programme was dedicated to fulfilling the late President Kennedy's iconic ultimatum: 'before this decade is out, of landing a man on the Moon and returning him safely to the Earth'.[17] The years 1967 to 1972 saw NASA strive for and accomplish this mission, following *Apollo 11* with another five successful crewed lunar landings. The importance of the geopolitical challenge raised by Soviet space exploits in motivating Kennedy's Apollo commitment has been made abundantly clear in John Logsdon's pioneering policy analysis *The Decision to go to the Moon* and his 2010 update *John F. Kennedy and the Race to the Moon*. However, as detailed in Logsdon's follow-up, *After Apollo: Richard Nixon and the American Space Program*, by the time the Apollo lunar missions took place, the Nixon administration's 'Space Doctrine' was dedicated to downgrading space exploration from a Cold War priority to 'a normal and regular part of our national life.'[18] The 'space slump' that the *Apollo 11* astronauts returned to differed profoundly from the early-1960s atmosphere that had prompted the programme.

NASA's finest hour was clouded by space exploration's declining political and cultural cachet but the Soviet programme was wracked by a deeper malaise: a recurrent nightmare prompted by the repeated catastrophic failures of tests of its N1 heavy lift launch vehicle, their equivalent of the Saturn V rocket that carried US astronauts to the Moon. Largely concealed from the West, this crisis marked a stark reversal from the Soviet programme's 1957-1965 'heroic age'. The semi-obscured failure of the N1 ensured that it was Armstrong rather than Alexei Leonov who first walked on the Moon, but is not the whole story. Whilst an unknown rocket of gargantuan proportions loomed menacingly within the Soviets' Shadow Programme of rumour and

[14] 'Editorial: Visitors from Moscow', *New York Times,* 25 October 1969, p. 32.
[15] 'Russia Emphasizes Space Stations, But Keeps Moon-Landing Plans Secret', *The Washington Post*, 14 November 1969, p. A14.
[16] For a summary of historiographical currents within book length treatments of the subject see Roger Launius 'Interpreting the Moon Landings: Project Apollo and the Historians', *History and Technology*, 22, 3, (2006), pp. 225-255.
[17] John F. Kennedy 'Special Message to Congress on Urgent National Needs', 25 May 1961, The American Presidency Project http://www.presidency.ucsb.edu/ws/?pid=8151 [accessed 28 February 2018].
[18] John Logsdon, *The Decision to Go to the Moon: Project Apollo and the National Interest*. (Cambridge, MA: The MIT Press, 1970); *John F. Kennedy and the Race to the Moon* (Basingstoke: Palgrave Macmillan, 2010); *After Apollo: Richard Nixon and the American Space Program* (Basingstoke: Palgrave Macmillan, 2015), pp. 278-9.

speculation, the USSR was far from inactive during the Apollo era. In addition to eleven crewed Soyuz missions (which included two spaceflight tragedies - *Soyuz 1* and *Soyuz 11*) the Soviets launched planetary probes to Venus and mounted a lunar programme that included the *Luna 16* robotic sample return mission and two Lunokhod (Moonwalker) robotic rover missions.[19]

Each of this chapter's three sections examines a different aspect of how Apollo-era Americans perceived the Soviet competitor. The first uses the unique research method and influential writings of Dr Charles Sheldon of the Congressional Research Service (CRS) to illuminate the lost discipline of cosmokremlinology. Having introduced how Sheldon helped popularise an image of the Soviet programme as a driven and unpredictable adversary, the second section explores how Soviet spacefarers were depicted in Apollo-era culture. Astrofuturist discourse represented space as an optimistic, redemptive realm where Cold War competition was reconfigured as a chivalrous and heroic competition between courageous individuals. The 'Space Chivalry' discourse informed depictions of Soviet spacefarers that were sympathetic but faintly patronising by downplaying cosmonauts' roles as ideological spokesmen. Finally, the third section discusses how the obfuscation of the Soviets' Shadow Programme persisted even as final preparations for *Apollo 11* were underway, and US victory in the Moon Race was met with warnings over complacency in victory given Soviet purposefulness.

Peering into the Shadows: The Lost Art of Cosmokremlinology

What we have learned of the Soviet patterns has been the result of painstaking scholarly work with little help from the Russians.'[20]– Dr Charles S. Sheldon II, 1967

Communists were notoriously unreliable when it came to keeping their word. The organisers of the American Astronautical Society's November 1967 seminar 'Astronautics International' had known this when they scheduled a speech on the Soviet space programme. Previously invited Soviet speakers had failed to show up, so as a contingency the Society also contacted the man they believed to be the best informed about the Soviets' puzzling space effort.[21] Their hunch

[19] For the Soviet space programme during this period see: Asif Siddiqi, *The Soviet Space Race with Apollo* (Gainesville, FL: University Press of Florida, 2003); Harvey, *Russia in Space* (2001), pp. 8-12; William Burrows *This New Ocean: The Story of the First Space Age* (New York : Modern Library, 1998), pp. 413-4, 427-8, 432; Of special interest is Soviet rocket scientist Boris Chertok's extremely dense but highly revealing memoir, *Rockets and People*. Volume 4: *The Moon Race.* ed. by Asif Siddiqi. (NASA History Series, SP-2011-4110.), (Washington, DC: National Aeronautics and Space Administration, 2011), http://www.nasa.gov/pdf/621513main_RocketsPeopleVolume4-ebook.pdf [accessed 28 February 2018].

[20] Charles S. Sheldon, Library of Congress Science Policy Research Division, *Review of the Soviet Space Program With Comparative United States Data* (Washington DC: U.S. Government Printing Office, 1967), p. 80.

[21] Paul Weinschel to Charles Sheldon, letter with attached program, 2 August 1967, Folder: Speeches by Sheldon 1967, Box Three, Charles Sheldon Papers, National Air and Space Museum Archives (hereafter 'Sheldon Papers') – A NOTE ON THE SHELDON PAPERS: When these were consulted at the National Air and Space Museum Archives in November 2015 they were largely unprocessed. As such, whilst some boxes contain folders from Sheldon's own filing system, in others the papers, manuscripts and books are loose or

proved right and it was Dr Charles S. Sheldon II, the 'lanky, talkative', fifty-year-old head of the Science Policy Division of the Library of Congress Reference Service, who addressed the audience at New York's Waldorf Astoria Hotel.[22] Sheldon began his lecture by saying 'I would prefer the USSR to speak for itself, but even so, we shouldn't be too hampered.'[23] As well as testifying to Sheldon's stature as an analyst of Soviet space policy, his role as understudy demonstrates how knowledge of Soviet space activities often reached the American people through the mediation of government-affiliated experts. Sheldon's long and intensive interest in his subject, the diversity of audiences he reached, and his ability to bridge the chasm between open and secret appraisals of the Soviet programme, all make him an excellent gateway through which to examine the world these experts inhabited.

Like the scientists and engineers who had made space travel a reality, Sheldon's interest in outer space was kindled by science fiction that gave him a decidedly astrofuturist view of space technology's potential.[24] Amongst his papers are science fiction magazines treasured from childhood and a copy of Edgar Rice Burroughs' interplanetary adventure yarn *A Princess of Mars* that he received as a Christmas present aged eleven.[25] Evidence that his childhood exhilaration never left him shines through in a 1966 speech he gave to students at the University of Miami where he enthused that 'Mankind will make the solar system his private pond, and then he will look beyond.'[26] Sheldon trained as an economist and was fascinated with the influence of transportation technology on the development of social and economic systems.[27] Following *Sputnik 1's* launch in 1957, space exploration was no longer the escapist fantasy of his boyhood: it was the next transportation technology revolution.

Sheldon was an insider from the dawn of the space age, assisting the House Preparedness Committee's 1958 post-Sputnik hearings and helping draft the legislation that authorised the

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in large unmarked envelopes, where folders are present they will be indicated, otherwise just the box will be given.

[22] 'Effective Advisers to Congress: The Science Policy Division of Library of Congress, although jury-rigged, gives high-quality output.', *Science News,* 8 April 1967, 91 p. 335 clipping in the Box Four, Sheldon Papers.

[23] 'Astronautics International: The Soviet Space program by Dr Charles S Sheldon' Speech notes, November 1967, Folder: Speeches by Sheldon 1967, Box Three, Sheldon Papers.

[24] Stephen J. Dick discusses the importance of Science Fiction as a formative influence for many important Space Age scientists and thinkers in 'Space, Time and Aliens: The Role of Imagination in Outer Space' in *Imagining Outer Space*, ed. by Geppert, (2012), pp. 27-44 (p. 36).

[25] Sheldon's science fiction magazines and copy of *A Princess of Mars* are located in Box 10, Sheldon Papers.

[26] Charles S. Sheldon II, 'The Challenge of Space Exploration', Paper presented at the University of Miami, Coral Gables, Florida, 9 February 1966, Folder: Speeches By Sheldon, Box 2, Sheldon Papers, NASM Archives.

[27] Charles S. Sheldon II, *The Overall Economic Outlook,* Paper presented at the Fourth Goddard Memorial Symposium of the American Astronautical Society, 'Space in the Fiscal Year 2001: Applications and Utilization of Space Technology and Systems', 16 March 1966, Folder: Speeches by Sheldon 1966, Box 2, Sheldon Papers.

creation of NASA: the 1958 National Aeronautics and Space Act.[28] He consolidated this experience during the Johnson and Kennedy administrations as a senior staff member on the Space Council, a White House body that offered space policy advice and coordination.[29] The State Department's Raymond Garthoff praised a 1963 report of Sheldon's that compared American and Soviet space programmes for its 'competent, thoughtful, and often penetrating analysis'.[30] The security clearances Sheldon received during his time at the Space Council gave him access to highly classified information on the Soviet space program.[31] When Sheldon returned to the CRS full time in 1967, he was extremely well placed to demystify the Soviet programme. He had built up an impressive CV, accrued valuable intelligence agency contacts and could call on the formidable resources and expertise of his workplace, the largest library in the world.

Sheldon is best remembered for the reports that he coordinated and helped author whilst employed by the Library of Congress's Congressional Research Service. These included annual reviews of Soviet activity, comparisons and a more detailed series published every few years titled *Soviet Space Programs*.[32] *Science* called his reports the 'definitive' works on the Soviet programme in the open literature; obituaries that followed Sheldon's death in 1981 likened them to a 'Cold War thriller' for revealing how the Soviets had concealed military satellites and potentially embarrassing failures under the 'blanket name Cosmos'.[33] In these reports Sheldon developed an influential taxonomy of Soviet rockets: 'The Sheldon Names' which grouped 'families' of rocket variants into alphabetised groupings. Thus, the 'A' family of boosters were those that had evolved from the Soviets' R-7 Intercontinental Ballistic Missile; numbers, and in some cases supplementary initials, further divided the categories, *Sputniks 1* and *2* were launched by the 'A' vehicle, the Vostoks by 'A-1', the Soyuzes by 'A-2' and so on.[34] Further B, C and D families were

[28]NASA History Office, *Legislative Origins of the National Aeronautics and Space Council: proceedings of an Oral History Workshop Conducted April 3rd 1992*, (NASA Monographs in Aerospace History Number 8). http://history.nasa.gov/40thann/legislat.pdf [accessed 28 February 2018]

[29] Charles S. Sheldon II, 'Comparison of the United States and Foreign Space Programs', 19 May 1964, Presidential Papers, Box 5, Sheldon Papers.

[30] Raymond L. Garthoff to the Secretary of State, 'Comments on the Paper 'United States and Soviet Union: Space Comparisons' By Charles Sheldon, Space Council Staff', Memorandum, 12 December, 1963, Record Number: 012318 'State Department 1965-', NASA History Office.

[31] E. C. Welsh to all National Aeronautics and Space Council Staff, 'Security', Memorandum, 10 January 1966, Presidential Papers, Box 5, Sheldon Papers.

[32] Sheldon edited the following entry's in the Library of Congress Research Service's 'Soviet Space Programs' series: *Soviet Space Programs: Goals and Purposes, Achievements, Plans and International Implications*, (Washington DC: US Government Printing Office, 1962),'*Soviet Space Programs 1962-65: Goals and Purposes, Achievements, Plans and International Implications* (Washington DC: US Government Printing Office, 1966), *Soviet Space Programs 1966-70 : Goals and Purposes, Achievements, Plans and International Implications*, (Washington DC: US Government Printing Office, 1971); *Soviet Space Programs: Goals and Purposes, Achievements, Plans and International Implications 1971-75*, (Washington DC: US Government Printing Office, 1976).

[33] 'The Soviet Program: Effort Said to Surpass U.S. at Peak' *Science,* 175, 18 February 1972, p. 731; John Noble Wilford, 'Obituary: Charles Sheldon, Congress Adviser' *New York Times*, 12 September, 1981, p. 16; 'Charles Sheldon II Dies; Science Adviser on Hill' *The Washington Post,* 12 September, 1981, p. C6.

[34] Stephen J. Zaloga's *Target America: The Soviet Union and The Strategic Arms Race, 1945-1964* (Novato, CA: Presidio, 1993), provides an excellent analysis of the Soviet space programme's origins as an offshoot of

identified leading up to the mysterious 'G' family: the ill-fated 'N-1' heavy-lift rocket that the Soviets had pinned their lunar hopes on.[35] Even after the opening of the Soviet archives, Asif Siddiqi praised Sheldon's 'excellent summaries' for their attention to the Soviet programme's political and organisational infrastructure.[36]

Sheldon's acclaimed work with the Library of Congress allowed him to reach diverse audiences, solidifying his position as the most influential American expert on the Soviet programme. In 1967 and 1968 alone, Sheldon undertook 61 speaking engagements including appearances on television and radio programmes, the vast majority of which focused on the Soviet programme. In addition to briefing US Naval Intelligence personnel and NASA astronauts, Sheldon spoke before high schools and colleges, citizens' discussion groups, science educators, The Foreign Service Institute, and broadcasters that ranged from CBS and NBC to the Voice of America.[37] Sheldon believed that the citizenry of a democratic society, high schoolers as well as NASA managers, should be as informed as possible when it came to the serious business of space policy. In 1967, he wrote: 'Our space policies, whether competitive, cooperative, or purely independent should be based upon a knowledge of trends and foreign activity in space since we share the use of the same medium.'[38] Sheldon was on the record asserting that the Soviets were 'dead serious about trying to hold a position of leadership in space'. He saw himself as an interpreter engaged in the vital task of ensuring the American people understood the esoteric world of space competition.[39]

Because the space activities of America's geopolitical adversary were considered a national security issue there was a sharp divide between analysts writing for public consumption and those with security clearances. Analysts from across America's intelligence community scrutinised Soviet launches, including not only the Foreign Missile and Spacecraft Centre (FMSAC) - a subdivision of the CIA's Directorate of Science and Technology, but also the National Security Agency's Defence Special Missile and Aerospace Centre (DEFSMAC) and various offices within the Defence Intelligence Agency (DIA).[40] These analysts' appraisals used highly classified intelligence

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the ICBM programme Stalin had ordered; Charles P. Vick 'Russian and Soviet Space Activities: Introduction' Globalsecurity.org via <http://www.globalsecurity.org/space/world/russia/intro.htm> [accessed 28 February 2018].

[35] Library of Congress Science Policy Research Division, *Soviet space programs, 1971-75: staff report prepared for the use of the Committee on Aeronautical and Space Sciences, United States Senate, by the Science Policy Research Division, Congressional Research Service, the Library of Congress* (Washington DC: US Government Printing Office, 1976), pp. 39-66.

[36] Siddiqi, *The Soviet Space Race With Apollo* (2003), p. 868

[37] 'Charles S. Sheldon II, 'List of Speeches (other than classes)', 1969, List of Speeches 1940 to the Present, Box 3, Sheldon Papers.

[38] Sheldon, *Review of the Soviet Space Program with Comparative United States Data* (1967), p. 121.

[39] 'House Science and Astronautics Committee: Executive Session Remarks of Dr Charles S Sheldon II, February 2 1966' Folder: Speeches by Sheldon 1966, Box 2, Sheldon Papers.

[40] For DEFSMAC see Richard L. Bernard, *In the Forefront of Foreign Missile and Space Intelligence: History of the Defense Special Missile and Aerospace Center (DEFSMAC), 1960-2010* - (Washington, DC: Center for Cryptologic History, National Security Agency, 2012) available at https://www.nsa.gov/about/cryptologic-heritage/historical-figures-publications/publications/assets/files/defsmac/DEFSMAC_Brochure.pdf

such as that gathered by 'national technical means' (a euphemism for spy satellites) and were only available to a narrow group of analysts and policymakers.[41] Naturally, NASA was a key consumer of such intelligence. James E. David notes that 'from its earliest days [NASA] received large amounts of finished intelligence on the Soviet space programme from the CIA', and between the years 1961 to 1972 'the existing ties between NASA and the national security community became much deeper and more complex'.[42]

NASA did not just passively consume analysis of Soviet spaceflights, it also helped shape the depiction of its rival by providing technical expertise on space technology. NASA played a leading role in a 'Space Intelligence Panel' that evaluated Soviet progress on a biennial basis.[43] The panel's membership hailed from across the upper echelons of the military-industrial complex: in 1966 members included a NASA programme manager, the Vice Director of the NASA/USAF Manned Orbiting Laboratory military space station programme, and representatives from the General Motors Corporation and Atomic Energy Commission. Information on the Space Intelligence Panel remains difficult to obtain but it appears to have fulfilled a crucial function in interpreting Soviet space activities. A 1966 memo described this 'vigorous, inquiring group' as a 'useful sounding board for our space estimates and the difficult projection of the apparent Soviet programme'.[44] The panel's existence reinforces the fact that any information that eventually reached the US public had been doubly filtered through both Soviet and American governmental censorship regimes.

However, as NASA administrators discovered, access to classified intelligence did not prevent accusations of self-interested exaggeration. In early 1967, Dr Charles Stark Draper, the founder of the Massachusetts Institute of Technology's Instrumentation Laboratory, returned from a visit to the USSR where his hosts had boasted they would beat America to the Moon. Draper promptly shared his concerns with both NASA Administrator James Webb and the CIA's Directorate of Science and Technology. Draper's warning was taken extremely seriously and he was instructed to

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[accessed 28 February 2018]; For the monitoring of the Soviet programme/ by the CIA, see Jeffrey T. Richelson, *The Wizards of Langley: Inside the CIA's Directorate of Science and Technology* (Oxford: Westview Press, 2001), pp. 34-6,79,83-5; Jeffrey T. Richelson, *US Intelligence Briefing Book No. 501: US Intelligence and the Soviet Space Program,* The National Security Archive, 4 February 2015, <http://nsarchive.gwu.edu/NSAEBB/NSAEBB501/> [accessed 28 February 2018]; Dwayne A. Day 'The Moon in the Crosshairs', 14 December 2015, *The Space Review*, 4 part article, Part 1, <http://www.thespacereview.com/article/2885/1> [accessed 28 February 2018].

[41] Clarence E. Smith, 'CIA's Analysis of Soviet Science and Technology' in *Watching the Bear: Essays on CIA's Analysis of the Soviet Union* ed. by Gerald K. Haines and Robert E. Leggett, (Washington DC: Center for the Study of Intelligence, CIA, 2001), <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/watching-the-bear-essays-on-cias-analysis-of-the-soviet-union/article04.html>, [accessed 28 February 2018].

[42] James E. David, *Spies and Shuttles: NASA's Secret Relationship with the DoD and CIA* (Gainesville FL.; University Press of Florida, 2015), pp. 5, 15-7, 36.

[43] For Administrator use of classified intelligence see Ibid., 46-7, 52, 57-8, for the detailing of NASA staff p. 36, for intelligence panel pp. 45, 54-5, 64-5.

[44] 'Scientific Advisory Panel', Memorandum, 11 October 1966, CIA CREST Database, NARA College Park (Hereafter CREST), ES Document Number: CIA-RDP71R00140A000100080039.

write an appraisal of the Soviet lunar programme.[45] The CIA judged Draper's resulting report to be 'most significant' and set about undertaking a 'complete reassessment of the Soviet programme'.[46] It had been two years since the previous National Intelligence Estimate on Soviet progress and the 1967 *Apollo 1* tragedy had further compounded the need for an updated and accurate appraisal.[47] The resulting estimate, NIE 11-1-67, used launch pad photographs obtained from spy satellites to argue that though the USSR's crewed landing programme 'was probably not intended to be competitive' with Apollo, the Soviets may have seen 'some prospect of getting to the Moon first' and stepped up their efforts.[48] Subsequently, Webb publicly raised the issue of Soviet booster progress during NASA's budgetary appropriations process later that summer. However, given that he had been warning of a colossal Soviet rocket, nicknamed 'Webb's Giant' by reporters, since 1964, his inability to provide new supporting evidence merely prompted scepticism.[49] Regardless of its grounding in intelligence, NASA's ominous depiction of Soviet progress would always be suspect given the agency's vested interest in perpetuating the space race.

A different set of problems confronted those scrutinising Soviet spaceflight in the open literature. This included the space, science and Moscow correspondents of mass-market newspapers, journalists in aerospace trade papers such as *Aviation Week and Space Technology* and even authors in Science Fiction magazines like *Analog*.[50] These publications could reach huge audiences, but their writers' reliance on what the Soviet and American governments were willing to disclose made their appraisals particularly vulnerable to the Shadow Programme's distortions and mirages. The purposes of entire programmes were routinely concealed under the 'Cosmos' designation, specific flights or programmes were not announced ahead of time, and often only terse, formulaic press releases were offered after the fact. Less elaborate deceptions employed by the Soviet media could easily ensnare the unwary. In 1969 a widely circulated image that the Soviets claimed depicted their planned space stations was unmasked by a seventeen-year-old high school student as artwork repurposed from a 1962 American aerospace manufacturer's

[45] 'Memorandum For The Record: Morning Meeting of 5 January 1967', 4 January 1967, CIA CREST, ESDN-RDP80R01284A001800010060-1.
[46] 'Memorandum For The Record: Morning Meeting of 5 January 1967', 5 January 1967, CIA CREST, ESDN: CIA-RDP80R01284A001800010059-3.
[47] Dwayne A. Day, 'The Moon in the Crosshairs: Part 3', 21 December 2015, *The Space Review*, <http://www.thespacereview.com/article/2889/1>, [accessed 28 February 2018].
[48] CIA, 'National Intelligence Estimate: The Soviet Space Program' (NIE 11-1-67), 2 March 1967, <http://nsarchive.gwu.edu/NSAEBB/NSAEBB501/docs/EBB-14a.pdf>, [accessed 28 February 2018].
[49] Dwayne A. Day, 'Webb's Giant', 19 July 2004, *The Space Review*, <http://www.thespacereview.com/article/188/3>, [accessed 28 February 2018]; Siddiqi, *The Soviet Space Race with Apollo,* pp. 551.
[50] Moscow Correspondent Nicholas Daniloff published a well-received summary of the Soviet programme: *The Kremlin and the Cosmos*,(New York, NY: Alfred A. Knopf, 1972), see also William Roy Shelton, *Soviet Space Exploration*, (New York, NY: Washington Square Press, 1968);G. Harry Stine 'The Big Boosters of the USSR' *Analog*, September 1969, pp. 54-73.

advertisement.[51] Forced to rely on fragmentary and unreliable information, the open literature often ended up inadvertently amplifying Soviet propaganda messages.

As a consumer of classified information whose job was to inform legislators and the public, Sheldon occupied a unique position and his research managed to skilfully circumvent the barriers of Cold War secrecy by synthesising open and classified appraisals. Sheldon described his work as 'intended to navigate its way between the rocks of security information which must be protected on the one side, and the shoals of inaccurate speculation and misinformation on the other side.'[52] His protégé James Oberg, an aerospace technician who later became a prominent cosmokremlinologist in his own right, has related how 'Sheldon had full security access but could only use non-classified material for his congressional reports... Without ever once transgressing his security boundaries, he encouraged our investigations and speculations in directions along which he knew we'd find pay dirt.'[53] Another of Sheldon's disciples, Charles P. Vick, who provided technical drawings of Soviet space vehicles for Sheldon's reports during the 1970s, remembered similar instances of being subtly steered away from dead ends or red herrings. Recalling Sheldon's own research method, Vick described how his mentor regularly conferred with his intelligence community contacts to build up an image of the Soviet programme. Using this image as a framework, he would scour the open literature for corroborating sources. Whilst some intelligence analysts expressed profound unease at this method, Sheldon was ultimately tolerated because every assertion he made was backed up with citations openly available to the public.[54]

Archival evidence corroborates Vick's reminiscences. In October 1967, George P. Miller, Chairman of the House of Representatives' Committee on Science and Astronautics, wrote to CIA Director Richard Helms enquiring if the CIA had any objections to the publication of Sheldon's 1967 *Report*. After detailing Sheldon's method of 'informally' consulting with intelligence analysts, Miller emphasised the committee's need for a 'concise, accurate source [on the Soviet programme] based entirely on unclassified data'. The CIA indicated it had no objections to publication and a similar vetting process must have been followed with subsequent reports.[55] Sheldon appears to have enjoyed relatively uninhibited access to classified information on the Soviet space programme until the late 1970s. A declassified 1978 letter from the CIA to Don Fuqua (D., FL), chairman of the House Subcommittee on Space Science and Applications describes Sheldon's access to so-called "compartmented classified intelligence", that is information derived from sensitive sources or intelligence-gathering methods, being revoked as part of a wider drive to

[51] 'Eureka! California Science Student Discovers Red 'Lifted' Art', *The Sperry News*, 26, No 11, 26 November 1969, Clipping in Record Number: 15519 'USSR Manned Space Station', NASA History Office.
[52] Sheldon, 'Review of the Soviet Space Program with Comparative United States Data' (1967), p. 126
[53] Dominic Phelan, 'Space sleuths and their 'scoops'' in *Cold War Space Sleuths* ed. by Phelan, (2013), pp. 1-28 (p. 7).
[54] Interview conducted with Charles P. Vick by Thomas Ellis, 27 May 2016.
[55] George P. Miller to Richard Helms, Letter, 18 October 1967, Folder: 'Sheldon', Box 2, Sheldon Papers.

tighten access to such material. However, even then, Sheldon retained access to "noncompartmented classified intelligence publications" and "special reports" deemed relevant to his "subject of interest". Sheldon would also continue to have access to noncompartmented classified intelligence furnished to him by NASA.[56] In summary, Sheldon's reports relied first and foremost on the open data that made up his source base: they were not simply repackaged classified intelligence estimates. But his conversations with intelligence analysts still profoundly shaped his own image of Soviet attainment, showing him where to look and allowing him to depict the Soviet programme with a degree of exactitude rare within the open literature.

Sheldon's assiduous citation of open sources prompted incredulity. How could he claim to know the real truth if he cited the same information available to everyone else? The aerospace trade paper *Space Business Daily* scoffed at the idea that Sheldon had access to more information than other civilian observers, dismissing his approach as 'Soviet space intelligence by belated arbitrary hindsight'.[57] In fact, Sheldon believed that hindsight was 'a most powerful tool and useful approach' because 'each month that passes throws some new light on earlier history, and consequently even the historical portion of such a study is never done.' Sometimes it was only when a series of flights had concluded 'that everything falls into place, and the earlier group becomes understood.'[58] For example, the Soviets only unveiled their Vostok launch vehicle to the world at the 26th Paris Air Show in 1965 after the crewed Vostok programme had concluded. Cathleen Lewis has described how even though the models displayed included deliberate inaccuracies they were still 'revelations, albeit minor ones'.[59] *Space Business Daily*'s vituperative dismissal was anomalous; Sheldon's retrospective discoveries were often enthusiastically received in the mainstream and specialist press.[60] Furthermore, his approach of continually reappraising past Soviet programmes was enthusiastically embraced by the next generation of cosmokremlinologists.[61] The Soviet space programme's past was a protean thing; with new information the Shadow Programme's mirages dissolved and different outlines emerged. The cosmokremlinologist's task was as much history as it was punditry or soothsaying.

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[56] Frederick P. Hitz to Hon. Don Fuqua, 8 December 1978, CIA CREST Database Document Number: CIA-RDP81M00980R003300070002-7, available online via the CIA FOIA Electionic reading room via https://www.cia.gov/library/readingroom/document/cia-rdp81m00980r003300070002-7 [accessed: 28 February 2018].

[57] 'Soviet Space Intelligence by belated arbitrary hindsight' *Space Business Daily,* 21 November 1967, pp. 111-2.

[58] Sheldon, *Review of the Soviet Space Program with Comparative United States Data* (1967), p. 11.

[59] Cathleen Lewis, 'The birth of the Soviet space museums: creating the earthbound experience of spaceflight during the golden years of the Soviet space programme, 1957-68,' in *Showcasing Space* ed. by Martin Collins and Douglas Millard (London: NMSI Trading, 2005), pp. 142-158 (p. 147).

[60] For more positive reviews of Sheldon's reports see Jim Maloney, 'Space Beat: Russia Ahead in Tonnage' *The Houston Post*, 18 December 1967 ; Donald C. Winston, 'House Unit Reports Soviet Payload Gains' *Aviation Week and Space Technology*, 4 December 1967, pp. 96-98.

[61] For other examples of historically focused cosmokremlinology see: Congressional Research Service (Marcia Smith), *Soviet Space Programs: 1981-1987* (Washington DC: U.S. Government Printing Office, 1988); Oberg, *Red Star in Orbit* (1981), *Uncovering Soviet Disasters* (London: Random House, 1989).

As with mainstream Sovietology, cosmokreminology was also an intensely political discipline in a culture where Cold War prejudice often filled in the gaps left by a lack of verifiable information. Soviet secrecy and an instinctive distrust of communist propaganda provided fertile ground for factually dubious 'myths' to flourish. Rebutting these was a crucial aspect of Sheldon's job. In addition to 'mythic' depictions of the Soviet effort as wholly scientific or completely uninterested in the Moon Race, were tenacious rumours surrounding the existence of 'lost cosmonauts': Soviet spacefarers whose deaths in space had been covered up by the secretive communist regime.[62] Predating the flight of Gagarin, these rumours had gained such traction in the early 1960s that NASA, CIA and White House issued official statements denying that Gagarin had been preceded into space by fatal failures.[63] The lost cosmonaut rumour might have been planted by Soviet secrecy and censorship, but it was nurtured by jingoistic anticommunism. The idea of a tragic would-be Gagarin or Tereshkova sacrificed by propaganda-obsessed commissars played to engrained depictions of the Soviet other as callous, amoral and technologically inept.[64] Born out of wounded American pride during the Soviet programme's Heroic Era, this appealing fantasy firmly embedded itself within the fabric of Cold War folklore.

For Julius Epstein, an Austrian-born historian affiliated with the conservative Hoover Institution, these Soviet space phantoms confirmed everything to be despised about Soviet communism: its secrecy, cruelty and love of propaganda.[65] Epstein claimed that cosmonaut deaths were 'merely historical truth' that the Johnson administration was complicit in covering up to curry favour with the Soviets.[66] In letters to the NASA, the CIA and the National Security Council and numerous unpublished articles, Epstein repeatedly cited evidence derived from early 1960s news reports and the 'testament' of executed Soviet double agent Oleg Penkovskii.[67] Like other lost cosmonaut

[62] Sheldon, 'Myths About the Soviet Program', 1968 draft, 'Speeches by Sheldon: 1968 Correspondence', Box 2, Sheldon Papers.

[63] Debunking the lost cosmonauts, and revealing the Soviets airbrushing of certain personnel out of photos, has been a central element of James Oberg's career: see Oberg 'Pre-Soyuz Cosmonaut Fatalities' *Spaceflight*, October 1974 pp. 375-377, *Red Star in Orbit* (1981); *Uncovering Soviet Disasters* (1989), pp. 146-176; 'Further on the 'Dead Cosmonauts' Claims of the Judica-Cordiglia Brothers', 1 August 2008, jamesoberg.com http://www.jamesoberg.com/udica-cordiglia-2.pdf [accessed 06/06/16].

[64] The cultural image of the lost cosmonaut during the 1960s is explored in my MPhil Dissertation Thomas Ellis, *The Cosmonaut in the American Imagination: 1961-1975*(Unpublished MPhil Dissertation, University of Cambridge, 2012),accessible via https://www.academia.edu/9439919/_The_Cosmonaut_in_the_American_Imagination_1961-1975_ [accessed 05/06/16] Primarily post-Cold War images of doomed or tragic cosmonauts are discussed in Darren Jorgensen's 'States of Weightlessness' *Science Fiction Film and Television*, 2, 2, (2009), pp. 204-225.

[65] Epstein is best remembered for his history of the forced repatriation of prisoners of war to the USSR after World War Two, Julius Epstein, *Operation Keelhaul: The Story of Forced Repatriation from 1944 to the Present*, (Old Greenwich, CT: Devin-Adair Company, 1973).

[66] '12 Cosmonauts Believed Killed, US Historian Believes', *The Milwaukee Sentinel*, 1 May 1967, p. 2 https://news.google.com/newspapers?id=v3ZQAAAAIBAJ&sjid=EhEEAAAAIBAJ&pg=7058,7890&dq [accessed 28 February 2018].

[67] For correspondence between Epstein and government agencies on the lost cosmonaut issue see 'Letters', Box 178, Epstein Papers, Hoover Institution Archives, Palo Alto, California (hereafter 'Epstein Papers'); Julius Epstein 'U.S. Public Not Properly Informed' *Los Angeles Times*, 4 October 1967 p. B-5; For Epstein on the

believers, Epstein attached great importance to the recordings of the Judica-Cordiglia brothers - two Italian amateur radio operators who had populated a veritable necropolis of lost cosmonauts during the 1960s by churning out recordings of what they claimed were doomed cosmonaut flights.[68] A farcical document in which Epstein interviews himself about the shocking evidence he has unearthed ('Now tell me....') reveals how he used the aura of Cold War secrecy to bolster the Judica-Cordiglias' dubious recordings. In the monologue, Epstein invokes the authority of a supposed 'CIA Report' that had been mentioned in the press during the early 1960s.[69] By appealing to the authority of an unseen classified source, Epstein's lost cosmonaut theorising was a partisan inversion of Sheldon's: a denunciation of Soviet despotism cloaked as scholarly inquiry.

Responding to a letter from Epstein, Brigadier General Don Flickinger, a pioneer of space medicine, recommended that he contact Sheldon, who had in his opinion 'the most complete facts'.[70] However, Epstein's annotated copy of Sheldon's 1967 *Review* and accompanying notes implies he too was unconvinced by Sheldon's use of 'open data'.[71] In a 1965 classified lecture to the Centre for Security Studies Sheldon denied the existence of secret evidence proving the existence of Soviet space fatalities.[72] After leaving the Space Council, Sheldon continued to challenge the lost cosmonaut rumours.[73] Although Sheldon agreed that the Soviets would conceal any failure that they could, he questioned how 'persistently lucky' amateurs like the Judica-Cordiglias picked up signals and voices that other, better equipped, listening posts always failed to hear. His impatience with some of the wilder rumours occasionally bubbled to the surface, as when he ridiculed a story of a cosmonaut hurtling towards the sun for breaking 'all the laws of physics'.[74] Sheldon's desire to understand Soviet activities in space, rather than simply denounce them, recalls David C. Engerman's contention that 'Sovietology was often a moderating impulse, its exemplars clashing with ideologically driven experts; they saw to it that the Cold War stayed cold.'[75] Sheldon's disavowal of the rumours went a long way to reducing their credibility; William H. Schauer's 1976 book *The Politics of Space* would describe the rumours as 'unconfirmable (sic)

Judica-Cordiglia Brothers see Julius Epstein, 'To the Editor of the Times', Palo Alto Times [Own Article] Soviet Cosmonauts Oct 1965, Box 142, Epstein Papers.

[68] James Oberg, 'Why I don't Believe the claims of the Judica-Cordiglia Brothers, 1 March 2007, http://www.jamesoberg.com/judica-cordiglia.pdf [accessed 28 February 2018].

[69] Julius Epstein, *Why I Believe That Soviet Cosmonauts have Died in Space and on Launching Pad: Interview with Myself by Julius Epstein*, Undated (post 1967), 'Own Article: MS interview with Myself: Soviet Cosmonauts', Box 142, Epstein Papers.

[70] Don Flickinger to Julius Epstein, letter, 26 June 1967, Letters, Box 178, Epstein Papers.

[71] Folder: Review of the Soviet Space Program/ Oct Nov 1967, Epstein Papers.

[72] Charles Sheldon, Notes for 1965 lecture, 'Lectures to Defense CSS intelligence school', Box 9, Sheldon Papers.

[73] Charles S. Sheldon, 'The Soviet Space Program: it's Political Implications', *Space Digest*, November 1968 pp.82-6, Box 8, Sheldon Papers, NASM Archives; 'Abstract: A Current Look at the US-Soviet Rivalry in Space', 12 January 1966, 'Speeches By Sheldon 1966', Box 2, Sheldon Papers, NASM Archives;

[74] Sheldon, *Review of the Soviet Space Program with Comparative United States Data*, (1967), p. 52.

[75] Engerman, *Know Your Enemy* (2009), p. 4.

and probably incorrect'.[76] Despite the intervention of experts like Sheldon, the lost cosmonauts remain un-exorcised; they continue to haunt discussion of the space race alongside the stubborn belief that *Apollo 11* took place on a Hollywood soundstage.[77]

Sheldon's position and the resources it afforded him, made him a valuable correspondent within a transnational network of Western observers of the Soviet space programme. As with the amateur scientists who helped track early satellites as part of the Smithsonian Institution's 'Operation Moonwatch', engagingly chronicled in W. Patrick McCray's *Keep Watching the Skies*, European sputnik-watching evolved into an increasingly sophisticated discipline.[78] By the Apollo-era, these space enthusiasts had moved from simply tracking Soviet satellites to reconstructing Soviet programmes and missions through observed orbital data, intercepted telemetry and reading between the lines of Eastern Bloc propaganda. A recent book of recollections by self-described *Cold War Space Sleuths* describes how an international network of correspondence emerged centring on the British Interplanetary Society's (BIS) magazine *Spaceflight*. This network's foremost amateur observer was Geoffrey Perry, a grammar school science master whose 'Kettering group' had made headlines by accurately tracking Soviet flights and identifying Plesetsk as the location of the USSR's military cosmodrome. Marcia Smith, Sheldon's research assistant and successor at the CRS, has testified to the importance of the BIS network as a source of data.[79] Through Perry, Sheldon was connected to Maarten Houtmann, a Dutch space sleuth whose company sold facsimiles of Soviet space propaganda obtained through Soviet embassies and communist youth congresses across Europe: a vital new source of open data.[80] The best space sleuthing led to engaging articles that helped clarify past mysteries, but it often lacked the political dimension of Sheldon's cosmokremlinology. Consequently, its relentless focus on engineering minutiae meant it more often resembled space age train spotting: engrossing to initiates but bewildering to outsiders.

Sheldon asserted that the Soviet programme must be considered in its totality, from its political organisation to its propaganda, its failures as well as its successes. All of the evidence, he believed, pointed to a deeply-rooted Soviet commitment to eventual interplanetary flight. In 1967, he warned that the Soviets' 'broadly based' programme exhibited 'great strength...Ten

[76] Schauer, *The Politics of Space* (1976), p. 135.
[77] YouTube and the blogosphere are littered with Lost Cosmonaut recordings, for example: Gregory Burkhart, 'The Terrifying Final Transmission of the Lost Cosmonaut', 3 December 2015, <http://www.blumhouse.com/2015/12/03/the-terrifying-final-transmission-of-the-lost-cosmonaut/> [accessed 28 February 2018].
[78] McCray, *Keep Watching the Skies!* (2008), p. 235.
[79] See Phelan, *Cold War Space Sleuths* (2013), this collection of recollections by many of the surviving sleuths themselves is celebratory in tone but is still an invaluable guide to their methods and discoveries. The Kettering group, and its interactions with Sheldon, is described on pp. 5-7.
[80] The surviving letters from Houtmann to Sheldon date from the mid 1970s and indicates Sheldon's interest in acquiring material from Houtmann for his CRS reports, See folder: Houtmann Correspondence, Box 2, Sheldon Papers, NASM Archives, for more information on Houtmann see Phelan, *Cold War Space Sleuths* (2013) p. 23

years have seen enormous progress.'[81] In contrast with America's openness about current programmes but lack of a longer-term plan, the Soviets constantly repeated their grand, if distant, goals: 'If one can really take seriously the Soviet stated long-term goal, it is nothing less than planting the Soviet system and its representatives in every part of the solar system which can be made habitable.'[82] He reiterated this idea in a 1968 speech that claimed Konstantin Tsiolkovsky's expansive writings on humanity's cosmic destiny and Lenin's purported interest in space travel demonstrated the existence of a Soviet 'deep philosophy' of space. The Soviet commitment to eventual interplanetary travel and colonisation was 'consistently advocated at every level of the technical community and the political structure'.[83] For Sheldon, the USSR's eschewal of Socialism on One Planet was more than an idle cosmist boast: it was the ideological backbone that made them a formidable adversary.

Sheldon argued the numerous robotic probes that the Soviets had dispatched to the Moon, Mars and Venus proved planetary exploration's political importance. Between their first attempt to launch a probe at Mars in October 1960 and the eventual, limited, success of *Venera 4* which briefly returned data from the Venusian surface in 1967, the Soviet planetary programme had endured an 'appalling' level of failures, including 20 failed flights in a row.[84] Rather than demonstrating technological incompetence, Sheldon argued these failures proved that the Soviets were taking advantage of almost every favourable launch 'window', pressing on in spite of the loss of the vast resources represented by each failure. Sheldon also drew attention to the fact the Soviets devoted a proportionally larger share of their launches to planetary missions than the US did.[85] The aerospace industry paper *Aviation Week and Space Technology* described Sheldon's 1967 *Report on the Soviet Space Program,* as '[warning] against complacency'.[86] Sheldon would later argue that though crewed interplanetary flight was not yet a concrete programme, it was an 'orderly' and well funded effort that was justified to the long-suffering Soviet consumer with the quasi-religious philosophy of 'a broader sacrificing [of] the present for Communist 'pie in the

[81] Charles S. Sheldon, Library of Congress Science Policy Research Division, *Review of the Soviet Space Program With Comparative United States Data* (Washington DC: U.S. Government Printing Office, 1967),1967 pp. 1-2.
[82] Ibid., pp. 86, 46.
[83] Charles S. Sheldon, 'The Soviet Space Program Compared with the United States' Speech to Bellevue Forest Citizens Association, 26 April 1968, Folder: Speeches by Sheldon 1968, Box 9, Sheldon Papers.
[84] For the Soviet planetary programme see: William Burrows, *This New Ocean* (1998), pp. 460-1; Wesley T. Huntress and Mikhail Ya. Marov, *Soviet Robots in the Solar System: Mission Technologies and Discoveries* (Chichester: Springer Praxis, 2015); a good example of cosmokremlinology on this subject is Nicholas L. Johnson's *Handbook of Soviet Lunar and Planetary Exploration* (San Diego, CA: Univelt, 1979).
[85] For further Apollo-era examples of this argument see Charles S. Sheldon, *The Soviet Challenge in Space* NASA Technical Memorandum X-53618, September 1, 1966, Folder: Sheldon Speeches 1960 Duplicate Copies, Box 2, Sheldon Papers, NASM Archives; Sheldon, *Review of the Soviet Space Program with Comparative United States Data* (1967), pp. 55-6; Sheldon, *A Fresh Look at the Soviet Space Programme,* 1967, Box 3, Sheldon Papers, NASM Archives.
[86] Donald C. Winston, 'House Unit Reports Soviet Payload Gains' *Aviation Week and Space Technology*, 4 December 1967, pp. 96-98.

sky'.[87] In a climate dominated by snap judgements about who was 'first' Sheldon called for missions and failures to be viewed within their wider context. For those seeking to discern the Soviets' next move, a string of failures could be just as illuminating as a single success.

Sheldon believed that, when one looked at the broader picture, the Soviet programme's ambitious plans were unfolding 'in an orderly way, building rather conservatively step by step with considerable economy of design.'[88] A 1968 speech Sheldon delivered on Canadian radio declared the Soviet space effort 'serious business' which was 'probably about as broad as the American, and seeks many different, interlocking goals.'[89] Surveying the previous five years' progress for the aerospace industry publication *TRW Space Log* in the winter of 1968, Sheldon summarised the extensive space facilities of the Soviets' 'growing enterprise', detailing how their launch rate had increased prodigiously, even though 'only a few [missions] have been sufficiently spectacular to catch the attention of the world press.'[90] By drawing attention to the Soviets' continually increasing launch rate and their lead in tonnage lofted to orbit, Sheldon stressed that cosmonaut spectaculars were just one facet of the Soviet effort. Even an observer as well informed as Sheldon could not have perceived the byzantine infighting, duplication and waste that pervaded the Soviet space industry.[91] Sheldon depicted the Soviet programme as a unified effort willing to persevere in the face of astounding difficulties. This image was in striking contrast to NASA's increasingly precarious position during the late 1960s as public squabbles over the agency's post-Apollo future buffeted America's long term space strategy.

Charles Sheldon inhabited two worlds. As a trusted insider who had been at the heart of space policy from NASA's conception, he retained access to classified information on the Soviet competitor. However, he was driven by a sense of duty to ensure the public remained as informed as possible about the true state of US-Soviet space competition. His unique research method, scouring the open literature for citations to corroborate impressions derived from conversations with intelligence officers, allowed him to bridge the gulf between open and secret appraisals of the Soviet programme. As with any activity focusing on the Soviet enemy, cosmokremlinology remained a contentious business. Sheldon's detractors disparaged his use of open data and his rebuttals failed to totally dispel the Lost Cosmonaut myth. Nevertheless, Sheldon's image of the

[87] Library of Congress Science Policy Research Division, *Soviet Space Programs 1971-75: Goals and Purposes, Achievements, Plans and International Implications*, (Washington DC: US Government Printing Office, 1976), p. 16.
[88] Sheldon, *Review of the Soviet Space Program with Comparative United States Data* (1967), p. 46.
[89] Sheldon, 'The Soviet Space Programme', speech draft, 27 February, 1968, Speeches by Sheldon 1968, Box 9, Sheldon Papers.
[90] Charles S. Sheldon, *The Soviet Space Program: A Growing Enterprise*, (Redondo Beach, CA: TRW Space Log, 1969), Box 11, Sheldon Papers.
[91] The vying for pre-eminence and political patronage between rival designers and their bureaus is a major theme of Siddiqi's two part history of the Soviet programme. He summarises the effects this chaos caused in *The Soviet Space Race with Apollo* (2003), pp. 855-9; for its impact on the collapse of the N1 programme see Asif Siddiqi, 'Fighting Each Other: The N-1, Soviet Big Science and the Cold War at Home' in *Science and Technology in the Global Cold War* ed. by Oreskes and Krige, (2014) pp.189-224.

Soviet space programme as a driven and dedicated adversary willing to shoulder burdens that would be intolerable for a democratic society was extremely influential. Sheldon's misrepresentation of the degree of unity within the Soviet space programme demonstrates the power of Soviet secrecy. Even America's best-informed analysts were vulnerable to the Shadow Programme's false impression of the Soviet programme as the monolithic Integral.

Cold War Chivalry: Images of Soviet Spacefarers

'Interestingly, relief is expressed if a Russian cosmonaut comes home safely, too. It would seem wrong to my neighbours, if the name of a defunct Communistic spaceman were mixed into the general body count, were mingled willy-nilly with the encouraging news of so-and-so many communists killed that day.'[92] Kurt Vonnegut Jr., July 1969

Charles S. Sheldon's correspondence reveals that whilst his meticulously researched reports were sober and analytical, he was personally enthralled by the space race's futuristic spectacle. In a particularly revealing letter to the BIS' Geoffrey Perry sent after the excitement of *Apollo 11* had subsided, Sheldon confessed to being 'broken hearted by the passage of more lunar launch windows without further activity including the appearance of G Vehicle [The N1]'.[93] Sheldon would never have expressed such excitement about the prospect of a Soviet lunar flight in his official reports, but amongst other space fanatics he could revert to being a spectator. In a 1967 letter to Sheldon, the space scientist Dr Burt Edelson had enthused about recent Soviet launches: 'And a good thing too. Our own programme shows great signs of bogging down in the mire of indifference and under the Vietnam pall. Something will be needed to rejuvenate it.'[94] Edelson's desire for 'rejuvenation' was redolent of Kennedy's famous 1962 speech at Rice University that had construed the Soviet space challenge as an opportunity to reinvigorate America's sense of national purpose.[95] For astrofuturist Americans like Sheldon and Edelson, space competition may have been a crucial dimension of the Cold War but it was an altogether different manifestation of that conflict to the grim struggle in Southeast Asia. This optimistic gleam ensured the Soviet spacefarer was perceived as a very different Cold War combatant to the Vietcong insurgent, Eastern Bloc apparatchik or Russian conscript.

During the 1960s, the astronauts' glory was reflected onto their heroic rivals: the Soviet cosmonauts. Tom Wolfe likened the Mercury Seven to the 'Single Combat Warriors' of epic poetry because, like champions who ritualistically duelled in front of opposing armies, they embodied

[92] Kurt Vonnegut Jr., 'Excelsior! We're Going to the Moon! Excelsior!', *New York Times*, 13 July, 1969, p. SM9.
[93] Charles S. Sheldon II to Geoffrey Perry, 6 September 1969, Box 4, Sheldon Papers.
[94] Burt Edelson to Charles S. Sheldon, 7 November 1967, Box 7, Sheldon Papers.
[95] John F. Kennedy, 'Address at Rice University in Houston on the Nation's Space Effort,' September 12, 1962. : *The American Presidency Project*. http://www.presidency.ucsb.edu/ws/?pid=8862.

their nation in a symbolic form of combat.[96] Celestial competition with communism, as Vonnegut reflected, seemed somehow morally removed from its terrestrial counterpart. Astrofuturists had frequently characterised space exploration as a benign societal outlet, a 'moral substitute for war' in the words of CBS journalist Eric Sevareid.[97] In the optimistic terrain of space, even Cold War rivalry could be transfigured and cleansed. Just as the idealised chivalric combat of Arthurian romances belied the brutal reality of the feudal order, competition in space presented a more honourable simulacrum of the Cold War that smouldered on Earth below.[98] Idealised depictions of the space race as a more chivalrous form of the Cold War were reinforced by an international legal regime that had limited the 'weaponisation' of space and the pervasive sense that spacefarers were bound to each other as part of an elite 'brotherhood'. Within Apollo-era American culture, the cosmonauts were ideologically misguided, but otherwise honourable, competitors rather than villainous antagonists.

Policy choices made by America's first space age president, Dwight Eisenhower, helped define outer space's role in the Cold War struggle. Sean Kalic argued that although American leaders from Eisenhower onwards sought to stop the 'weaponisation' of space, the placing weapons of mass destruction in space that targeted the Earth, they hoped to take full advantage of its 'militarisation', that is utilising space for a range of military support and force amplification missions.[99] Eisenhower's decision that America's space effort would be coordinated by a civilian agency had sent a powerful statement of America's non-aggressive intentions when it came to space.[100] The president's overarching priority had been to avoid an arms race in outer space, whilst making it a safe arena for reconnaissance satellites, an increasingly urgent need after the 1960 U2 debacle when a CIA spy plane was shot down over Soviet territory. Sputnik's flight over American territory legitimised the principle of satellite overflight, a crucial requirement for the reconnaissance satellite programme.[101] For all this farsighted success, his administration's tone-deaf response to the issue of space prestige was exemplified by his Chief of Staff's disavowal of the space race: 'Science, not a high score in an outer space basketball game, has been and still is

[96] It is no accident that Wolfe depicted his subjects as warriors, for a gender-centric reading of the highly masculinised world of American spaceflight see: Weitekamp, *Right Stuff, Wrong Sex* (2004); Jennifer Ross Nazzal 'You've Come a Long Way: The First Six Women Astronauts and the Media' in Neufeld, *Spacefarers* (2013), pp. 175-202.

[97] Tribbe, *No Requiem for the Space Age* (2014), p. 110.

[98] Maurice Keen states that the medieval ideal of chivalry's 'most important legacy... was its conception of honour and the constituents thereof, specifically and especially in their relation to nobility'. Furthermore, the centrality of individualism to chivalry, as expressed by the 'ideal of the knight errant', also had a profound effect on Western culture: *Chivalry* (London: Yale University Press, 2005), pp. 249-50.

[99] Sean N. Kalic, *US Presidents and the Militarization of Space, 1946-1967* (College Station: Texas A&M University Press, 2012), for Eisenhower's Military space policy see pp. 26-59.

[100] Dwayne A. Day, 'Invitation to Struggle: The History of Civilian-Military Relations in Space' in John M. Logsdon, Linda J. Lear, and Roger D. Launius, *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program*, *The NASA History Series II: External Relationships*), 233-70 (Washington, DC: NASA, 1995), pp. 249-50.

[101] Matthew Mowthorpe, 'US Military space policy 1945–92' *Space Policy*, 18, 1, (2002), pp. 25–36 (p. 26).

our country's goal'.[102] Kennedy's setting of the prestige-oriented lunar goal repudiated this high-minded stance, belatedly acknowledging that it was time to beat the Soviets at their own game. The global adulation that Yuri Gagarin received proved that the thrill of a basketball game brought more cheers than a sedate science fair.

The 1967 UN Treaty of Principles Governing the Activities of States in the Exploration and Use of Outer Space, widely known as the Outer Space Treaty (OST), further consolidated the rules of the game established by Eisenhower. The road to the OST had begun with the 1963 Limited Nuclear Test Ban Treaty, which had banned nuclear weapons tests in outer space and a United Nations General Assembly Resolution of the same year in which US and Soviets stated their intention to refrain from placing nuclear weapons in orbit.[103] With the OST's swift and relatively non-contentious passage through the Senate, America entered into a legally binding UN treaty that prohibited the placing of weapons of mass destruction in space or on celestial bodies. Governments were also forbidden from making or enforcing territorial claims on those celestial bodies, now deemed to be the 'common heritage of all mankind'.[104] The 1967 OST had created, in Christy Collis' words, 'an entirely new legal geography'.[105] In December 1968, another UN agreement came into force that bound its signatories to render as much assistance as possible to any spacefarers in difficulty.[106] These treaties codifying the growing consensus regarding the de-weaponisation of space reinforced the image of space as a special realm that must be kept pristine. Space technology could never be entirely disassociated from that of the nuclear arms race but the international legal regime for outer space bolstered the fiction that the space race was an elevated, chivalrous form of superpower rivalry.

The second crucial influence on space chivalry was a 'space brotherhood' discourse that claimed astronauts and cosmonauts possessed a deeply-felt sense of kinship that transcended their ideological affiliation. This idea dated back to early in the space age and recalled earlier romantic depictions of aviators as a breed apart.[107] International gatherings like the biennial Paris Air Show provided opportunities for spacefarers to fraternise and swap stories. The rapport between space

[102]Yanek Mieczkowski, *Eisenhower's Sputnik Moment: The Race for Space and World Prestige* (Ithaca, NY: Cornell University Press, 2013), p. 60.
[103] For the history leading to the OST see Raymond L. Garthoff, 'Banning the Bomb in Outer Space' *International Security,* 5. 3 (Winter, 1980-1981), pp. 25-40; Library of Congress Legislative Reference Service, *Space Treaty Proposals by the United States And USSR: Staff Report* (Washington DC: U.S. Government Printing Office, 1966).
[104] The OST itself is available online via http://www.unoosa.org/pdf/gares/ARES_21_2222E.pdf [accessed 09/06/16].
[105]Christy Collis, 'The Geostationary Orbit: A Critical Legal Geography Of Space's Most Valuable Real Estate.', *Sociological Review,* 57 (2009), pp. 47-65 (54).
[106]The 1968 UN Agreement on the Rescue of Astronauts, The Return of Astronauts and the Return of Objects Launched into Space is available via http://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introrescueagreement.html [accessed 11/06/16].
[107] Corn, *The Winged Gospel* (1983), p. 18; Michael Paris, 'The Rise of the Airmen: The Origins of Air Force Elitism, c. 1890-1918' *Journal of Contemporary History*, 28, 1 (1993), pp. 123-141.

explorers, who often shared similar military test pilot backgrounds, is a recurrent motif in astronaut and cosmonaut memoirs.[108] American presidential rhetoric had drawn on the theme to stress America's eschewal of an arms race in space with Kennedy saluting 'The brave cosmonauts of the USSR' and Johnson's statement on the signing of the OST declaring that the treaty 'means that astronaut and cosmonaut will meet someday on the surface of the moon as brothers and not as warriors for competing nationalities or ideologies'.[109] The space brotherhood idea chimed well with idealistic arguments that space exploration had prompted a shift in human consciousness: the awareness that humanity were passengers aboard what engineer and futurist Buckminster Fuller had called 'Spaceship Earth'.[110]

The spaceflight tragedies of 1967 added a poignant undercurrent to space brotherhood by fostering a sense of mutual vulnerability that cut across ideological boundaries. Vladimir Mikhailovich Komarov's *Soyuz* ('*Union*') *1* flight, launched 23 April 1967, had been feverishly anticipated by observers of the Soviet space programme. It had been almost two years since the flight of *Voskhod 2* and cosmonauts had been hinting that something spectacular would occur to celebrate the 50th anniversary of the Great October Socialist Revolution; at the least it was expected that the Soviets would unveil their new launch vehicle. Faults multiplied and the launch of *Soyuz 2*, which was to have rendezvoused and docked with Komarov's craft in a demonstration of cosmonautical 'union', was cancelled. Komarov was an experienced cosmonaut who had commanded the *Voskhod 1* mission, but his skill in managing to bring his stricken craft back for re-entry was futile; he died a horrific death when his craft's parachute malfunctioned, slamming his capsule into the ground.[111] Whilst Komarov's death predictably reignited the lost cosmonaut rumours, the predominant American response was characterised by the empathy that Vonnegut had observed.[112]

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[108] David Scott, and Alexei Leonov, *Two Sides of the Moon: Our Story of the Cold War Space Race* (London, Simon and Schuster, 2004), p. 130; Edwin 'Buzz' Aldrin (with Wayne Warga), *Return to Earth* (New York NY: Random house, 1973), p.172; Frank Borman (with Robert J. Serling),*Countdown* ((New York, NY: Silver Arrow, 1988); Valentina Tereshkova, and A. Lothian, '*Valentina: First Woman in Space, conversations with A. Lothian*' (Durham: The Pentland Press, 1993), p. 245.

[109] John F. Kennedy, 'Address in New York City Before the General Assembly of the United Nations', 25 September 1961, available via *The American Presidency Project,* <http://www.presidency.ucsb.edu/ws/?pid=8352> [accessed 28 February 2018]; Lyndon B. Johnson: 'Remarks at the Signing of the Treaty on Outer Space' 27 January, 1967 available via *The American Presidency Project*. <http://www.presidency.ucsb.edu/ws/?pid=28205> [accessed 28 February 2018].

[110] Tribbe, *No Requiem for the Space Age* (2015), pp.80-1; Oliver *To Touch the Face of God* (2014), pp. 59-60; the cultural influence of photographs of the whole Earth produced by the Apollo programme is explored in detail in Robert Poole's *Earthrise: How Man First Saw The Earth* (London : Yale University Press, 2008).

[111] See Siddiqi *The Soviet Space Race with Apollo* (2001), pp. 576-90; Sheldon discusses the rumours of impending activity in his *Review of the Soviet Space Program* (1967), pp. 73-4,76; American Embassy, Tokyo to Department of State, 'Soviet Space Plans', Airgram, 14, July 1966, Folder: Soviet Lunar, Box 9, Sheldon Papers, NASM Archives.

[112] For Komarov's place in lost cosmonaut mythology see Ellis, 'The Cosmonaut in the American Imagination', (2011), pp.74-93; Ben Evans 'This Devil Ship: The Tragic Tale of Soyuz 1', 24 April 2012 <http://www.americaspace.com/?p=17776> [accessed 28 February 2018]; Piers Bizony's *Starman: The*

Americans knew all too well how it felt to lose a space hero. Just months before NASA had been suddenly plunged into mourning when *Apollo 1*'s prospective crew, Astronauts Roger Chafee, Gus Grissom, and Ed White, had been killed when the oxygen-rich atmosphere of their command module simulator ignited during a launch rehearsal test on 27 January 1967.[113] Sheldon noted that 'As grim as this comparison of tragic losses is, it tends to put both countries back closer to a par position.'[114] The Soviet tragedy coming so soon after NASA's own was a bleak coincidence that made it easy for Americans to empathise with their Cold War rivals, enforcing a brutal sense of equivalence as the superpowers were united in vulnerability and grief.[115] This idea was poignantly demonstrated in the editorial cartoons that depicted the Soviet and American flags lowered at half-mast, either side by side, or divided by a symbolic chasm.[116] *The New York Times* captured a prevailing feeling that mutual vulnerability underscored the need for cooperation by observing that 'both nations are duplicating costly and dangerous work. Thus good and brave men die unnecessarily'.[117]

Space brotherhood imagery was graphically, and movingly, incorporated into the Apollo programme's symbolism. During his 1969 visit to the USSR, Frank Borman, commander of the pioneering *Apollo 8* circumlunar mission, toasted the memory of Komarov and Yuri Gagarin, who had died in a plane crash the year before and 'had become almost a deity in Russian eyes'.[118] He returned bearing two small but significant souvenirs: medals honouring the two fallen cosmonauts given to him by their widows. President Nixon described the decision to place these medals on the lunar surface during the *Apollo 11* mission as a 'reach across national boundaries' that he hoped 'bodes well for mutual peace and progress in the future'.[119] Teasel Muir-Harmony persuasively argues that this gesture was part of Apollo's wider symbolic choreography that depicted the world as interconnected and interdependent 'participants' in the epochal mission.[120] However, honouring Soviet cosmonauts also broadcast a very specific Cold War message. Nixon

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Truth Behind the Legend of Yuri Gagarin (London: Bloomsbury, 1998), p. 241 incorporates dubious lost cosmonaut information into its narrative, breathing new life into tired and misleading claims.

[113] French and Burgess *In the Shadow of the Moon* (2007)pp. 140-168; The Apollo 1 fire is, understandably a major moment in memoirs by Astronauts and NASA staffers, see for example Gene Kranz, *Failure is Not an Option: Mission Control from Mercury to Apollo 13 and Beyond* (New York, NY: Simon and Schuster, 2009) pp. 191-208.

[114] Sheldon, *Review of the Soviet Space Program* (1967), p. 78.

[115] James Oberg later implied that the disaster could have been prevented had the Soviets shared information about a cosmonaut trainee who had been killed in a similar test chamber fire; though the fact NASA persisted in using oxygen-rich atmospheres long after the fire makes it seem doubtful they would have believed their rivals, see Oberg, *Uncovering Soviet Disasters* (1989), p.170.

[116] Ellis, 'The Cosmonaut in the American Imagination' (2011), p. 89-91.

[117]'Editorial: Death of a Cosmonaut' *New York Times*, 25 April 1967, p. 42, See also Edwin Diamond, 'Astronauts and Cosmonauts: Unite!' *Newsweek*, 8 May 1967, p. 68.

[118]Borman, *Countdown* (1988), pp. 245, 248.

[119] 'Proposed White House Press Release To Be Issued on July 17', Ex OS 3 7/1/69-7/21/69, White House Central Subject Files Outer Space 3, Nixon Library.

[120] Muir-Harmony, *Project Apollo, Cold War Diplomacy and the Framing of Global Interdependence* (2014), p. 143.

was already interested in potential post-Apollo cooperation with the Soviets and would discuss possibilities with NASA administrator Tom Paine during the helicopter ride to the USS Hornet that recovered the *Apollo 11* capsule.[121] The lunar memorial drew on resonant themes of space brotherhood, shared sacrifice and Soviet Gagarin worship to send a signal that whilst America had won, it was a gracious victor.

In 1971, *Apollo 15* mission commander Dave Scott placed a second memorial to fallen astronauts and cosmonauts on the lunar surface. In addition to a small plaque listing the names of fourteen astronauts and cosmonauts, including several astronauts who like Gagarin had been killed in plane crashes, this memorial included what was arguably the first piece of art placed on another celestial body: a small sculpture called 'The Fallen Astronaut'.[122] The Soviets had recently experienced their second spaceflight tragedy, the *Soyuz 11* disaster, where a crew of three cosmonauts were killed when their craft depressurised as it returned from a groundbreaking mission aboard the *Salyut 1* space station.[123] Scott reflected that although he only knew some of the cosmonauts from 'formal photographs alongside a brief announcement of their deaths in the Soviet press', he still felt 'a strong sense of brotherhood' with them.[124] NASA's offer to send a representative to the Komarov funeral had been declined but the *Soyuz 11* tragedy occurred during the onset of US-Soviet detente. The superpowers were actively discussing potential cooperative missions and Astronaut Thomas Stafford was invited to act as a pallbearer alongside Leonid Brezhnev at the *Soyuz 11* cosmonauts' state funeral.[125] Stafford's participation in the *Soyuz 11* funeral was part of the same pageantry of the space chivalry as the lunar memorials. These emotionally affecting spectacles of mutual grief strengthened the idea that astronauts and cosmonauts were star-crossed comrades.

There were limits to Apollo-era expressions of space brotherhood. In May 1972, Dr Oskar Morgenstern, the Chairman of the Mathematica Corporation, proposed NASA symbolically bury the space race hatchet by magnanimously inviting a Soviet cosmonaut as a passenger on the final Apollo flight. Such proposals were respectfully dismissed with references to complicating factors and ongoing, more tentative, cooperative discussions, but their existence demonstrates the

[121] 'Memorandum to Dr Henry Kissinger' Space programs foreign cooperation 1970 [February69-nov 70] 3 of 3, National Security Council (NSC), Files Subject Files Box 392, Nixon Library.
[122] This poignant gesture has been somewhat diminished by a subsequent controversy surrounding the sculptor who designed the abstract spacesuited figure's decision to sell replicas for profit. See Corey S. Powell and Laurie Gwen Shapiro, 'The Sculpture on the Moon', 16 December 2013, <http://www.slate.com/articles/health_and_science/science/2013/12/sculpture_on_the_moon_paul_van_hoeydonck_s_fallen_astronaut.html> [accessed 28 February 2018].
[123] See Ivanovic, *Salyut* (2008)
[124] Scott and Leonov, *Two Sides of the Moon* (2004), pp.313-4.
[125] Stafford and Cassutt, *We Have Capture: Tom Stafford and The Space Age* (Washington DC: Smithsonian Books, 2002), pp. 152-6.

existence of a discourse of space chivalry.[126] The respect shown to the cosmonauts who found themselves on the space race's losing side recalled the gracious treatment that noble but vanquished enemies could expect to receive from an Arthurian hero. As Anti-Satellite weapons programmes and propaganda which denounced the other side for being hell-bent on militarising or imperialistically dominating space proved, Cold War space competition was the result of venal terrestrial rivalry. Space brotherhood elevated that rivalry to an idealised form, deflecting focus from increasingly tarnished ideological motivations towards shining, supposedly transnational, virtues of heroism and sacrifice. It was this astrofuturist-influenced vision of space exploration as an idealised form of Cold War rivalry, rather than American disenchantment with space competition in itself, that prompted sympathetic cultural depictions of Soviet and Russian space travellers.

Outside of NASA symbolism, space chivalry was also evident in wider Apollo-era culture and is particularly apparent in narratives that depicted Soviet or Russian space travellers as partners, comrades or fallen rivals worthy of respect rather than villainous antagonists. Apollo-era science fiction has been extensively analysed, both by aerospace historians and the scholarship interrogating notable cultural products such as *Star Trek* or Stanley Kubrick and Arthur C. Clarke's epic collaboration *2001: A Space Odyssey*.[127] The remainder of this section explores the portrayal of Soviet space travellers within Apollo-era culture, examining what these fictional cosmonauts had in common, and how they relate to the unique place that space occupied within the Cold War imagination.

Space Chivalry was enthusiastically embraced by a science fiction subgenre that Gary Westfahl terms the 'Spacesuit Film' for the importance these protective cocoons play within their narratives. Unlike the extravagant fantasy of *Buck Rogers* or *Flash Gordon,* Spacesuit Films took pains to emphasise the alienating and hazardous nature of space exploration.[128] Even before Gagarin's flight, this subgenre had highlighted the mutual vulnerability rival spacefarers shared; a 1960 episode of the TV Series *Men into Space* portrayed American astronauts abandoning a mission to Mars to help their imperilled Soviet competitors.[129] After the spaceflight tragedies of

[126] John B. Walsh to Henry A. Kissinger, 'Oskar Morgenstern's Suggestion for Cooperation with the Soviets', Memorandum, 12 May 1972; RNPL; Thomas J. O'Donnell to Richard Nixon, Letter, 3 August 1972, folder: GEN OS 3 Space Flight 10/1/1971-[10/1/1971-12/31/1972], Box 11, Outer Space, White House Central Files, Subject Files, Nixon Library.
[127] *2001* in particular has been extensively analysed, see for instance Robert Kolker (Ed) *Stanley Kubrick's 2001: A Space Odyssey: New Essays*, (New York NY: Oxford University Press, 2006); Stefanie Schwarm, *The Making of 2001: A Space Odyssey*, (New York, NY: The Modern Library, 2000).
[128] Gary Westfahl, *The Spacesuit Film: A History 1918-1969,* (Jefferson NC: McFarland and Company, 2012), pp.3-4.
[129] Westfahl, (2012), pp. 290-1, see also Margaret Weitekamp, 'Setting the Scene: *Men into Space* and *The Man and the Challenge*', in *Spacefarers* ed. by Neufeld (2014), pp. 9-34.

1967, this theme returned to the fore in the films *Countdown* (1968) and *Marooned* (1969).[130] Whilst *Countdown*'s depiction of the deadly consequences of crash programmes chasing Cold War prestige recalled the downbeat Apollo-Era depictions of miserable and broken astronauts identified by Tribbe, it is also a notable cinematic depiction of space chivalry.[131] Its protagonist, Astronaut Lee Stegler (James Caan) lands on the Moon to discover a crashed Soviet rocket with two dead cosmonauts, one of which clutches a Soviet flag. Believing that he too is doomed, Stegler honours his Soviet competitors' sacrifice by laying the Soviet flag alongside his own. Westfahl contends this moment represents 'the absurdity of national conflicts and the need for international cooperation in space'.[132] However, this image also drew on the resonant idea of space brotherhood: as in the post-Komarov editorial cartoons, the Soviet flag symbolises comradeship and mutual vulnerability rather than communist expansionism. Stegler ultimately succeeds where the Soviets fail; the film ends with him staggering towards shelter in a space habitat capsule, his chivalric commemoration of the cosmonauts symbolically redeeming their failure.

In *Marooned*, an American space station's crew are stranded in orbit until their rescue is ultimately effected with the help of a Soviet cosmonaut. Despite initial concern over the cosmonaut's motives, and the fact that his craft is too small to accommodate the astronauts, he renders crucial assistance by replenishing their oxygen supply.[133] *Marooned*'s depiction of space cooperation would impress both National Academy of Sciences President Philip Handler, who attended a special screening before a 1970 visit to the USSR to discuss scientific cooperation, and a later delegation of Soviet scientists, who were shocked to see a heroic cosmonaut in an American film.[134] Rather than suggesting cinema's power to transcend ideology, these anecdotes instead testify to how *Marooned*'s idealised view of space competition flattered Cold War space technologists by asserting they would put aside their ideological differences in the event of emergency. Latter-day Savonarolas such as cultural historian Lewis Mumford had denounced NASA's technocratic worldview as 'actively hostile to human welfare'.[135] The space chivalry of *Marooned*'s rescue narrative attempted to refute such criticisms by heroically re-imagining Cold War technocracy.

Marooned may have cast the cosmonaut in a positive light, but American culture was not yet ready to let a cosmonaut take centre stage. Analyses of *Marooned* have drawn attention to the

[130] *Countdown,* dir. by Robert Altman, (Warner Brothers, 1968), *Marooned,* dir. by John Sturges (Columbia Pictures, 1969); Westfahl, *The Spacesuit Film* (2012), pp. 290-9.
[131] Tribbe, *No Requiem for the Space Age* (2014), p. 12.
[132] Westfahl, *The Spacesuit Film* (2012), p. 294.
[133] *Marooned,* dir. by Sturges (Columbia Pictures, 1969).
[134] Edward Clinton Ezell and Linda Neuman Ezell, *The Partnership: A History of the Apollo Soyuz Test Project* (Washington DC: NASA, 1978), pp. 9-10; Donald K. Slayton, and Michael Cassutt, *Deke! US Manned Space from Mercury to the Shuttle* (New York: St. Martin's Press, 1995), p. 277.
[135] Tribbe, *No Requiem for the Space Age* (2014), pp. 4, 71, 89.

cosmonaut's 'dark and foreboding' spacecraft, and to how the cosmonaut proves to be a 'bumbler, unable to achieve anything significant until the real hero, Dougherty [another astronaut], arrives.'[136] That Apollo-era spacesuit films continued to depict American supremacy is unsurprising; Kilgore argued astrofuturism's roots within colonial ideas of exploration and conquest meant that such narratives typically depicted white male Americans as courageous leaders with the rest of the world cast as grateful subalterns.[137] Said asserts such silencing and 'speaking for' the subject was a crucial element of the othering process.[138] Just as medieval romances that cast Saladin as a noble savage entranced by the crusader's superior chivalrous ideal robbed the sultan of his authentic voice, space chivalry had a similarly patronising aspect.[139] Whether on film or on a lunar memorial, silent or dead cosmonauts were reduced to palatable symbols of courage incapable of challenging their American comrades.

The most gleaming of all the Apollo-Era visions of a technocratic future, was that depicted in *Star Trek,* the phenomenally successful television series which ran in its original iteration between 1966 and 1969.[140] Under the leadership of a courageous white male American captain, the Starship *Enterprise*'s international and unisex crew was a harmonious microcosm of a new world order in which humanity had unified following a disastrous nuclear war to create a 'United Federation of Planets'.[141] Cold War-centric readings of Star Trek have focused on either storylines that restaged the ongoing Vietnam War or series creator Gene Roddenberry's use of the Klingon Empire, warlike, devious aliens with a stereotypically Asian appearance, as surrogates for the Soviets.[142] Whilst the antagonism between the Klingons and the Federation allowed Roddenberry's writers to tackle the issue of wider Cold War rivalry, *Star Trek*'s fundamentally optimistic, astrofuturist worldview contended that humanity, at least, would eventually transcend Twentieth Century ideological struggles.

That transcendence was personified by Walter Koenig's character, Ensign Pavel Chekov. Whilst the young Russian, who combined Yuri Gagarin's boyish charm with the haircut of The Monkees'

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[136] Jorgensen, *States of Weightlessness* (2009), p. 209; Westfahl, *The Spacesuit Film* (2012), pp. 288-9
[137] Kilgore, *Astrofuturism* (2003), pp. 1-17.
[138] Said, *Orientalism* (2003), pp. 5-6.
[139] Keen, *Chivalry* (2005), pp. 7-8.
[140] Reflecting its popularity there is a colossal critical literature on Star Trek: Susan R Gibberman, Star Trek*: An Annotated Guide to the Resources on the Development, the Phenomenon, the People, the Television Series, the Films, the Novels, and the Recordings*. Jefferson, NC: McFarland, 1991; Robin Roberts, *Sexual Generation. Star Trek: The Next Generation and Gender* (Champaign IL: University of Illinois Publishing, 1999); Lincoln Geraghty, 'Reading on the Frontier: A *Star Trek* Bibliography.', *Extrapolation* 43, 3 (Fall 2002): 288–315; Nancy R. Reagin, *Star Trek and History* (Hoboken, NJ: John Wiley, 2013); Daniel Leonard Bernardi. *Star Trek and History: Race-ing Toward a White Future* (New Jersey: Rutgers University Press, 1998).
[141]Daniel Leonard Bernardi, '"Star Trek" in the 1960s: Liberal-Humanism and the Production of Race.', *Science Fiction Studies*, *24* (2), 1997), pp. 209–225; see also Douglass *Astrofuturism* (2003), pp. 21-30.
[142]H. Bruce Franklin, ''Star Trek' in the Vietnam Era.', *Science Fiction Studies* 21,1 (1994), pp. 24-34; Rick Worland, 'Captain Kirk: Cold Warrior', *Journal of Popular Film and Television* 16*,* 3 (1988), pp. 109-117, 'From the New Frontier to the Final Frontier: Star Trek From Kennedy to Gorbachev, *Film & History: An Interdisciplinary Journal of Film and Television Studies*, 24, No 1-2, (1994), pp. 19-35 (19-25).

Micky Dolenz, had been written into the series to appeal to younger viewers, he was more than a space age update of *The Man from U.N.C.L.E*'s Soviet heartthrob Ilya Kuryakin. A Russian character allowed the series to acknowledge the USSR's contribution to space exploration and posit the Federation as something greater than just a NATO space programme.[143] Chekov's penchant for boasting about the Russian provenance of famous inventions and historical figures (reliably informing his crewmates that whiskey was invented in Leningrad and the Garden of Eden had been located near Minsk) allowed *Star Trek*'s writers to poke gentle fun at the nationalist grandstanding of Soviet space age propaganda.[144] In *Star Trek*'s optimistic future of human unity, such boasts were the sole vestigial remnants of defanged Soviet pride, now, like the Russian ensign's inability to pronounce the letter 'V', just another comical national eccentricity. In keeping with space chivalry's well-meaning but patronising parameters, the Soviets could be valued and resourceful comrades but their historical baggage remained slightly ridiculous.

In Stanley Kubrick's *2001,* Cold War tension simmers beneath cordial pleasantries as the superpowers grudgingly share the use of outer space. Travelling to the Moon to investigate the discovery of a mysterious 'Monolith', American scientist Heywood Floyd (William Sylvester) bumps into a group of Soviet scientists during a stopover at the Hilton orbiting hotel. Floyd and one of the Soviets, Elena (Margaret Tyzack), exchange polite small talk that conjures up the transnational world of international scientific conferences, but it is an awkward meeting. One of the Soviets, Dr Smyslov (a typically unctuous Leonard Rossiter) continually pesters Floyd as to why his countrymen have not been able to contact the American Clavius moon-base: are rumours of an epidemic there true? This, it turns out later, is merely disinformation to cover up the Monolith's existence. In his attempt to chart the superpower relationship through science fiction films, A. Bowdoin Van Riper contends that this scene demonstrates the extent of Apollo-era Cold War mistrust, where a scientist must be a 'political animal' to succeed.[145] However, even in a film as deeply ambiguous about technology's promise as *2001*, there are still glimmers of space chivalry.[146] *2001*'s Soviets are not the doomsday machine-wielding drunks of *Dr Strangelove,* but rather foreign competitors unnerved by American secrecy. Smyslov describes the American

[143] 'Discovered Documents: 040 'Friday's Child/ Recurring Character Writing Notes' A memo from Gene Roddenberry concerning the character writing of the recurring task' Mission Log Podcast, <http://missionlogpodcast.com/discovereddocuments/040/> [accessed 28 February 2018]; Thomas M. Barrett 'The Undefined Agent, Illya Kuryakin: Making the Russian (In)Visible in the Man from U.N.C.L.E' in *James Bond and Popular Culture: Essays on the Influence of the Fictional Superspy* ed. by Michele Brittany, (Jefferson, NC: McFarland, 2014), pp. 103-122.

[144] 'The Apple' *Star Trek*, NBC, 29 December 1967; 'I, Mudd' *Star Trek*, NBC, 3 November 1967.

[145] A. Bowdoin Van Riper, 'From Gagarin to *Armageddon:* Soviet-American Relations in the Cold War Space Epic.', *Film & History: An Interdisciplinary Journal of Film and Television Studies* 31, 2 (2001), pp. 45-51 (p.47).

[146] Tribbe contends that *2001* undermined NASA's technocratic positivist philosophy of finding the answers to the universe's secrets with its mystical and ambiguous ending; he less convincingly contends that large stretches of the film were deliberately 'boring' to critique astrofuturist ideology, *No Requiem for the Space Age* (2014), pp. 185-7.

refusal to let a Soviet craft make an emergency landing at Clavius as a serious breach of international protocol, warning Floyd 'there is going to be a bit of a row'.[147] The discord caused by the Monolith's discovery is an aberration. Floyd's familiarity with Elena and the presence of the Soviet scientists with their Aeroflot-branded luggage at the orbital Hilton further indicates that whilst the superpowers may not trust each other, their joint occupancy of the Moon necessitates frequent contact.

Even amidst the disillusion of the space slump, American depictions of Soviet spacefarers were remarkably sympathetic. Underlying these depictions was an idea that competition in outer space, an environment closely associated with optimism and limitless possibility, was a morally elevated form of Cold War rivalry. Here, unlike on the flawed planet below, Cold War rivals were bound to rescue one another and force was constrained by international law rather than a morally repugnant balance of terror. The Soviet other could be redeemed through heroism in outer space, though often it was as a junior partner or sacrificial tragic figure that they were thus elevated. The dominant cultural image of Soviet spacefarers as potential comrades or partners was informed by this idealistic, if slightly patronising, discourse of space chivalry. Unlike the outspoken cosmonauts of reality who loudly articulated a vision of the future where space exploration was inseparable from socialism's inevitable triumph, in American culture, Soviet characters were silent, docile or dead.

To The Finish Line: The Climax of the Moon Race

'The notion of a competition between the United States and Soviet Russia in any field whatsoever, is obscene: they are incommensurable entities, intellectually and morally. What would you think of a competition between a doctor and a murderer to determine who could affect the greatest number of people?' – Ayn Rand, September 1969.[148]

John Updike's *Rabbit* novels follow a beleaguered American everyman, Harry 'Rabbit' Angstrom, on an elegiac journey through the post-war period. Appropriately, the second novel, *Rabbit Redux,* presents his emblematic characters re-enacting the turmoil of 'The Sixties' against the backdrop of the July 1969 *Apollo 11* lunar landing. Jill, the troubled flower child who has found a dubious shelter with Rabbit, idealistically contends that, 'People have run on fear long enough. Let's try love for a change.' Rabbit, watching familiar certainties crumble around his head responds: 'Then you better find yourself another universe. The Moon is cold, baby. Cold and ugly. If you don't want it, the Commies do. They're not so fucking proud.'[149] Rabbit Angstrom's wounded rebuke contrasted Soviet tenacity with American hedonism and sloth. During the

[147] *2001: A Space Odyssey*, dir. by Stanley Kubrick (MGM, 1968).
[148] Ayn Rand, *The Objectivist*, September 1969, p. 9.
[149] John Updike, *Rabbit Redux* in *A Rabbit Omnibus* (London, Penguin, 1991), p. 278; for an analysis of *Rabbit Redux*'s portrayal of the space age see Atwill, *Fire and Power* (2010), pp. 45-66.

Apollo-era, American astrofuturists struggling to sustain public enthusiasm for space exploration articulated similar depictions of the Soviet programme as a determined, and perversely admirable, antagonist. Historians have treated warnings about the Soviet space programme in this period as the cynical creation of embattled NASA administrators who had badly misread the public mood.[150] This section argues that depictions of the Soviet programme as a slumbering giant were not as unreasonable as they appear with hindsight. Secrecy concealed the chaos that was overwhelming the Soviet space effort, presenting a polished image of determination and dogged persistence to American observers. *Apollo 11* was widely hailed as an important Cold War victory, but the lunar dust had hardly settled before the image of the Soviets as unpredictable and formidably persistent adversaries once again re-emerged.

By 1967, the Mercury and Gemini programmes had advanced through a range of space milestones: longer flight durations, extravehicular activity (EVA) forays outside of the space capsule and spacecraft rendezvous and docking.[151] However, as NASA's budget precipitously declined from its peak of $19.8 billion in 1965 to $8.8 billion in 1972, America's lead appeared imperilled.[152] With Kennedy's 'end of this decade' deadline approaching, rumours about impending Soviet circumlunar missions proliferated.

The debate over whether these rumours led to the December 1968 *Apollo 8*'s mission profile being upgraded from prosaic Earth orbit test to spectacular crewed circumlunar navigation is one of the Soviet programme's principal appearances in the Apollo historiography. Historiographical consensus has swung back and forth over whether rumours about Soviet circumlunar missions played the decisive role. In contrast to the direct causational relationship between rumours and the upgrade of earlier histories, Robert Poole argues 'hard evidence is elusive' when it comes to proving a direct link, but depicts a febrile atmosphere of speculation at NASA exacerbated by the pressure to fulfil Kennedy's challenge.[153] In 2015, James E. David concluded that available intelligence agency evidence indicated that whilst NASA was pestering the CIA for any information they had, intelligence considerations were only 'in part' a factor in addition to 'sound technical reasons' for the mission upgrade.[154] Finally, Dwayne A. Day's recent essay 'Chasing Shadows' references previously overlooked CIA FMSAC memos issued in April and October of 1968 that

[150] Byrnes, *Politics and Space* (1994), pp. 3, 73; Kay, *Defining NASA* (2005), p.103; Tribbe, *No Requiem for the Space Age* (2014), p.159.
[151] For the Gemini programme see Barton C. Hacker and James M. Grimwood, *On the Shoulders of Titans: A History of Project Gemini*. (NASA SP-4203) (Washington, DC: National Aeronautics and Space Administration, 1977), <http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19780012208.pdf> [accessed 28 February 2018] French and Burgess, *In the Shadow of the Moon, 1965-1969* (2007), pp. 1-139.
[152] Byrnes, *Politics and Space* (1994), p. 90.
[153] Tom Crouch, *Aiming for the Stars: The Dreamers and Doers of the Space* (Washington DC: Smithsonian Institution Press, 1999), p. 219; Burrows, *This New Ocean* (1998), pp. 418-9; Robert Poole, *Earthrise* (2008), pp. 15-18, 203.
[154] James E. David, *Spies and Shuttles* (2015), pp. 48-9, 50-7, 67; Dwayne A. Day also sees the evidence of a direct link as 'circumstantial'; 'Chasing the Zonds', *The Space Review*, 9 February 2009, <http://www.thespacereview.com/article/1302/1> [accessed 28 February 2018].

both predicted Soviet circumlunar missions as likely for the winter of 1968/1969. Day contended that although 'the preponderance of evidence still supports the conclusion that it was the Apollo schedule that drove the decision, not specific Soviet actions', the US-Soviet space race 'established the larger context in which all decisions were made'.[155] Regardless of a direct link, the historiography nevertheless depicts NASA as haunted by the prospect of a Soviet circumlunar mission.

As the CIA was reassessing the Soviet lunar programme in light of Dr Charles Stark Draper's report, cosmonaut Pavel Beliaev hinted to astronauts at the May 1967 Paris Air Show that he expected to be selected for a circumlunar mission in the near future.[156] The USSR had also begun sending 'Zond' ('Probe') capsules on flights around the Moon. In September 1968, *Zond 5* safely returned a biological payload that included two steppe tortoises from around the Moon. It seemed certain a cosmonaut would follow, just as Gagarin had followed his canine comrades Belka and Strelka.[157] Marshall Spaceflight Centre director Wernher von Braun called David S. Brandwein, director of FMSAC, for his thoughts; Brandwein cautioned that the *Zond* was incapable of landing a cosmonaut on the Moon, but agreed it would be 'perfectly proper' to predict a crewed circumlunar flight 'either late this year or sometime next year'.[158] With hindsight Beliaev's prediction seems hopelessly optimistic, but the Soviet programme that Apollo-era Americans perceived was not the pathetic, defeated creature of Apollo-centric historical accounts, but an apparently well-organised and determined entity that had repeatedly surprised its Western rivals in the past.

Recollections from members of America's space community corroborate archival evidence's picture of intense anxiety over Soviet lunar plans. Astronaut David Scott described the 'political implications' of the Soviets being first to orbit the moon as 'unthinkable' and *Apollo 7*'s Wally Schirra recalled that 'the timeframe was that we had a real beautiful Cold War going on.'[159] Even the cantankerous Apollo Flight Director, Chris Kraft, who viewed the Soviet effort as a persistent irritant predicated on 'stunts', took the warnings seriously: 'We had to assume that this space race we were running still focused on putting men on the Moon.'[160] A December 1968, *Time* magazine cover 'Race to the Moon' depicted an astronaut and cosmonaut, their limbs elongated

[155] Dwayne Day, 'Chasing Shadows: Apollo 8 and the CIA' *The Space Review*, 11 April 2016, available online via <http://www.thespacereview.com/article/2962/1> [accessed 28 February 2018]
[156] Scott and Leonov, *Two Sides of the Moon*,(2004), pp. 202-5; Siddiqi, *The Soviet Space Race with Apollo*, (2001), pp. 609-10.
[157] Siddiqi, *The Soviet Space Race With Apollo (2001),* pp. 620-1, 653-6; for the Soviet canine flights see Amy Nelson, 'Cold War Celebrity and the Courageous Canine Scout: The Life and Times of Soviet Space Dogs' in Andrews and Siddiqi *Into the Cosmos* (2011)pp. 133-155; Olesya Turkina, *Soviet Space Dogs* (London: Fuel, 2014).
[158] 'Memorandum For the Record: Telephone Conversation with Dr Wernher von Braun, Director, Marshall Space Flight Center', 25 September, 1968, CIA CREST, ESDN CIA-RDP71R00510A000200220025-3.
[159] Scott and Leonov, *Two Sides of the Moon* (2004), p. 209; French And Burgess, *In the Shadow of The Moon* (2007), p. 230.
[160] Chris Kraft, *Flight: My Life in Mission Control* (New York, NY: Penguin, 2002), pp. 214, 226, 265.

like figures in an El Greco painting, sprinting towards the Moon, neck and neck.[161] Decades later, that magazine's space correspondent, James Shefter, argued the painting's ambiguity was 'a good guess' based on the available information: 'Nobody but the Russians knew exactly what they were up to. And they weren't talking'.[162] If the Russians were not talking, then Western experts like Sheldon spoke for them and they contended Sputnik was a powerful argument against complacency.

The much-rumoured Soviet crewed circumlunar mission failed to materialise and the December 1968 *Apollo 8* mission is often seen as the moment that NASA's quest to fulfil Kennedy's challenge became a fait accompli.[163] The crew's reading of passages from Genesis and the spellbinding photographs of the Earth that the mission returned were deeply resonant moments that transcended NASA's usual blend of arid technical jargon and fighter pilot folksiness.[164] Meanwhile, the Soviet programme 'froze into a kind of collective shock', only to be dealt further blows when tests of its N1 launch vehicle ended in catastrophic failures in February and July of 1969, the latter being one of the largest non-nuclear explosions in history.[165] American spy satellite imagery of the charred and devastated launch pads and gantries remained highly classified. FMSAC analysts were confident that America would beat the Soviets to the first crewed lunar landing, but even they remained unaware of the true scale of the despair engulfing the Soviet effort.[166] On New Year's Day, 1969 *The Atlanta Constitution* described declining NASA funding as raising the 'spectre' of the military advantage the Soviets would possess if they were able to win the 'over-all space race'.[167] A little over two weeks later when the *Soyuz 4* and *5* capsules docked in orbit, American press coverage interpreted this as portending a 'vigorous' Soviet effort in the emerging field of orbiting space stations.[168] Occluding the Soviet programme's inner turmoil, the Shadow Programme focused attention on the Soyuz docking as an important step towards Tsiolkovsky's dream of space habitats.

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[161] 'Race to the Moon' *Time*, 6 December 1968.
[162] James Shefter, *The Race: The Complete Story of How America Beat Russia to The Moon (*New York, NY: Anchor, 200), p. 271.
[163] Allen, *Live from the Moon,* (2009) p. 135; French and Burgess, *In The Shadow of the Moon* (2007), pp. 298; Siddiqi, *The Soviet Space Race with Apollo,* (2003), p. 674.
[164] See Poole, *Earthrise* (2008) and Oliver, *To Touch the Face of God* (2014), pp. 143-63.
[165] Siddiqi (2000), pp. 674-5. 688-93; Boris Chertok's memoir discusses the N1 failures in typically exhaustive detail: *Rockets and People Volume 4: The Moon Race*, (2011), pp. 189-243 <http://history.nasa.gov/SP-4110/vol4.pdf> [accessed 28 February 2018].
[166] Dwayne Day, 'The Moon in the Crosshairs: Part 4', *The Space Review*, 11 (January 2009), http://www.thespacereview.com/article/2900/1 [accessed 28 February 2018] Day draws attention to the June 1969 NIE on the Soviet space programme that set a likely Soviet crewed lunar landing for 1971/1972 but denied the Soviets were experiencing severe technical problems with their N1 vehicle, see National Intelligence Estimate 11-1-69, *The Soviet Space Program*, June 19, 1969, p. 14, Available via <http://nsarchive.gwu.edu/NSAEBB/NSAEBB501/docs/EBB-16a.pdf> [accessed 28 February 2018].
[167]'Future Worrying Space Officials' *The Atlanta Constitution,* 1 January 1969, p. 19A.
[168] John Noble Wilford, 'Where the Russians Lead in Space', *New York Times*, 19 January 1969, p. E20; Charlotte Saikowski, 'What next by Soviets in space?' *The Christian Science Monitor,* 20 January 1969, pp. 1, 7; 'Still seen behind on Moon' *Boston Globe*, 17 January 1969, p. 22; Victor Cohen, 'The Soviet Goal: A Laboratory in Space' *The Washington Post*, p. A14.

NASA's gloomy prognosis of the Soviet programme also reflected existential fears about the incoming Nixon administration's desire to reduce the agency's budget. In early 1969, the agency made a concerted effort in both public statements and letters to the White House to portray the 1970s as a decisive period where America might 'find the Russians doing many spectacular things, and probably moving ahead of us'.[169] NASA Administrator Tom Paine had discovered the 1963 Soviet ballad 'Apple Trees Will Blossom on Mars', where a Soviet crooner describes a jolly future of interplanetary friendship to the accompaniment of a swooning orchestra, and had toyed with the idea of playing the record to Moon-bound Apollo astronauts.[170] Ultimately though, he used the song's existence to demonstrate the Soviet Union's cultural obsession with space, proof that they were 'extremely interested in landing on the planets'.[171] Paine's warnings of Soviet determination complemented his hippy-baiting rhetoric that depicted *Apollo 8* as a 'triumph of the squares'.[172] In a 1970 commencement speech at the Worcester Polytechnic Institute, Paine drew a Manichean divide between 'Potland and Squareland', contrasting the 'outward looking and mathematical' technocratic establishment 'deeply concerned with future consequences' with the frivolous and introspective counterculture.[173] As in the post-Sputnik jeremiads that excoriated pampered Americans for obsessing over consumer goods whilst the hungry communists reached for space, the communists were once again cast as the beautiful enemy.[174] Their forward-thinking focus on planetary exploration was a reproach to American spiritual weakness. It was a sad state of affairs when Russia's youth sang earnest songs to space conquest whilst Americans turned their backs on NASA's vision of technocratic progress.

By the spring of 1969, the prospect of a Soviet crewed lunar landing before *Apollo 11* looked increasingly unlikely, and the American press depicted Soviet propagandists preparing their people for the American victory.[175] In such an 'other-directed' Cold War contest, the American media was fascinated by the extent to which the Soviet people had been informed about *Apollo 11*. One article noted there was not a single Soviet amongst the 840 foreign correspondents who

[169]John Noble Wilford, 'NASA Aide Says Low Budget May Bring Soviet Space Lead', *New York Times,* 29 January 1969, p. 5; Thomas Paine to Richard Nixon, 'Problems and opportunities in manned spaceflight', 26 February 1969, RN: 125581 Space Task Science And Astronautics Advisory committee including Soviet expenditure, NASA History Office.

[170] Paine's copy of the record with an accompanying note for NASA public relations chief Julian Scheer can be found in Folder 1, Box 49, Thomas Paine Papers, Library of Congress, Washington DC (hereafter 'Paine Papers') Russian lyrics for 'Apple Trees' are available at Sovmusic.Ru <http://www.sovmusic.ru/text.php?fname=yablmars> [11/06/16]; a version recorded by Vladimir Troshin, the singer of the USSR's unofficial theme tune 'Moscow Nights' is available online via: <https://www.youtube.com/watch?v=z4CAzgl-lQw> [accessed 28 February 2018].

[171] 'Russians may win planet race', *Boston Globe*, 19 May 1969, p. 20.

[172]Tribbe, *No Requiem for the Space Age*, (2015), p.130.

[173] Ibid., p. 135-7.

[174] Burrows *The New Ocean* (1998) pp. 191-2.

[175]'US Will Try 1st Landing on Moon: Russia' *Chicago Tribune,* 28 May 1969; p. 16; 'Russians Get the Word: U.S. to Be First on Moon', *New York Times,* 28 May 1969; p. 24.

had descended on Houston to cover the mission.[176] Stories emphasised the circumscribed way that the Soviets' 'government controlled' media reported *Apollo 11,* whether in the delayed transmission of footage or subordinating it to coverage of the Soviets' robotic *Luna 15* probe.[177] Denunciations of Soviet secrecy depicted *Apollo 11* as a triumph of openness that allowed American journalists to place themselves at the centre of the story. By castigating Soviet secrecy and censorship, the press congratulated itself for the independence of American journalistic culture as much as it celebrated NASA's technological feat.

The Soviets' meagre coverage may have been disappointing, but it was preferable to the total censorship of the event in communist Asia.[178] Still, on the 22nd of July, President Nixon would include the Soviet Union with the 'approximately one-half of the world that did not see it', something he believed was 'sad not in terms of East-West conflict, because this is no time to discuss that, but sad in terms of the people involved, because you see I know the Russian people'.[179] When the Soviet newspaper *Pravda* angrily corrected Nixon that unlike in China, *Apollo 11* had been covered by Soviet television, Nixon responded that he had only been referring to live coverage.[180] Juxtaposing Soviet secrecy and American openness in space had been a defining Cold War contrast. President Kennedy had disparaged Soviet practices as 'just being secret and hailing successes'.[181] America's civilian efforts were unquestionably more transparent that their Soviet counterparts, but there was still an element of hypocrisy to these boasts. Whilst Kennedy assailed Soviet secrecy and praised NASA's openness, he had expanded Eisenhower-era military space and reconnaissance programmes that remained heavily classified. In 1967 Lyndon Johnson acknowledged that America maintained a constellation of spy satellites, but, given the sensitivity of the programme, he had assumed his remarks would be kept off the record.[182] Nixon's Apollo rhetoric continued this trend. For all its superficial disavowals of 'East-West conflict', by homogenising communist reaction it nevertheless perpetuated the totalising Cold War discourse of the world as 'half slave and half free'.

Even as the American media luxuriated in the *Apollo 11* victory, it continued to sound a cautionary note about the danger of underestimating the Soviets. Coverage of the lunar landing was predictably triumphal. The *Chicago Tribune* quoted British astronomer Sir Bernard Lovell's

[176]John J. Goldman, 'Most of World Centers Interest on Moon Trip', *Los Angeles Times*, 19 July 1969 p. 4.
[177] For coverage of the Soviet reaction to the *Apollo 11* lunar mission see '"Courageous" Is Soviet View', *The Washington Post,* 17 July 1969, p. A6; **'**Tass Is Quick With Big Story**',** *The Hartford Courant,* 21 July 1969, p. 2; James F. Clarity, 'Soviet Shows Moon-Walk 3 Times**',** *New York Times,* 22 July 1969, p. 29; Frank Starr, 'Kosygin Hails Apollo Feat Thru Humphrey' *Chicago Tribune,* 22 July 1969, p. 5.
[178]'800 Million Earthlings Unaware of Moon Walk', *Boston Globe,* 22 July 1969, p. 3.
[179]Richard Nixon: 'Remarks to American Field Service Students', 22 July 1969, *The American Presidency Project*. http://www.presidency.ucsb.edu/ws/?pid=2134 [accessed 28 February 2018].
[180] Telegram from H. R. Haldeman to John Erlichman, July 30 1969, Folder: EX OS 3 Space Flight 7/26/1969-7/31/1969; White House Central Subject Files, Outer Space 3 Nixon Library.
[181]Harlem Makemson, *Media, NASA, and America's Quest for the Moon* (New York, NY: Peter Lang 2009), p.70.
[182] Kalic, *US Presidents and the Militarization of Space* (2012) pp. 87-8; Dolman, *Astropolitik* (2002), p. 127.

confident assertion that the landing had proved 'the American nation can do almost anything if it wishes to do it.'[183] A *New York Times* piece looking back at the space race exclaimed that the USSR's 'stunning reversal' in fortunes would have astonished a 'Rip Van Winkle who had gone to sleep in the early 1960s'.[184] *Apollo 11* had been a virtuoso demonstration of American technological leadership but the Soviet challenger continued to vex American astrofuturists; warnings about the Soviet programme's dedication and its potential to surprise were a common feature of Apollo reportage. The *New York Times'* voluminous coverage of the landing included an article by Sheldon surveying the Soviet space programme's 'New Marxist frontier', and the potential challenge it could still mount.[185] A *Los Angeles Times* piece argued that Apollo may have humbled America's rival, but 'Russia is not going to opt out of the space race... though Soviet space officials may be dejected today, there seems to be no good reason to think that they will slacken their efforts.'[186] These warnings may have been drowned out by mainstream celebration, or countercultural condemnation, of *Apollo 11*, but they remain an important element of American reaction to the flight. The image of the Soviet programme as a determined and, more importantly, unpredictable adversary remained firmly lodged in the minds of American space correspondents.

Cosmonauts would never set foot on the Moon, but the Soviet programme did make a surprising last-minute cameo when it launched the robotic spacecraft *Luna 15* on 13 July, a mere three days before *Apollo 11*. *Luna 15*'s mission was to obtain and return a lunar soil sample in order to prove that socialist robots were the equals of capitalist astronauts. However it malfunctioned and crashed into the lunar surface before it could complete its mission.[187] By treating the Soviet robotic lunar probes as underwhelming space age trivia, historians have overlooked a fascinating lens through which to examine Apollo's nationalistic pageantry.[188] Soviet robotic spacecraft had long been depicted as propagandistic inferiors to their American counterparts, a perception that owed as much to stereotypes of Russian technical incompetence as to America's nigh-insurmountable lead in instrumentation technology. The Soviet *Venera* programme was criticised by both scientists and journalists for potentially contaminating the Venusian surface through shoddy sterilisation countermeasures, but it also served to legitimise America's less high-minded

[183] 'US Ahead of Russ in Space, Briton Says', *Chicago Tribune*, 23 July 1969, p. 10.
[184] Harry Schwartz, 'Why Cosmonauts Fell Behind in Moon Race', *New York Times*, 27 July 1969, p. E7.
[185] Charles S. Sheldon, 'The Soviet Challenge: The New Marxist Frontier', *New York Times*, 17 July 1969, p. 41.
[186] Howard Simons, 'US Takes Lead in Space but Soviet Not Expected to Let Up.', *Los Angeles Times*, 13 August 1969, pp. A1, 9.
[187] For the Soviet Luna programme see Huntress and Marov, *Soviet Robots in the Solar System*, (2011), pp. 181-230; Siddiqi *The Soviet Space Race With Apollo*, (2003), pp. 693-6.
[188] For examples see Heppenheimer, *Countdown* (1997), p. 261; Andrews, *Live from the Moon,* pp. 122,159; Poole, *Earthrise*, (2008), p.89; Scott and Jurek, *Marketing the Moon*, (2014), pp. 112.

inclinations.[189] Patriotic legislators had expressed disgust at the idea *Apollo 11* might plant the UN's anaemic banner on the Moon, a gesture that would allow 'Communist nations a full share of what is essentially an all-American project'.[190] To offset criticism about violating the terms of the OST, Indiana Representative Richard L. Roudebush drew attention to the Soviet emblem and 'bas relief of Lenin' that had been carried aboard *Venera 5*.[191] If Lenin was permitted to glower out at Venus's hellish surface, then surely Old Glory could fly proudly on the Moon? 'The communists started it!' was a convenient excuse for a gesture that uncomfortably recalled the flag-planting fervour of 19th century European imperialists.

Allegations that the Soviets prioritised propaganda over safety and science fuelled fears that the mysterious *Luna 15* might endanger *Apollo 11*'s crew. Press coverage of *Luna 15* repeatedly emphasised how little was known about its mission, with a face-saving sample return being only the most likely goal.[192] Reporting on the *Apollo 11* crew's final pre-launch press conference on 15 July, the *Los Angeles Times* stated 'about the only thing [Wernher von Braun] professed to know with any certainty... is that it does not have men aboard it.'[193] NASA's concerns prompted Flight Director Chris Kraft to call astronaut Frank Borman, recently returned from a tour of the USSR, to ask 'What the hell's going on?' Borman suggested the Soviets themselves might know more than he did; a message with Borman's signature was cabled to Soviet Academy of Sciences President Mstistlav V. Keldysh who quickly confirmed that *Luna 15* would not intersect with the *Apollo 11* trajectory. Borman believed this communication testified to the success of his trip and both Administrator Paine and the press agreed, hailing it as 'unprecedented' cooperation.[194] US intelligence agencies continued to monitor *Luna 15* electronically, and on 21 July, Nixon's National Security Advisor, Henry Kissinger, was passed a note informing him that the craft had crashed uselessly into the Moon.[195]

In September 1970, *Luna* 16 successfully returned a small sample of lunar soil to the USSR. Soviet propagandists began using robotic probes to perpetuate the fraudulent assertion that they had

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[189] 'Soviet Space Shot: A Scientific Blunder?' *US News and World Report,* 14 March 1966, p. 18; Bruce C. Murray, Merton E. Davies, and Philip K. Eckman, 'Planetary Contamination II: Soviet and U.S. Practices and Policies.', *Science*, 155.3769 (1967) pp. 1505-511

[190] 91st Congressional Record, Daily Edition, 25 March 1969, (Statement of Rep. Michel), p. H2022.

[191] 91st Congressional Record, Daily Edition, 10 June 1969 (Statement of Rep. Roudebush), p. H4646.

[192] Jim Strothman, 'Astronauts Hail Weather News**',** *The Atlanta Constitution,* 14 July 1969, p. 1A; 'Lovell Says Soviet Attempts to Extract Specimens of Moon', *New York Times,* 16 July 1969; p. 20; Frank Starr, 'May Move Up Moon Walk: Russ Orbit', *Chicago Tribune,* 18 July 1969; p. 1; 'Luna's Maneuvers Baffle British', *Chicago Tribune,* 19 July 1969, p. N6.

[193] 'Apollo Crew Views Flight Into History', *Los Angeles Times*, 15July 1969, pp. A1, 14.

[194] Borman, *Countdown* (1988), pp. 240-1; Robert Anglin, 'Apollo's Destiny Only Hours Away: Luna No Threat, Soviets Promise', *Boston Globe,* 19 July 1969; pp. 1,4; Howard Simons, 'Borman Gets Russia To Yield Luna Data: Borman Call Prompts Russia To Give Data on Luna Flight', *The Washington Post,* 19 July 1969, pp. A1, 4.

[195] '*Luna 15*' Al Haig to Henry A. Kissinger, memorandum, 21 July 1969, Folder: USSR Vol III Jun July 1969 1 of 1, Box 710, NSC Country Files, Europe USSR, Nixon Library.

chosen not to land a cosmonaut on the Moon.[196] Cosmonauts still occupied the zenith of the Soviet pantheon, but a new propaganda emphasis stressed the superior economy of robotic exploration. This new emphasis resonated with an established critique of crewed spaceflight as a costly distraction that was put forward by a significant segment of the American scientific community: space exploration was a job best left to robots.[197] However, as Charles Sheldon correctly pointed out, when the Soviets made such arguments they conveniently ignored the fact the USSR had 'made very heavy investments...and built many facilities... without the actual success of manned circumlunar or manned landings.'[198]

There had been internal discussion at NASA about US-Soviet lunar sample exchange since 1968 and the agency viewed *Luna 16* as 'a major new opportunity' for expanding cooperation, especially if the subject was approached tentatively through a conference 'they could attend as 'equals''.[199] However, lunar sample exchange agreements inadvertently legitimised Soviet propaganda narratives by depicting *Apollo* and *Luna* as peers. The Apollo programme's efficiency in obtaining lunar material to analyse is evidenced by the Nixon administration's ostentatious gifting of surplus lunar material to nations it wished to impress.[200] A *Chicago Tribune* article on the display of an *Apollo 11* Moon rock in Moscow depicted 'thousands of Russians' stampeding to get a glimpse, 'smashing a glass door and nearly demolishing an Apollo film room'.[201] Eventually, the 21 January 1971 Lunar Sample Exchange Agreement was signed during a period of expanding contact between the programmes as relations warmed.[202] Such cooperation allowed Americans an unprecedented look at the Soviet programme's internal workings at the cost of presenting a bogus image of scientific equality.

In November 1970 the Soviets' *Lunokhod* ('Moonwalker') *1* descended the ramp of *Luna 17*. This robotic rover spent 10 months traversing the lunar surface and was followed by a more advanced successor in 1973.[203] William Burrows' description of the *Lunokhods* as 'toys that crawled in the shadow of astronauts' typifies the chauvinism that occasionally creeps into American histories of

[196] Harvey, *Russia in Space: The Failed Frontier?* (2001), pp. 13-4.
[197] Schauer, *The Politics of Space* (1976), pp. 133; for a contemporary US example of this scientific critique of Apollo see Thomas Gold, 'A Case Against Man in Space: A Case Against Man in Space', *Chicago Tribune*, 5 September 1971, pp. A1, 7.
[198] Charles S. Sheldon, 'Apollo Compared with Soviet Luna Flights', draft paper, Folder: 'Soviet Space Budget', Box 8, Sheldon Papers, NASM Archives.
[199] Wilmot N. Hess to Homer E. Newell, 'Exchange of Lunar Samples with the Soviets', 28 October 1968, RN 15575 'US-USSR Coop in Space 1964-1975', NASA History Office; Director of Apollo lunar Exploration (Lee R. Scherer),to Assistant Administrator for International Affairs(Arnold Frutkin), 'US-Russian Lunar Science Cooperation', 25 September 1970, RN 15575 'US-USSR Coop in Space 1964-1975', NASA History Office.
[200] Muir-Harmony, pp. 210-240; For information on the 'staggering' efficiency of the Apollo astronauts in collecting lunar material see I. Crawford, 'The scientific legacy of Apollo', *Astronomy and Geophysics*, , 53, 6, (2012) pp. 24-28.
[201] 'Soviets Break Door Trying To See Moon Rock', *Chicago Tribune*, 1 December 1969, p. A1.
[202] Portree, *Thirty Years Together* (1993), p. 13.
[203] Andrew Chaikin, 'The Other Moon Landings' *Air and Space Magazine*, March 2004 accessed via <http://www.airspacemag.com/space/the-other-moon-landings-6457729/?no-ist> [accessed 28 February 2018]

Apollo.[204] Contemporary American discussion of the *Lunokhods* did acknowledge they could not match the 'adventurousness' of Apollo and 'if a robot vehicle had rolled down a ramp onto the moon on 20 July, 1969....there would not have been anything like the excitement that swept the world that day.'[205] Yet despite the humorous descriptions of the *Lunokhods* as 'bathtubs' that might cause interplanetary road accidents, American observers were impressed with the engineering proficiency that they evidently represented.[206] Furthermore, Soviet secrecy imparted a sense of mystery to the *Lunokhods* absent from NASA's meticulously explained robotic missions. Speculation over how long *Lunokhod* missions could last, or where they were going, helped sustain American curiosity. The American press closely followed *Lunokhod 1*'s movements, reporting on the solar powered 'Soviet Moon Cart's' search for minerals and a close call in sandy terrain as it voyaged across 'Moon Pits' and the evocatively named 'Sea of Rains'.[207] Darren Jorgensen has described how 'uncanny' *Lunokhod* imagery was 'less contaminated by the human figure.'[208] This was what the American press found so absorbing; there was something genuinely alien about the *Lunokhods'* lonely robotic treks across the desolate moonscape at a time when repetition of the Apollo formula was dulling America's interest in its own space programme.

NASA engineers who worked on the 1990s *Sojourner* Mars rover missions disagreed over the specific engineering achievement that *Lunokhod* represented, but more broadly, its vision of virtual extraterrestrial exploration has proven more prophetic than Apollo's 'adventurous' heroism.[209] Additionally, anthropomorphised propaganda depictions of Soviet lunar robots predicted the cultural image of the European Space Agency's *Philae* comet lander and NASA's *Curiosity* Mars rover, confirming that even with respect to space exploration, there is no such thing as a new idea in advertising. Soviet propaganda posters had portrayed the 1966 *Luna* 9 lander as a friendly robot clutching a microphone saying 'I'm reporting the tasks have been carried out!' and depicted *Lunokhod 1* as a smugly smiling pedestrian exclaiming 'And I'm striding on the Moon!'[210] Toy replicas of the *Lunokhods* proved an enormous hit with Soviet children.[211]

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[204] Burrows, *This New Ocean* (1998), p. 429.
[205] Walter Sullivan, 'Moon Exploration: Is Man Or the Machine The Best Way?', *New York Times,* 22 November 1970, p. 176.
[206] 'For Russian Scientists, A Fine Technical Feat', *The Hartford Courant*, 23 January 1973, p. 26.
[207] James F. Clarity '8-Wheel Soviet Vehicle Maneuvers on Moon', *New York Times,* 18 November 1970, p. 1; 'Russ Cart Travels on Moon's Surface' *Los Angeles Times,*18 Nov 1970;p. A1; Anthony Astrachan, 'Lunokhod-1 Traverses Moon Pits', *The Washington Post,* 20 November 1970, p. A22; 'Moon Prowler Finds Minerals, Soviets Report' *The Hartford Courant;* 20 Jan 1971, p. 36A; 'Lunokhod Marks 6 Months on Moon' *New York Times,* 18 May 1971, p. 12; Theodore Shabad, 'Soviet Moon Car Ends its Travels', *New York Times,* 10 Oct 1971, p. 68.
[208] Darren Jorgensen, 'Middle America, the Moon, the Sublime and the Uncanny' in: *Space Travel and Culture: from Apollo to Space Tourism* ed. by David Bell and Martin Parker (Oxford: Wiley Blackwell, 2009), pp. 183, 201.
[209] Chaikin 'The Other Moon Landings', 2004.
[210] Poster: 'I'm Reporting the Tasks Have Been Carried Out' <http://www.betelgeuse-supernova.ru/kosmicheskie-foto/sovetskie-kosmicheskie-plakaty/dokladyvyu-zadanie-vypolneno-40.html Poster: 'And I'm Striding on the Moon' http://www.betelgeuse-supernova.ru/kosmicheskie-foto/sovetskie-kosmicheskie-plakaty/a-ya-idu-shagayu-po-lune-80.html> [accessed 28 February 2018].

Like their Soviet forebears, modern space publicists have tried to reduce the alienating aspect of robotic explorers by anthropomorphising them; the *Philae* and *Curiosity* rovers were given their own, slightly cloying, Twitter accounts that reported back on their progress in voices inflected with childhood curiosity.[212]

The mysterious *Lunas* and *Lunokhods* were soon incorporated into warnings that the Soviet programme might take advantage of America's complacency in victory. Even as NASA revelled in its Apollo victory, it could not resist incorporating Soviet robotic flights into its visions of the 1970s as the decade when the USSR made full advantage of its investments in space technology.[213] Whilst most strongly associated with NASA's efforts to commit America to an expansive post-Apollo space policy, these fears surfaced elsewhere in American discourse. The *Lunokhods* were frequently linked to future planetary exploration: a *Los Angeles Times* article described *Lunokhod 1* as 'undoubtedly' a test of techniques for exploring the planets and asked 'Are we headed for a new Sputnik?'[214] Such warnings were a persistent undercurrent to post-Apollo jubilation and introspection. Images of a driven and focused Soviet adversary did not reflect the demoralised and fractured reality, but they spoke to the unease that the space slump's sudden onset prompted. NASA's Soviet rival was unencumbered by the vicissitudes of public opinion; its unpredictable space effort appeared as an ominous manifestation of the will of a totalitarian society.

NASA's yearning for a forward-thinking and expansive space programme like that of its beautiful enemy was crystallised in the President's Space Task Group (STG) Report of 1969. Chaired by Vice President Spiro Agnew, the STG's task was to consider the direction of America's post-Apollo Space programme.[215] The final STG report, delivered in September 1969, proposed variations on an ambitious programme involving further lunar missions, a 100-man space station, and a fully reusable space shuttle to build the logistical basis for eventual crewed missions to Mars. Although the STG Report contended that 'for the short term, the race with the Soviets has been won' and that widespread public 'frustration over Soviet accomplishments in space' was no longer present, it still warned that 'there is no sign of retrenchment or withdrawal by the Soviets' who retained their capability for 'dramatic missions of high political impact'.[216] T. A. Heppenheimer described

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[211] Oberg, *Red Star in Orbit* (1981), p. 125.
[212] @Philae2014 European Space Agency comet lander twitter account: <https://twitter.com/Philae2014> [accessed 28 February 2018]; @MarsCuriosity NASA Mars rover twitter account: <https://twitter.com/MarsCuriosity> [accessed 28 February 2018].
[213] 'NASA Views on the Significance of Recent Soviet Flights to The Moon', 12December 1970, Record Number: 13673 George M Low Papers US/USSR Affairs, NASA History Office.
[214] Rudy Abrahamson, 'In Space With US and Russian: Headed for New Sputnik?', *Los Angeles Times,* 22 November 1970, pp. F1-2.
[215] The STG is discussed in detail in Logsdon, *After Apollo* (2015), pp.50-82.
[216] NASA Space Task Group, *The Post Apollo Space Program: Directions for the Future*. (Washington, DC: Government Printing Office, September 1969), http://www.hq.NASA.gov/office/pao/History/taskgrp.html; [accessed 28 February 2018].

the Nixon administration's rejection of the STG's expansive, and expensive, vision as Tom Paine receiving 'a cold bath in the sea of reality'.[217] Space historians characterise the STG Report as an example of how NASA, awash with post-*Apollo 11* exuberance, profoundly misjudged not only the national mood, but also the political power of playing 'the Soviet card'.[218] Self-preservation was undoubtedly a motive in NASA's warnings, but the Soviet programme should not be seen as the malignant creation of NASA's public relations department. Immersed in an astrofuturist milieu that saw space as the vital terrain of the future, NASA took its mission to preserve American space leadership extremely seriously.

The STG had deemed a new Special National intelligence Estimate on the Soviet space programme as 'essential' to their deliberations.[219] To supplement the CIA's appraisal, the STG also invited former Moscow ambassador Foy Kohler to comment on space policy. Kohler recommended capitalising upon 'every possibility of international cooperation and participation' but cautioned 'communist dogma and the military-oriented nature of the Soviet space program' made an element of rivalry 'inescapable'. Kohler argued 'our future program... should be so presented as to contrast with Soviet secretness [sic] and chauvinism.'[220] An article by Charles Sheldon published whilst *Apollo 11* was en-route to the Moon had similarly depicted the Soviet dragon as cowed rather than slain. Sheldon claimed the Soviets' investment in space 'roughly parallels the tremendous commitment of the United States', an impressive feat given the relative sizes of the two nations' economies.[221] Sheldon reiterated this view in a July 1969 essay for the *Bulletin of Atomic Scientists*. He argued that Soviet history demonstrated that the Russian people were not 'quitters in the face of adversity' and pondered whether *Apollo 11* might be a potential 'American Sputnik' that would galvanise the Soviets into action.[222] Even as America basked in its Apollo victory, the Soviets were lurking menacingly in the wings, poised to seize the initiative. NASA's perception of the Soviet programme may have been motivated by self-interest, but it also

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[217] T. A. Heppenheimer, *The Space Shuttle Decision, 1965-1972* (Washington, DC: Smithsonian Institution Press, 2002), p. 186.

[218] Thomas H. Johnson, 'The Natural History of the Space Shuttle', *Technology and Society*, 10, (1988), pp. 417-424 (p.417); Ray A. Williamson, 'Developing the Space Shuttle,' in *Exploring the Unknown: Selected Documents in the History of the US Civil Space Program, Volume IV: Accessing Space*, ed. by John M. Logsdon (Washington, DC: US Printing Office, 1999), pp. 166-7; Heppenheimer, *The Space Shuttle Decision, 1965-1972* (2002), p. 130; Kay, *Defining NASA:*(2005), pp. 112-14;Peter Hays, 'NASA and the Department of Defense: enduring Themes in Three Key Areas' in *Critical Issues in the History of Spaceflight* ed. by Steven J. Dick and Roger D. Launius, (Washington DC: NASA SP-2006-4702, 2006), pp. 199-238 (p. 222); Roger Launius, 'Planning the post-Apollo space program: Are there lessons for the present?' *Space Policy,* 28, 1, February 2012, pp. 38–44 (p. 39)

[219] 'Background for Space Task Group meeting with the Vice President', David Beckler, Russell Drew and Donald Steininger to Lee DuBridge, 6 March 1969, Folder: White House Space Task Group 1969 (1 of 2), Edward E. David Box 35, White House Central Files, Staff Member and Office Files, Nixon Library.

[220] Foy D. Kohler, 'The Post-Apollo Space Program: Proving the Promise of Space', 24 July 1969, Folder: White House Space Task Group 1969 (2 of 2), Edward E. David Box 35, White House Central Files, Staff Member and Office Files, Nixon Library.

[221] Charles S. Sheldon, 'A New Marxist Frontier', N*ew York Times,* 17 July 1969, p. 4.

[222] Charles S. Sheldon, 'An American Sputnik for the Russians', *Bulletin of the Atomic Scientists,* 25, 7, September 1969*,* pp. 23-27 (p. 27).

reflected the image propagated by the experts tasked with interpreting the motivations of the mysterious Soviet other.

Soviet propaganda had begun shifting its emphasis away from the Moon and towards space stations prior to *Apollo 8*; after *Apollo 11* the American press took greater notice. During their American tour, cosmonauts Beregovoi and Feoktistov were bombarded by questions about what the puzzling simultaneous flights of the *Soyuz 6*, *7* and *8* crewed spacecraft of October 1969 had meant for the Moon's place in Soviet space plans.[223] At a Kremlin reception celebrating the triple flight, Leonid Brezhnev congratulated America for its lunar mission but enthused that the Soyuz mission brought closer the prospect of orbital stations with rotating crews to become 'cosmodromes in space and roads for future flights to the planets.'[224] The Soviet propaganda emphasis on space stations reflected a genuine new direction in the Soviet space effort, but it was accompanied by a deceitful disinformation campaign that alleged that the USSR had never been in the lunar race at all. Apollo-era disavowals of interest in the Moon were disingenuous; the USSR's struggling crewed lunar effort was only formally terminated with the cancellation of N-1 rocket programme in 1974.[225]

The idea that the Soviet space programme had never competed to land humans on the Moon was the greatest myth the Shadow Programme ever encouraged. Whilst it was never accepted by government observers with access to satellite imagery of the devastation wrought by N1 test failures and cosmokremlinologists like Sheldon and James Oberg, this idea still gained considerable currency amongst some American space scientists and journalists.[226] An October 1969 *New York Times* article on Soviet space plans mentioned how 'some observers in Washington and some American scientists' doubted that the USSR had ever undertaken an Apollo-style crash programme to reach the Moon.[227] The idea of *Apollo 11* as a colossally expensive hollow victory resonated with a culture that was increasingly sceptical of NASA's technocratic worldview.[228] After astronauts abandoned the Moon, Soviet propaganda was amplified by articles such as a June 1974 *Houston Chronicle* report that claimed revelations about the 'lack of sophistication' of Soviet space technology proved that 'the Soviets never were in the

[223] Thomas O'Toole, 'Russia Emphasizes Space Stations, But Keeps Moon-Landing Plans Secret: Numerous Attempts', *The Washington Post,* 14 November 1969, p. A14.
[224] 'Brezhnev says USSR ready to Build Space Cosmodromes' *Space Business Daily*, 46: 36, 23 October 1969, p. 240.
[225] Siddiqi, *The Soviet Space Race with Apollo* (2003), pp. 832-4.
[226] Sheldon is described as dispelling claims that the Soviets had abandoned their lunar programme in a *Christian Science Monitor* article reprinted in *Technology Review*, Robert C. Cowen, 'Can we Look at Space Realistically' *Technology Review*, May 1972, pp. 6-7, Box 4, Sheldon Papers; James E. Oberg, *Red Star in Orbit: The Inside Story of Soviet Failures and Triumphs in Space* (New York, NY: Random House, 1981), pp. 111-27.
[227] John Noble Wilford, 'Soviet Apparently Drops Plan to Put Men on Moon', *New York Times* 26 October 1969, p. 1
[228]Tribbe, *No Requiem for the Space Age*, (2015), pp. 276-7.

race'.[229] The Shadow Programme's greatest triumph came the following month when this fraudulent idea was repeated as fact by the reassuring tones of CBS News anchorman Walter Cronkite during a 1974 *Apollo 11* retrospective broadcast.[230]

Worries that the Soviets might once again unleash a potentially devastating technological surprise continued to plague the American space community even after the Star-Spangled Banner had been driven into the lunar dust. The image of the Soviet programme calmly progressing along its rational plan to conquer the planets resembles the frightening spectres projected by magic lanterns in shadowy Victorian 'phantasmagorias'. That this image little resembled the chaotic reality of duplication, bitter rivalry and explosive failures does not detract from its plausibility in an atmosphere of rumours and limited verifiable information. Even those with access to the best intelligence that the American state possessed cautioned against underestimating the Soviets. Cosmokremlinologists like Sheldon, Russia hands like Foy Kohler and space age technocrats like Tom Paine all believed that the Cold War space rivalry was a serious matter. Laughing at the phantom is easier to do after leaving the theatre. American images of the Soviet other are intensely revealing. Depictions of Soviet purposefulness reflected the space community's anxieties about the American public's declining interest in space and its growing mistrust of Cold War technocracy. Similarly, the space chivalry of sympathetic depictions of Soviet spacefarers are best understood as attempts to rehabilitate the astrofuturist ideal of peaceful competition in space than as attempts to truly understand the astronaut's communist counterpart. Space chivalry proved to be an extremely useful concept after Apollo concluded in 1972, as NASA faced what Nixon's inaugural address had hailed as 'an era of negotiation' with the communist world.[231]

[229] Howard Benedict, 'Soviets Never Were in Moon Race, New Evidence Reveals', *Houston Chronicle*, 7 June 1974, p. 3.
[230] James Oberg, 'Cronkite on Space: Inspiration Not Information', *The Space Review*, 6 March 2006, <http://www.thespacereview.com/article/570/1> [accessed 28 February 2018]; for Cronkite's coverage of the moon landings see Scott and Jurek, *Marketing the Moon*, (2014), pp. 82-3.
[231] Richard Nixon: 'Address Accepting the Presidential Nomination at the Republican National Convention in Miami Beach, Florida', 8 August 1968, *The American Presidency Project*. <http://www.presidency.ucsb.edu/ws/?pid=25968> [accessed 28 February 2018].

Chapter Two | | The 'Summit in Space': Space Cooperation and US-Soviet Detente

'Men who have worked together to reach the stars are not likely to descend together into the depths of war and desolation.'- Senate Majority Leader Lyndon Johnson, 1959.[1]

Touring the Soviet Union in the summer of 1969, astronaut Frank Borman and his wife Susan were guided by cosmonaut Gherman S. Titov and his wife Tamara. After a rocky start when Borman had continually tested the boundaries of Soviet secrecy, the two spacefarers eventually hit it off; Borman would later describe Titov, the second cosmonaut to orbit the Earth, as 'the Soviet version' of his *Apollo 8* crewmate Jim Lovell.[2] To pass the time during flights across the enormous nation, Borman suggested they play a game he called 'Capitalist Versus Communist', a series of light-hearted 'selling job' debates over the merits of their respective ideologies. Borman assuaged Titov's initial doubts with an impassioned plea, 'I can't make a capitalist out of you and you can't make a communist out of me, but it's a starting point for friendship... the only way we're going to end up as true friends is by trying to understand each other.'[3] This scene of former rivals bonding over their roles as ideological exemplars encapsulates the peculiar collaborative interlude that followed the 1960s Moon Race. The Nixon and Ford administrations attempted to use space cooperation to dramatise detente, their policy of reducing tensions with the Soviet Union through a web of constructive cooperative projects. However, the centrality of Cold War competition to the two space programmes' identities proved difficult to overcome. NASA, never entirely comfortable with its new Soviet partner, was haunted by negative perceptions of the Soviet programme that it had helped foster. Meanwhile, space cooperation advocates discovered that space exploration's visibility attracted the attention of detente's critics as well as its supporters.

Borman's unprecedented visit to the USSR was a crucial 'first step' on the road to the Apollo-Soyuz Test Project, the July 1975 rendezvous and docking mission between American Apollo and Soviet Soyuz spacecrafts that saw astronauts and cosmonauts work together in orbit.[4] The astronaut's invitation to tour the USSR had sparked considerable interest in President Nixon's National Security Council for representing a 'considerable change in Soviet policy'.[5] Borman recalls Nixon perceiving the visit as an 'opening wedge' for greater cooperation and being instructed to

[1] Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age*, (London: Frank Cass, 2002), p. 172.
[2] Borman, *Countdown* (1988), p.243, Borman's visit is described on pp. 242-257.
[3] Ibid., (1988), pp. 247-8.
[4] Logsdon, *After Apollo* (2015), p. 17; Rex Hall, and David Shayler, *Soyuz: A Universal Spacecraft* (Chichester: Springer-Praxis, 2003), pp. 205-16.
[5] Don Lesh to Henry A. Kissinger 'Soviet Invitation to Astronaut Borman', 9 June 1969, Folder: 'USSR III Jun July 1969, 1 of 1', Box 710, NSC Country Files, Europe USSR, Nixon Library.

'sound out' the Soviets.[6] Borman's visit was thus a tentative 'backchannel' to the Soviet programme, analogous to the clandestine meetings between Nixon and his National Security Advisor Henry Kissinger and Soviet Ambassador Anatoly F. Dobrynin that laid the groundwork for wider US-Soviet detente.[7] In a follow-up memo to Kissinger that argued America should capitalise on the visit with more formal discussions, Borman claimed that a 'joint meeting of cosmonauts and astronauts' would be an excellent way to capitalise on 'public awareness' of these spacefarers.[8] Borman's role as charismatic emissary sent to gauge Soviet interest in space cooperation prefigured the important diplomatic role that spacefarers would play during detente.

Following Borman's visit, NASA Administrator Paine used the congratulatory letter that the President of the Soviet Academy of Sciences, Academician Mstsislav V. Keldysh had sent after *Apollo 11* to begin a correspondence on cooperation.[9] Their discussion over potential cooperative projects eventually coalesced around a rendezvous and docking mission. After Paine left NASA in June 1970 his replacements, Acting Administrator George Low and Administrator James Fletcher, continued to correspond with Keldysh. In October 1970, the first NASA delegation left for Moscow for face-to-face meetings; over the next year the two programmes took turns in hosting each other to further discuss organisational and technological practicalities. The Soviets rejected a proposal for an Apollo craft to dock with one of their Salyut space stations, and by the beginning of 1971, Apollo-Soyuz had begun to take shape.[10] At the May 1972 Moscow Summit, President Nixon and Soviet Chairman Alexei N. Kosygin signed the Agreement Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes which mandated the two nations explore a rendezvous and docking project.[11] Over the next three years, Soviet and American engineers and managers, cosmonauts and astronauts worked feverishly alongside each other to bring Apollo-Soyuz to reality.

Despite being the most visible, intense and complicated instance of scientific-technical cooperation between the superpowers during the Cold War, the ASTP has often been analysed as an afterthought to other processes. Raymond Garthoff's landmark study of US-Soviet relations

[6] Borman, *Countdown,* (1988), p. 237.
[7] Selected declassified documents on the Dobrynin backchannel are available in William Burr, 'Kissinger Conspired with Soviet Ambassador to Keep Secretary of State in The Dark' National Security Briefing Book No. 233, 2 November 2007, <http://nsarchive.gwu.edu/NSAEBB/NSAEBB233/> [accessed 28 February 2018].
[8] Frank Borman to Henry Kissinger, Space programs foreign cooperation 1970 [February69-nov 70] 3 of 3, Box 392, National Security Council (NSC) Files, Subject Files, Nixon Library; Borman discusses his rapport with the president in *Countdown* p. 227.
[9] Edward Clinton Ezell and Linda Neuman Ezell *The Partnership: A History of the Apollo Soyuz Test Project* (Washington DC: NASA, 1978), available online via <http://history.nasa.gov/SP-4209/cover.htm> [accessed 28 February 2018] pp. 1-14.
[10] Portree, *Thirty Years Together* (1993), pp. 9-23.
[11] U.S.-Soviet Cooperation in Space (Washington, DC: U.S. Congress, Office of Technology Assessment OTA-TM-STI-27, July 1985), p. 25-6 <https://www.princeton.edu/~ota/disk2/1985/8533/8533.PDF> [accessed 28 February 2018].

during the 1970s, *Detente and Confrontation* described the joint mission as the 'culmination' of detente, but otherwise totally ignored space cooperation's symbolism or its implications.[12] Likewise, space historians characterise Apollo-Soyuz as a 'politically motivated link-up' or 'public relations blitzkrieg' to promote US-Soviet detente, but have shown remarkable reticence in engaging with the meaning and impact of the project's political symbolism, other than to 'unrealistically' condemn Apollo-Soyuz for failing to prevent US-Soviet detente's collapse in the latter half of the 1970s.[13] Depicting Apollo-Soyuz as 'politically motivated' posits previous space spectaculars as seemingly uncorrupted by 'political' motivations, an absurd proposition as far as crewed spaceflight is concerned. Political and prestige considerations were ever-present passengers aboard the Soviet and American missions of the 1960s. To understand 1970s space cooperation, its symbolism should be analysed rather than condemned or treated as self-explanatory.

The superficial analysis of ASTP's political context partially results from an overreliance on NASA's official history of the event, Edward and Linda Ezell's *The Partnership*. Researching and writing whilst the mission's preparations were ongoing, the Ezells likened themselves to WW2 'combat historians' and freely admitted to telling the 'NASA side of the story'.[14] Although *The Partnership* benefitted from describing events that were fresh in its interviewees' minds, it deliberately avoided analysing the mission's impact and reception, which 'will have to wait... for now, the mission can be judged only upon its merits as a test flight.'[15] *The Partnership* offers valuable insights into the organisational and engineering hurdles that NASA overcame to realise Apollo-Soyuz, but the Ezells desire to insulate NASA from the political controversy surrounding US-Soviet detente demonstrates that it was part of the project's public relations strategy. Taking *The Partnership* at face value, historians have defined the ASTP, the last launch of Apollo hardware, in relation to Apollo's scientific and engineering legacy. NASA's Chief Historian Bill Barry's description of Apollo-Soyuz as 'In many ways...more of an end than a beginning' encapsulates this view.[16] Alternatively, others have depicted the technological legacy of the project's 'Androgynous

[12] Raymond Garthoff, *Detente and Confrontation: American-Soviet Relations from Nixon to Reagan* (Washington DC: Brookings Institution, 1994), p.5; For historiographical criticism of mainstream history's superficial study of space exploration see Oliver, *To Touch the Face of God*, (2013), p. 3.

[13] Von Bencke, *The Politics of Space* (1997), p. 82; Dale Carter *The Final Frontier: The Rise and Fall of The Rocket State* (London: Verso, 1988), p. 253; Joan Johnson Freese criticised this 'unrealistic' tendency in, *Changing patterns of International Cooperation in Space* (1990), p. 34; for examples see Peter Bond, *Heroes in Space: From Gagarin to Challenger* (Oxford: Basil Blackwell, 1987), p.339; Michael Sheehan *The International Politics of Space: No Final Frontier* (London: Routledge, 2007), p. 66; Burrows *This New Ocean*,(1997), p.450; James Oberg, *Star-Crossed Orbits* (2002), p.70.

[14] Ezell and Ezell, *The Partnership* (1978), p.ix.

[15] Ibid., p.352; Angelina Long-Callahan discusses the access to key personnel afforded to the Ezells by NASA in her essay 'Sustaining Soviet American collaboration: 1957-1989' in *NASA in the World: Fifty Years of International Collaboration in Space* ed. by John Krige, Angelina Long Callahan and Ashok Maharaj(New York, NY: Palgrave Macmillan, 2013), pp. 138-9.

[16] William Barry at *The Space Programs under Nixon and Ford,* Open Forum event at the National Archives: June 13, 2013. recording <http://www.ustream.tv/recorded/34285199> [accessed 28 February 2018]; For

Docking Adaptor' and the interpersonal relationships between its American and Soviet participants as precursors to the US-Russian cooperation that created the International Space Station.[17] These approaches divorce the ASTP from the heady atmosphere of expectation and dismay that surrounded US-Soviet detente. Considered on its own terms, Apollo-Soyuz is a unique transnational voyage of discovery, one that attempted to reformulate the space race's competitive pageantry to symbolise a deeply controversial cooperative diplomatic paradigm.

This chapter analyses how detente-era space cooperation's image of productive and inspirational collaboration arose, was received and contested. Its first section focuses on NASA, detailing how the space agency came to embrace the Soviet programme as old certainties crumbled. The agency's attempts to juggle cooperation and competition resulted in a confused and contradictory rhetoric that simultaneously depicted the Soviets as trustworthy partners and dangerous rivals. Its second section explores how the Nixon and Ford administrations used space cooperation to advertise US-Soviet detente. The domestication of visiting Soviet cosmonauts was a crucial element of this effort as icons of communist power were transformed into exotic but harmless personifications of detente. A final section evaluates the effectiveness of Apollo-Soyuz's space symbolism and describes how critics of detente invoked space race-era depictions of the Soviet as deceitful, callous and propagandistic to attack Apollo-Soyuz as a costly exercise in space showmanship. For the Bormans and Titovs, the Cold War ideological divide provided an entertaining icebreaker; more generally, though, space cooperation threw these differences into sharp relief by demonstrating detente's limits as well as its potential.

An Awkward Embrace: NASA's Detente-era Alliance with the Soviet Space Programme

'I think they've got a lousy system of government, I don't want any part of it. I had that opinion to start with and I haven't changed my mind.' –Apollo-Soyuz astronaut Deke Slayton describes the USSR, July 1975.[18]

The Partnership quotes former NASA Administrator Thomas O. Paine reflecting that following *Apollo 11*, 'The time had come for NASA to stop waving the Russian flag and to begin to justify our programs on a more fundamental basis than competition with the Soviets.'[19] Although NASA-Soviet dialogue demonstrably intensified following *Apollo 11*, this was because of political expediency rather than any Damascene conversion. During the early 1970s, NASA entered into an

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ASTP as the end of an era see Audra Wolfe *Competing with the Soviets* (2013), p.102, Matthew Hersch, *Inventing the American Astronaut* (New York, NY: Palgrave Macmillan, 2012), p.118, Burrows, *This New Ocean* (1998), p.450; Allen, *Live from the Moon: Film,* (2009), p.189; Oliver, *To Touch the Face of God* (2014), p.6.

[17] James Oberg, *Star-Crossed Orbits*, (2002), pp. 70-1; Von Bencke, *The Politics of Space* (1997), p. 80.

[18] Bruce Hicks, 'Astronauts like Russia but Not Their Government', *Nashua Telegraph*, 14 July 1975, p. 5 available online via: https://news.google.com/newspapers?id=HZpKAAAAIBAJ&sjid=iZQMAAAAIBAJ&pg=1219%2C3368003 [accessed 28 February 2018].

[19] Ezell and Ezell, *The Partnership* (1978), p. 2.

alliance of convenience with its old rival that recalls Jeremy Suri's conception of detente as a defensive manoeuvre. Suri argues that the rise of countercultural youth movements and a concurrent global wave of mass protest in the late 1960s left Cold War leaders embattled and bewildered. Unable to understand their own people, they sought solace by turning to the enemies that they knew so well. Thus, Nixonian detente, West German *Ostpolitik* and Brezhnev's 'peaceful coexistence' were conservative strategies that attempted to solidify their architects' positions by burnishing their image as peacemakers.[20] Unlike an increasingly uninterested American public, the Soviets, for all their faults, remained true believers in the space age's promise. By the time Paine left NASA in September 1970, the Nixon administration had rejected the STG report's vision of extra-terrestrial expansion and two Apollo missions, *18* and *19*, had been cancelled following a bruising round of budget cuts.[21] A major cooperative project would help placate nervous contractors and keep key engineering teams together that might otherwise have dispersed during the hiatus between the Apollo programme's conclusion and the Space Shuttle's debut.[22] Old habits die hard, though. To adapt Paine's metaphor, US-Soviet detente saw NASA practice a confusing form of semaphore, continuing to wave its Russian flag even as it brandished the olive branch.

NASA's international outlook reflected impulses encoded within the 1958 National Aeronautics and Space Act. This legislation charged the agency with pursuing peaceful international cooperation under Presidential guidance whilst simultaneously preserving America's position as 'a leader in aeronautical and space science and technology'.[23] Between 1959 and 1978, these impulses were shaped into policy by Arnold W. Frutkin, NASA's Assistant Administrator for International Affairs.[24] Frutkin believed in pursuing specific, clearly defined, scientifically rigorous projects that would bolster national prestige by reinforcing the United States' image as a charitable hegemon generously doling out its technological gifts.[25] During the 1960s, this typically involved facilitating the launch of foreign satellites or sharing technological expertise, such as when NASA launched the United Kingdom's *Ariel* satellite or helped Third World governments undertake meteorological sounding rocket experiments.[26] Walter A. McDougall characterised this

[20] Jeremy Suri, *Power and Protest: Global Revolution and the Rise of Detente,* (Cambridge, MA: Harvard University Press, 2003), pp. 258-9.
[21] Heppenheimer, *The Space Shuttle Decision 1965-1972* (2002), p. 187; for the context of Paine's remarks and his departure see Logsdon (2015), *After Apollo* (2015), pp. 137-41.
[22] Ezell and Ezell, *The Partnership* (1978), p. 353.
[23] The un-amended 1958 National Aeronautics and Space Act is <http://history.nasa.gov/spaceact.html> [accessed 28 February 2018].
[24] Frutkin's title between 1959 and 1963 was Director for International Programs, his role remained the same. See NASA History Office, 'Apollo Soyuz Biographies', July 2005, http://history.nasa.gov/astp/bios.html [accessed 28 February 2018].
[25] John Krige, Angelina Long Callahan Ashok Maharaj, 'Introduction and Historical Overview: NASA's International Relations in Space' in *NASA in the World* ed. by Krige, Long Callahan and Maharaj, (2013), pp. 3-20.
[26] Arnold Frutkin, *International Cooperation in Space* (Englewood Cliffs, NJ: 1965), pp.43-51.

approach as 'benign hypocrisy' where altruistic rhetoric concealed 'diplomacy that was self-interested', and denounced Apollo-Soyuz for abandoning this self-interest.[27] Setting aside his moralising tone, McDougall correctly identified the chasm between 1960s and 1970s cooperative projects. Detente-era space cooperation found NASA working with a communistic superpower with its own proud spaceflight tradition rather than a grateful ally or prospective client.

Frutkin outlined his philosophy of scientific-technical diplomacy in his 1965 treatise *International Cooperation in Space.* Published during the height of the space race, the book depicted NASA as an entity of saintly patience, persisting in offering generous terms even as it was repeatedly wronged by the propagandistic Soviets and 'dangerously misleading' press narratives.[28] Frutkin bluntly dismissed ventures like the Pugwash Conferences that believed international scientific dialogue would help propel Cold War breakthroughs for wilfully ignoring the fact there was 'virtually no evidence of an international quality in science or scientists which can over-ride or negate political loyalties or alignments'.[29] This uncompromising view of Soviet motives was codified in the letters and memos collated within the Office of International Affairs' policy manuals. In a December 1968 letter, Frutkin reiterated the importance of constraining US-Soviet exchanges to approved channels because 'Soviet scientists and engineers operate not as individuals but as agents of the Soviet government'. Even presentations at 'less structured' exchanges at international gatherings were vetted to ensure they did not violate State Department munitions control guidelines.[30] Furthermore, in addition to blocking personnel engaged in 'sensitive' work from travelling to the Eastern Bloc in an 'unofficial' capacity, NASA policy also defined such personal or touristic travel as 'inadvisable' for all other employees.[31] Frutkin saw Soviet engineers and scientists as spies tasked with uncovering America's technological secrets. Policy reflected this perception. Cooperative dialogue was closely monitored as it flowed through the proper channels, insulating NASA personnel from spontaneous contact with their Soviet counterparts.

Arnold Frutkin's mantra was that space exploration did not present 'an 'either-or' choice between competition and cooperation'.[32] Nevertheless, during the 1960s Moon Race, NASA's public pronouncements on US-Soviet space cooperation had largely been limited to intermittent

[27] McDougall *The Heavens and the Earth* (1997), p.359.
[28] Frutkin, *International Cooperation in Space,*(1965), p. 114-9; for a chronology of US cooperative entreaties towards the USSR during the 1960s see Portree, *Thirty Years Together*, (1993), pp. 1-10, http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19930010786.pdf [accessed 28 February 2018].
[29] Frutkin, *International Cooperation in Space* (1965), p.172; Frutkin discusses Pugwash type ventures pp. 157-159.
[30] Code 1 Policy Manual, Subject: 'USSR/US Space technology exchanges 8 January 1969', Record Number: 18475 Office of External relations international affairs office policy directories I-Z 1968-1972, NASA History Office.
[31] Arnold W. Frutkin to Robert C. Seamans Jr., 'Unofficial Travel in Soviet or Chinese Dominated Areas', Memorandum, 12 March 1966, Record Number: 18475 Office of External relations international affairs office policy directories I-Z 1968-1972, NASA History Office.
[32] Frutkin, *International Cooperation in Space*, (1965), p. 9.

handwringing over communist disingenuousness. Although Mark E. Byrnes' *Politics and Space* simplistically depicts NASA cycling between three neatly delineated themes ('Nationalism', 'Romanticism' and 'Pragmatism') in orderly succession, its argument that nationalism dominated the agency's 1960s rhetoric is essentially correct.[33] Wernher von Braun characterised competitive space racing as a pedagogical exercise on a societal scale, likening it to the positive role 'sports and skills' played in preventing a young boy from becoming a 'sissy'.[34] Frutkin's office jealously monitored NASA publications that discussed the relative attainment of the space race rivals, vociferously criticising a June 1965 report that described the orbiting of 'untrained personnel', meaning non-pilots like Valentina Tereshkova, as an area of 'clear Soviet advantage'.[35] Frutkin vigorously contested any suggestion of superpower parity; his department argued conferences that 'paired' the two nations should be discouraged for giving a misleading perception of equality in scientific attainment.[36] During the 1960s, competition rather than cooperation paid NASA's bills as the agency justified its budgets on a competitive basis. Consequently, cooperative entreaties to the Soviet Academy of Sciences were at best an intermittent sideshow to the Moon Race's competitive grand spectacle.

The Space Task Group Report echoed Frutkin's mantra, leavening its warnings of spectacular Soviet attainment lurking in the near future with vague pledges to pursue superpower space cooperation. During their deliberations, Task Group members consulted both government departments and 'invited contributors'.[37] A State Department memorandum stated the uncomfortable truth that NASA could not ignore the Soviet presence because 'The world of space activity is essentially bi-polar'. Echoing NASA policy and perceptions, the memorandum blamed the Soviets for the space race and advocated the simultaneous pursuit of 'all-out competition' with the Soviets alongside cooperative dialogue even if a positive response was 'doubtful'.[38] A recurring theme of the invited contributors' recommendations was that US-Soviet space cooperation would defuse Cold War tensions and solidify America's lead in space. Renewed discussions were enthusiastically endorsed by the former film star and future diplomat Shirley Temple Black, Raymond E. Bauer of the Harvard Graduate School of Business Administration and

[33] Byrnes, *Politics and Space* (1994), pp. 3, 73.
[34] Tribbe, *No Requiem for the Space Age*, (2014), p. 111.
[35] Arnold W. Frutkin to Jay Holmes, 'Paper on US and Soviet accomplishments in space' Memorandum, 2 July 1965, Record Number: 726 'Frutkin, Arnold W.', NASA History Office.
[36] Code 1 Policy Manual, 'Subject: Pairing of US and USSR presentations at international meetings' 20 November 1968 Record Number: 18475 Office of External relations international affairs office policy directories I-Z 1968-1972, NASA History Office.
[37] Logsdon, *After Apollo?* (2015), pp. 59-60.
[38] Robert F. Packard to Members of the Staff Committee, Space Task Group, 'International implications of the Space Program for the Next Decade', Memo, 4 June 1969, Record Number: 125581 'Space Task Group', NASA History Office.

Henry S. Rowen of the Rand Corporation.[39] The STG's eventual report lamented that previous entreaties had been stymied by 'political rather than technical or economic' obstacles and sketched some broad areas for potential cooperation: scientific and applications programmes, crewed flights and coordinated satellite tracking or planetary exploration.[40] Ultimately, though, cooperation was secondary to the STG's nationalistic and competitive arguments. Superpower space cooperation was a laudable aspiration, but America must prioritise maintaining its space leadership through a grand, astrofuturist programme of extraterrestrial expansion.

NASA's cooperative efforts intensified after the Space Task Group vision's rejection but there had been internal discussion over using US-Soviet cooperation to exploit the new president's enthusiasm for foreign policy from the moment Richard Nixon entered office. John Logsdon argues that Nixon treated space policy as 'primarily a domestic rather than a national security and foreign policy issue' which ensured that it would always be 'a matter of secondary concern' during his tenure.[41] Space cooperation was different. In the August 1969 memo to the President that led to the formation of an ad-hoc interagency committee on space cooperation, Kissinger stressed the need for executive oversight of NASA-Soviet cooperative dialogue because space cooperation was 'very largely a foreign policy problem'.[42] In January 1969, Frutkin informed Paine that he believed the President-elect would be interested in renewing cooperative discussions with the USSR. In preparation, Frutkin's department had outlined the lacklustre history of previous discussions and drawn up a list of possible cooperative projects.[43] Capitalising on the newly elected President's obsession with foreign affairs was a prudent political strategy. After the STG was rejected, it became a vital lifeline as NASA struggled against the prospect of post-Apollo irrelevance. NASA hoped becoming a tool of detente would prove the space programme was still as valuable an instrument of statecraft as it had been in the aftermath of Gagarin's flight.

Space cooperation aligned with the new administration's priorities but NASA's hallowed role as defender of American space 'leadership' precluded the agency from jettisoning its space race rhetoric entirely. Testifying before a March 1971 Senate Committee on Aeronautical and Space Sciences hearing on space cooperation, Acting Administrator George Low drew on a speech he had made at a National Space Club luncheon to reassure doubters within the American space

[39] Shirley Temple Black to Spiro T. Agnew, 20 August 1969; Raymond A. Bauer to Lee DuBridge, 5 August 1969; Henry S. Rowen to Jerome B. Wolff, 26 July 1969, White House - Space Task Force 1969 [2 of 2] Box 35, Staff Member Office Files: Edward E. David, White House Central Files, Nixon Library.
[40] The Space Task Group, *The Post Apollo Space Program: Directions for the Future*. (Washington, DC: Government Printing Office, September 1969), <http://www.hq.NASA.gov/office/pao/History/taskgrp.html> [accessed 28 February 2018]
[41] Logsdon, *After Apollo*, (2015), p. 45.
[42] Henry A. Kissinger to The President, 'Letter from Dr Paine on Increased International Participation in Space Programs' August 27, 1969, Folder: Space Programmes Foreign Cooperation [February69- Nov 70] Box 392, NSC Subject Files, National Security Council (NSC) Files, Nixon Library.
[43] Arnold W. Frutkin to Thomas O. Paine, 'US/USSR Space Cooperation', Memo, 2 January 1969, Record Number 15590 'USSR Cooperation documentation, 1963-1974, NASA History Office.

community several months earlier. He began by repeating Frutkin's dictum that cooperation and competition were not mutually exclusive: NASA was 'giving clear recognition' to both cooperation and competition, reiterating the space race's fundamental formula that 'accomplishments in space represent a measure of the state of our technology'. He prefaced his discussion of cooperation with warnings that the USSR's successful lunar probes proved that NASA's 'leadership is under continual challenge by a capable and determined competitor'.[44] Even as they stressed benefits of pooling efforts with the Soviets, NASA's leaders had to continually reassure their congressional backers and nervous contractors that they were not relinquishing America's hard-won space supremacy.

Cooperating with the communist adversary was inherently controversial because, as Frutkin put it, such cooperation was 'heavily burdened by the implications of space for military use and equipments.'[45] Documents prepared by the interagency Ad Hoc Committee on Space Cooperation established by Nixon's National Security Study Memorandum (NSSM) 72 of September 1969 indicate deep scepticism within the Defence and Intelligence Communities about space cooperation's desirability.[46] Sounding out the relevant bureaucracies, the committee's report thoughtfully outlined space cooperation's advantages and disadvantages, discussing everything from the need to avoid the appearance of an exclusionary US-Soviet 'space hegemony', to the importance of technological prestige to communist ideologues.[47] Although the CIA reportedly agreed with the State Department's recommendation that a 'renewed and more intensive effort' was justified, the Pentagon was more pessimistic. The DOD could countenance continuing efforts at their current level for a limited period, but argued for their ultimate curtailment: 'After fifteen years of trying without significant success... we should pursue a different tack.'[48] At the height of the Moon Race NASA had delighted in contrasting sincere American cooperative proposals with lacklustre Soviet responses; now, struggling to demonstrate its post-Apollo political utility, the agency found this history being quoted back at them.

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[44] Congress, Senate, Committee on Aeronautical and Space Sciences*, Space Cooperation Between the United States and the Soviet Union, Hearing Before The Committee on Aeronautical and Space Sciences*, Ninety Second Congress, First Session, 17 March 1971 (US Government Printing Office, Washington DC: 1971), pp. 3-4; for the initial speech see NASA Press Release: 'International Aspects of Our Space Program' by George M. Low, Acting Administrator, National Aeronautics and Space Administration at the National Space Club Luncheon, Washington DC, 26 January 1971, pp. 8-10, Record Number: 7457 'ASTP Inception', NASA History Office.

[45] Frutkin *International Cooperation in Space*, (1965), p. 119.

[46] National Security Study Memorandum 72: International Space Cooperation Committee, 4 September 1969, <http://fas.org/irp/offdocs/nssm-nixon/nssm_072.pdf> [accessed 28 February 2018].

[47] *Second Report of the NSSM -72 Committee*, pp. 12, 18, Folder: 'NSSM-72 [1 of 2]', Box H-162: 'H' Files Study memorandums 1969-1974, NSC Institutional Files, Nixon Library.

[48]Department of State, 'International Space Cooperation US-Soviet Activities' 9 June 1970, pp. 2-3, Folder: 'NSSM-72 [1 of 2]', Box H-162: 'H' Files Study memorandums 1969-1974, NSC Institutional Files, Nixon Library.

In July 1970, the Nixon administration directed cooperation be pursued through both high-level diplomatic and NASA-Academy of Science channels. The DoD and Intelligence Community remained sceptical.[49] In March 1971, the CIA and DIA warned NASA that cooperation in the field of geodetic satellites might lead to an 'erosion of the U.S. technical and scientific lead' in an area of critical importance to ICBM targeting.[50] In contrast to its earlier, guarded, optimism, February 1972 saw the CIA convinced that Soviet secrecy would make real-time telemetry sharing almost impossible.[51] By then, though, NASA was preparing for the final negotiations to ensure Nixon and Brezhnev would be able to sign a cooperative agreement to pursue a joint docking flight at the planned US-Soviet Moscow Summit in May.[52] NASA's Deputy Administrator George Low attempted to counter the CIA's concerns by arguing, 'The problems were problems of procedure and not problems of principle.'[53] Unease and suspicion were constant undercurrents to the early 1970s space cooperation negotiations. The persistence of intelligence community doubts about the Soviet programme's sincerity and motives testifies to the difficulty NASA experienced pushing against the perceptions it had helped shape.

In October 1970, Houston Manned Spacecraft Centre Director Bob Gilruth led a NASA delegation to Moscow for negotiations with representatives of the Soviet space programme. In an interview with Edward Ezell, Gilruth recalled that the 'CIA and DoD told us not to expect much out of our trip. They said the Soviets would break our hearts when we got over there.'[54] In actuality, Gilruth's delegation was pleasantly surprised by their sincere and accommodating Soviet hosts. On his return Frutkin warned the press that, given previous experience, progress towards a joint rendezvous and docking mission would be slow. Nevertheless, he still characterised the negotiations as 'straightforward, open and forthright', the work of two teams driven by 'mutual self-interest'.[55] Acting Administrator George Low informed Henry Kissinger that, 'in marked contrast' to NASA's previous experience, 'the Soviet Side appeared to be entirely direct and open,

[49] See National Security Decision Memorandum 70 'International Space Cooperation US-USSR Activities', 10 July 1970, <http://fas.org/irp/offdocs/nsdm-nixon/nsdm-70.pdf> [accessed 28 February 2018].
[50] 'Memorandum for the Record' 15 March 1971, Record Number 7457: 'ASTP Inception', NASA History Office; For the Cold War applications of geodesy see David, *Spies and Shuttles*, (2015), pp. 95-7; John Cloud, 'American Cartographic Transformations During the Cold War', *Cartography and Geographic Information Science*, 29, 3, (2002), pp. 261-282 <https://www.geography.wisc.edu/histcart/v6initiative/11cloud.pdf> [accessed 28 February 2018].
[51] Senior Review Group Meeting: Review of U.S.-Soviet Negotiations, 11 February 1972, p. 4. Folder: JRG Minutes (originals),1972-1973 [2 of 4], Box H-113, 'Senior Review Group', 'H' Files Minutes of Meetings (1969-1974), NSC Institutional Files, Nixon Library.
[52] Ezell and Ezell, *The Partnership*, (1978), pp. 182-3.
[53] George Low, 'Memorandum for the Record: SRG Meeting, 11 February 1972', 14 February 1972, Record Number: 15590 'USSR Cooperation documentation, 1963-1974, NASA History Office.
[54] Edward E. Ezell, ASTP Narrative History Log Note #41: Interview with Robert R. Gilruth, 25 March 1975, p. 2; Record Number: 1693 'Petrov Boris N.', NASA History Office.
[55] Background Press Briefing: US and USSR cooperation in Space', 13 October 1970, pp. 7,9, Record Number 15575 'US-USSR Coop in Space 1964-1975', NASA History Office.

clearly intent on reaching a positive result'.[56] NASA had an equally positive experience hosting the Soviet delegation, characterised in an internal memorandum as 'experts in their respective fields' who were 'most cooperative and amenable to suggestions for technical changes.'[57] Even Arnold Frutkin was impressed. His report on the second round of negotiations in Moscow in January 1971 grumbled about the Soviets' frustrating tendency to speak in 'generalities' rather than technological specifics but nevertheless recounted an enlightening and productive trip.[58] Discussions were far from effortless, but their conspicuous change in tenor aided NASA's rhetorical reconfiguration of the Soviets as trustworthy partners.

For all their ideological bluster, the Soviet and American space programmes were parallel universes. Both struggled against the same physical obstacles in the pursuit of nationalist glory, both possessed vast networks of laboratories and facilities and both relied on the military-industrial complex's patronage. Matthew von Bencke contends that 'perhaps the most important aspect' of Apollo-Soyuz was that it saw the 'first large scale exchanges of Soviet and American space scientists, engineers and officials'.[59] These exchanges, during both the 1970-1972 negotiations and during the actual mission preparations in 1972-1975, were modelled after NASA's earlier cooperative projects and were organised around Joint Working Groups: panels comprised of experts in a particular area.[60] Through the Joint Working Groups, NASA personnel met their Soviet counterparts who, unlike the exalted cosmonauts, had hitherto been anonymous. Recipients of Frutkin's report of the January 1971 negotiations must have experienced an uncanny feeling of déjà vu upon reading about Soviet scientists complaining about the 'debate on space vs. immediate economic needs', and the worrying trend of youth interest in humanities subjects instead of the sciences.[61]

The effect this shared culture had on negotiations surprised Alexis Tatistcheff, a vehemently anticommunist Russian émigré who had been brought in as a freelance interpreter.[62] Having

[56] George M. Low to Henry A. Kissinger, 26 October 1970, 'Space programs foreign cooperation 1970 [February69-nov 70] 1 of 3', Box 392, Subject Files, National Security Council (NSC),Files, Nixon Library.
[57] Memorandum For The Record: 'Review of US/USSR Joint Rendezvous and Docking Meeting at HSC- July 2, 1971,' 7 July 1971, Record Number 7457: 'ASTP Inception', NASA History Office.
[58] Arnold W. Frutkin, 'Memorandum To The File: Moscow Negotiations, January 1975 14 April 1971' pp. 1-2, 16-7, Record Number 7457: 'ASTP Inception', NASA History Office.
[59] Von Bencke, *The Politics of Space* (1997), p. 80.
[60] Frutkin enthuses about the working group system in *International Cooperation in Space* (1965), pp. 43; five broad Joint Working Groups were initially set up to discuss cooperative projects in January 1971, and another five Joint working groups would be set up for ASTP itself. See Office of Technology Assessment, *U.S.-Soviet Cooperation in Space* (Washington, DC: U.S. Congress, Office of Technology Assessment, OTA-TM-STI-27, July 1985), <https://www.princeton.edu/~ota/disk2/1985/8533/8533.PDF> [accessed 28 February 2018]; Ezell and Ezell, *The Partnership* (1978), Appendix A.
[61] Arnold W. Frutkin, 'Memorandum To The File: Moscow Negotiations, 14 April 1971' pp. 1-2, 16-7, Record Number 7457: 'ASTP Inception', NASA History Office.
[62] Tatistcheff would receive the NASA Public Service Award for his translation work during Apollo-Soyuz negotiations and preparations : 'Obituary: A. B. Tatistcheff, 86, Leading Interpreter in U.S. Treaty Talks', *New York Times*, 10 October 1990, <http://www.nytimes.com/1990/10/10/obituaries/ab-tatistcheff-86-leading-interpreter-in-us-treaty-talks.html> [accessed 28 February 2018]; James E. Fletcher to Henry A

served as a consultant to the State Department for many years, Tatistcheff was so impressed by the relaxed and respectful atmosphere of the space negotiations that he felt compelled to write to the eminent Sovietologist George Kennan. Tatistcheff attached a remarkable Russian language satire of technical agreements to his letter that he argued 'portrays well the relaxed 'unpolitical' atmosphere' of the joint rendezvous and docking talks.[63] Written by a member of the Soviet delegation, the document was filled with self-deprecating humour and engineering in-jokes, such as mischievously proposing to weld together the spacecraft on Earth prior to launch in order to reap the praise of an orbital rendezvous without all the hassle.[64] Tatistcheff's letter to Kennan depicted space cooperation as a depoliticised journey of discovery, an oasis of jocularity amidst the stilted formality of Cold War diplomacy.

In a letter to Olin Teague (D, TX), chairman of the House Committee on Science and Astronautics, Tatistcheff enthused about the 'heartening' interpersonal relationships forged during technical negotiations as Americans and Russians solved problems in a relaxed atmosphere of 'friendly jostling and joking and the inevitable sharing of salacious stories and anecdotes.'[65] Tatistcheff's approving reference to 'salacious stories' illuminates how, in the largely homosocial world of aerospace engineering, space cooperation came to resemble detente as transnational male bonding. Whilst not solely masculine workplaces, both space programmes shared similar cultures of rigidly binary gender roles and testosterone-infused male bonding through technological problem solving.[66] Astronaut memoirs abound with anecdotes of fraternity house-style hi-jinks: stories of American engineers distributing semi-pornographic photographs to a visiting Soviet delegation, or the astronauts separating the cosmonauts from their KGB 'handlers' to take them on a vodka-fuelled hunting trip in Wyoming.[67] In these stories, boisterous fraternising in stereotypically masculine pursuits was the crucial means of sustaining space brotherhood and breaking down Cold War barriers. Space cooperation recalled the meetings between astronauts and cosmonauts at the Paris Air Show, where communists and capitalists had bonded over spirits and a mutual interest in the esoteric world of spaceflight engineering. Rather than transcending the space race's highly gendered images of heroic masculinity rooted in technological competence, Cold War space cooperation perpetuated and reinforced them.

Kissinger, 1 November 1975, Folder P750170-1200 through P750170-1299, Box 170c, P-Reel Microfilm Printouts, Central Foreign Policy File, 1975 Record Group 59 General Records of the Department of State, NARA.

[63] Alexis B. Tatischeff to George F. Kennan, 29 October 1972, 'Correspondence: George Kennan 1972-1975' Box 5, Alexis B. Tatischeff Papers, Hoover Institution Archives, Stanford University, CA.

[64] Attachment B, Ibid.

[65] Alexis B. Tatistcheff to Hon. Olin E. Teague, 15 April 1973, Folder: '6:12 Fullbright, William J., 1968', Box 6, Tatistcheff Papers, Hoover Institution.

[66] Daniel Sage, 'Giant Leaps and Forgotten Steps: NASA and the Performance of Gender' in *Space Travel and Culture: from Apollo to Space Tourism* ed. by David Bell and Martin Parker (Oxford: Wiley Blackwell, 2009), pp. 146-163; Slava Gerovitch *Voices of the Soviet Space Program* (2014), p. 14.

[67] Stafford and Cassutt, *We Have Capture* (2002), p. 185; Donald K. Slayton, and Michael Cassutt, *Deke! US Manned Space from Mercury to the Shuttle* (New York, NY: St. Martin's Press, 1995), p. 294.

Despite the lingua-franca of aerospace engineering, some elements of Soviet space culture remained baffling to visiting Americans. The Soviet state's veneration of the cosmonauts, most notably its martyred golden boy Yuri Gagarin, was particularly shocking to NASA personnel accustomed to struggling against the space slump.[68] Matthew Hersch characterised the 1970s astronaut as 'the man in the grey flannel spacesuit', an increasingly anonymous 'company man' rather than a heroic individualist.[69] A 1970 survey in *The Philadelphia Sunday Bulletin* had found 70% of respondents unable to name the first man to set foot on the Moon.[70] Conversely, when Neil Armstrong visited the USSR that year he was phenomenally popular. A Moscow Embassy staffer's report of the visit stated the Soviet regime had made 'astronautics a new 'opiate of the people'' and claimed Armstrong's purported physical resemblance to Gagarin 'added to the attractiveness of the guest, especially to young women.'[71] Reporting on his first visit to the Soviets' space headquarters in the Moscow suburb of Zvezdnyi gorodok ('Star City'), Arnold Frutkin had marvelled at the 'virtual deification of the astronauts, especially Gagarin.'[72] A Moscow Embassy report of that visit described Star City as the 'purest distillation' of 'Gagarinolatry', where the NASA visitors had been shown a 'highly sentimental film of Gagarin's early years' replete with comically inept attempts to edit disgraced former Premier Nikita Khrushchev out of the early-1960s archival footage.[73] Whilst the Gagarin cult's image of glorious attainment and superpower parity epitomised how the Soviets desired to be perceived, its quasi-religious tenor ended up graphically underlining the differences between American and Soviet space cultures.

NASA proffered Joint Working Group rapport as evidence it was forging a diplomatic conduit to the USSR's scientific-technical elite. Soviet scientists were contradictory figures in the Western imagination, simultaneously depicted as dominated by the Communist Party and as a secular priesthood upon which the ruling regime was dependent.[74] A CIA report from March 1969, *Kremlin and Scientists: Dependence and Disaffection*, went so far as to conclude 'the crisis of the [Communist] Party is the loss of its dynamic role in Soviet society' as the 'best minds have

[68] For Gagarin's afterlife as a Soviet and post-Soviet icon see Andrew Jenks, 'The Fiftieth Jubilee: Yuri Gagarin in the Soviet and Post-Soviet Imagination' in *Spacefarers* ed. by Neufeld, (2013), pp. 107-224.
[69] Matthew Hersch, *Inventing the American Astronaut*, (2012), p. 129.
[70] Tribbe, *No Requiem for the Space Age*, (2014), p. 8.
[71] Armstrong visited Moscow and Novosibirsk's 'Science City' of Akademgorodok after giving a paper at a meeting of the international Space Science Forum COSPAR in Leningrad. See: American Embassy, MOSCOW to Department of State 'Visit of Astronaut Neil Armstrong to the USSR', Airgram, 27 July 1970, P. 4, Folder SP10-1 US 6/1/70, Box 2970, Record Group 59: Entry: 1613 General Records of the Department of State, Subject Numerical Files Science 1970-73, NARA.
[72] Frutkin 'Memorandum for the file: Moscow Negotiations for Compatible Rendezvous and Docking,' October 1970', 2 December 1970, P. 3; Record Number 7457: 'ASTP Inception', NASA History Office.
[73] American Embassy Moscow to Department of State, 'Compatible Space Docking Talks', Airgram, 9 November 1970, pp. 2-3, Folder SP 1-1 US-USSR 1/1/70, Box 2973, Record Group 59: Entry: 1613 General Records of the Department of State, Subject Numerical Files Science 1970-73.
[74] For contemporary examples of this depiction of Soviet Scientists see Stefan T. Possony and J. E. Pournelle's pro-strategic defence jeremiad, *The Strategy of Technology: Winning the Decisive War*, (Cambridge, MA: University Press of Cambridge, 1970), pp. 22-7; or Schauer's work of cosmokremlinology, *The Politics of Space* (1976).

spurned the discipline and ideological demands of party work to make their careers in the fields of science.'[75] Pro-space cooperation discourse emphasised Soviet scientists' political influence to argue that transnational contact between engineers and scientists would expose an elite section of Soviet society to the siren song of Western openness. A 1975 letter from a Berkeley astronomer to President Ford argued that space cooperation had induced the 'opening up of Soviet scientific institutions' and advocated a joint US-Soviet crewed mission to Mars as a way to further raise 'the status of Soviet citizens vis-a-vis their own government.'[76]

The Pentagon, however, disagreed. During the NSSM 72 consultation process the DoD had strenuously objected to the idea that even unsuccessful cooperative discussions might engender beneficial changes in Soviet society through 'exposure of Soviet scientists and engineers to their American counterparts and to the American social, economic and technical environment.' DoD officials saw this argument as wishful thinking. It did not believe that 'continued offers of cooperation will so whet the appetites of soviet scientists or so embarrass them' that they would 'bring pressure on Soviet officials' to allow greater cooperation. They also disputed the idea that even if such cooperation didn't materialise 'the long-run result will be changes in Soviet society or advantage to the US'.[77] The Pentagon was challenging one of space cooperation's principal justifications: that Western models of scientific freedom and openness were somehow contagious and cooperative projects could help smuggle this benign bacillus into the USSR.

NASA's contradictory depictions of Soviet scientists and engineers exacerbated the confusion of its detente-era rhetoric. Internally, NASA officials assessed their Soviet colleagues according to how 'political' they were; namely, the extent to which they exhibited an unhelpful or unsavoury adherence to communist dogma. Hence, Frutkin's report of the October 1970 Moscow negotiations contrasted Konstantin Feoktistov, a 'technician', with the more 'political' Intercosmos Council Chairman Boris Petrov, approvingly highlighting Feoktistov's impatience with 'political attitudinizing and pomposity by his own people.'[78] However, by simultaneously stressing space cooperation's 'unpolitical atmosphere' whilst asserting its political utility, NASA's justifications risked collapsing into a tangle of contradictions. This confusion was particularly evident in a speech Apollo Programme Director Chester M. Lee delivered to the National Space Club in October 1974. Lee praised Apollo-Soyuz for opening a diplomatic 'window' into the USSR's

[75] CIA Directorate of Intelligence, *Special Report Weekly Review No. 1: Kremlin and Scientists: Dependence and Disaffection,* 28 March 1969, P. 9, Folder: USSR Vol 1 [Dec 68- Dec 69] [3 of 3], Box 709, NSC Country Files, Europe USSR, Nixon Library.
[76] Dr R. A. Wells to President Gerald R. Ford, 18 July 1975, Folder: Outer Space (OS),3 8/1/75-7/31/76, Box 1, Outer Space 8/9/74 (exec),to Space Flight 7/31/76 (Exec), White House Central Subject Files, Ford Presidential Library, Ann Arbor MI (hereafter, 'Ford Library').
[77] *Second Report of the NSSM -72 Committee*, P. 11, Folder: 'NSSM-72 [1 of 2]', Box H-162: 'H' Files Study memorandums 1969-1974, NSC Institutional Files, Nixon Library.
[78] Arnold W. Frutkin, 'Memorandum for the file: Moscow Negotiations for Compatible Rendezvous and Docking, October 1970', 2 December 1970, P. 4; Record Number 7457: 'ASTP Inception', NASA History Office

closed society, characterising the project as a depoliticised engineering exercise where 'our working relations are not with the politicians, but are with the engineers, scientists and technicians... these people have constantly worked towards the optimum engineering solution.'[79] Unlike Frutkin's policy manuals that had depicted Soviet technicians as pawns of the Kremlin, Lee constructed a rhetorical barrier between the Soviet politician and engineer. Any political traffic was strictly unidirectional; democratic light shone through NASA's window but the Soviet apparatchik's malign influence was blocked. NASA paradoxically depicted its Soviet partners as influential powerbrokers who were somehow simultaneously quarantined from the communist apparatus enough to be trusted inside US facilities. NASA's attempts to depoliticise its Soviet partners ended up undercutting its own rationale for space cooperation as a diplomatic catalyst.

Reconciling wildly different American and Soviet public relations practices into a coherent information and media strategy further complicated attempts to present a cohesive image of space cooperation. *The Partnership* describes the discussions over 'public release of information about the flight' as amongst the 'most difficult' of the ASTP negotiations. Difficulties were exacerbated by the uncompromising negotiating stance taken by John Donnelly, NASA's Assistant Administrator for Public Affairs exacerbating matters. Donelly was determined to defend NASA's definition of 'full and open disclosure' to the end, though he later reflected that this approach had been 'hard-nosed'.[80] Chester M. Lee neatly summarised the eventual agreement whereby each country conducted its Public Affairs strategy according to its own 'traditions and practices' as 'a headache'.[81] When the Soviets inevitably failed to live up to their new partner's high standards of transparency, criticism inevitably followed. Whilst giving a pro-space cooperation speech at an aerospace industry awards ceremony, Senator Frank Moss (D, UT), Chairman of the Senate Committee on Aeronautical and Space Sciences, mentioned learning about a recent failed attempt by the Soviets to launch a space station during a recent visit to the USSR. This revelation inadvertently prompted charges that NASA was complicit in perpetuating communist censorship practices, with the *Philadelphia Bulletin* thundering that 'cooperation in space has reached the point where we are helping the Russians keep embarrassing secrets'.[82] Having meticulously cultivated the American programme's image as a champion of freedom and openness, NASA's Public Affairs Department was vulnerable to accusations of hypocrisy during its detente-era alliance of convenience with the notoriously secretive Soviets.

[79] Chester M. Lee, Speech before National Space Club, Washington DC, 31 October 1971, p. 12, Record Number: 001278 'Lee, Chester M', NASA History Office.
[80] Ezell and Ezell, *The Partnership*, (1978), pp. 188, 234-50.
[81] 'Transcript of Proceedings: Interview of Chester M. Lee, Apollo Program Director', 5 May 1975 p. 10, Record Number: 001278 'Lee, Chester M.', NASA History Office.
[82] Karl Abraham, 'U.S. Helped Soviets Keep Space Secret', *Philadelphia Bulletin,* 13 June 1973, p. 11, Record Number: 001278 'Lee, Chester M.', NASA History Office.

As it struggled to reduce the controversy surrounding ASTP, Donnelly's department attempted to refocus attention onto the project's technological innovations, most notably the 'Androgynous Docking Adaptor' that would link the two nations' spacecraft together. Mark E. Byrnes' *Politics and Space* argues appearing 'future-oriented' was central to the NASA brand; the agency habitually brandished whatever engineering marvel it happened to be working on as the key to maintaining America's position at the vanguard of technological progress.[83] Responding to a press question about whether the mission was 'just... another space spectacular' in service of 'international diplomacy', Thomas Stafford and Glynn S. Lunney, NASA's ASTP Technical Director, both stressed that a compatible US-Soviet docking adaptor was a technological investment comparable to the docking technology developed during the Gemini Programme. Stafford enthused 'this docking mechanism is definitely better than what we had on Apollo; it's better than what they have on Soyuz.'[84] A *Popular Science* article by NASA's veteran hero-engineer Wernher von Braun sketched a selection of marvellous potential follow-ups to Apollo-Soyuz that ranged from an international space station to an 'international super-adventure' to Mars. The docking adaptor was apparently 'an absolute 'must' for any major joint international space venture'.[85] Focusing critics' attention on the Androgynous Docking Adaptor's novelty presented the mission as a technological rather than diplomatic venture. However, justifications that relegated problematic Soviet participation to the rhetorical background intensified the overall confusion of NASA's detente-era rhetoric. Apollo-Soyuz was inherently political; the technological novelty of its absurdly named docking mechanism would be meaningless without substantive political engagement with the only other nation capable of crewed spaceflight.

NASA officials combined the emotionally resonant idea of space chivalry with less stirring discussions of technological standardisation to depict the Androgynous Docking Adaptor as paving the way for future space rendezvous and rescue capabilities. America's *Apollo 13* near-catastrophe and the Soviets' 1971 *Soyuz 11* disaster had demonstrated human frailty in the face of imperfect machines and a pitiless cosmos, underscoring the need for a space rescue capability with dreadful urgency. Testifying before the Senate, Low contended Apollo-Soyuz would establish 'a basis for achieving greater flexibility in space emergencies' which would have valuable diplomatic repercussions by 'reducing international tensions and demonstrating common human interest.'[86] Frutkin's 1973 Senate testimony depicted the docking adaptor's rescue capability as proof Apollo-Soyuz was 'more than a pleasant and useful gesture in an era of political

[83] Byrnes, *Politics and Space* (1994), pp. 61-2.
[84] Apollo Soyuz Test Project Prime Crew Press Conference, February1 1973, transcript, Record Number: 007459 ASTP 1972-73, NASA History Office.
[85] Wernher von Braun, 'We get set for Astronaut-Cosmonaut space linkup', *Popular Science*, January 1975, pp. 38-41 (p. 41).
[86] Congress, Senate, Committee on Aeronautical and Space Sciences*, Space Cooperation Between the United States and the Soviet Union, Hearing Before The Committee on Aeronautical and Space Sciences*, Ninety Second Congress, First Session, 17 March 1971 (US Government Printing Office, Washington DC: 1971), p. 8.

accommodation.'[87] A space rescue capability recalled the heroic scenarios of films like *Marooned*, a less confrontational model of astronautical heroism that chimed well with growing public apathy towards nationalistic space spectaculars. Space rescue justifications highlighted a vexing problem, but they also elided the difficult reality of compromise that Cold War space cooperation entailed by fleeing into speculative fantasies of space chivalry.

The Androgynous Docking Adaptor took centre stage when the former Moon Race competitors ostentatiously celebrated their new alliance with a joint exhibition at the July 1973 Paris Air Show. The biennial Paris Le Bourget Air Show had become a crucial fixture on the international aerospace calendar. A 1971 United States Information Agency (USIA) memo characterised it as part trade fair, part international exposition where the federal government's objectives were to expand 'the market for American aerospace products' and 'maintain and enhance the image of U.S. Leadership in peaceful achievements and capability in the international aerospace field in support of the sales objective.'[88] The Soviet Union also used Paris as an international stage on which to flaunt its technological achievements. Cathleen Lewis' essay on Soviet space exhibitions in the collection *Showcasing Space* describes how Soviet exhibits often 'eschewed interpretation... to focus on space as a celebratory symbol'.[89] Despite revealing few technological secrets, such exhibitions still made a big impression on American observers. Arnold Frutkin described the Moscow Museum of Cosmonautics to his superiors as a 'more highly concentrated, elaborate, and impressive collection of spacecraft and launch vehicles... than anything we have in this country.'[90] A USIA briefing memo for the 1969 Paris Air Show had warned that in addition to exhibiting their Tu-144 supersonic transport aircraft and 'the world's largest helicopter', the Soviets were 'expected to have a first-class space exhibit.'[91] Chasing a potent blend of aerospace sales contracts and international prestige, the superpowers had turned Le Bourget into a symbolic battleground between competing Cold War visions of technological progress.

The Paris Air Show's history as an arena for competitive posturing made the 1973 joint exhibition all the more remarkable. Donnelly had first suggested a joint Apollo-Soyuz exhibition in the

[87] 'Statement of Arnold W. Frutkin, Assistant Administrator for International Affairs, National Aeronautics and Space Administration' before the Committee on Aeronautical and Space Sciences, United States Senate', 22 March 1973, p. 14, Record Number: 729 'Frutkin Speeches', NASA History Office.
[88] Henry Loomis, '1971 Paris Air Show', 16 March 1970, (Part II), Exhibits: Paris Air Show 1970, Box 14, Directors Subject Files 1968-1972, Records of the U.S. Information Agency, Record Group 306
[89] Cathleen Lewis, 'The Birth of the Soviet Space Museums: Creating the earthbound experience of space flight during the golden years of the Soviet space programme, 1957-68' in *Showcasing Space* ed. by Collins (2005), pp. 142-156 (p. 143).
[90] Arnold W. Frutkin 'Memorandum for the file: Moscow Negotiations for Compatible Rendezvous and Docking, October 1970' 2 December 1970, P. 3; Record Number 7457: 'ASTP Inception', NASA History Office.
[91] V. R. Mresinski, 'Status of U.S. participation in the Paris Air Show', 14 April 1969, Folder: Wolff, Jerome, Box 42, Office Files of Executive Secretary William A. Anders 1969-1973, Entry A1 34110-D National Air and Space Council, Record Group 220 Temporary Committees Commissions and Boards, NARA.

summer of 1972, shortly after Nixon and Kosygin had signed the cooperative space agreement.[92] Deputy Administrator George Low wrote to Academician Keldysh suggesting collaborating on a mock-up of the Apollo and Soyuz spacecrafts connected through the new docking mechanism would be 'entirely consistent with the spirit of the actual mission' and 'attract a good deal of favourable interest to our joint project'.[93] When NASA found its budget might not stretch to the cost of transporting the Apollo mock-up, the White House instructed a reluctant DoD to provide USAF transportation, reasoning, 'Additional expenditure to publicize the event seems quite appropriate' when the government was already spending '$250 to $300 million' on the mission 'for reasons of international detente'.[94]

Logistical details for the exhibition were hammered out over the spring of 1973 in an exhaustive process that necessitated consensus on the exact dimensions of the US-Soviet pavilion and the procedure for correcting 'any major size discrepancy' between the national emblems displayed on the side of each model spacecraft.[95] The Soviets used the exhibition to announce their primary and backup crews for the Apollo-Soyuz two years ahead of the mission, something the *New York Times* described as a 'major break with secrecy'.[96] Photographs of mission commanders Thomas Stafford and Alexei Leonov shaking hands beneath mock-ups of their iconic spacecrafts dramatised detente's central theme of former adversaries learning to live and work together.[97] The joint US-Soviet pavilion was Apollo-Soyuz in microcosm in more than just its meticulously correct dimensions. It was a tightly choreographed display of cooperative showmanship in a formerly competitive arena.

If the joint exhibition at Le Bourget depicted the ideal of detente-era space cooperation, then NASA's struggles to open up the Soviet's Baikonur cosmodrome illustrated the exhilarating, surreal and often exasperating reality. Baikonur was the largest of the USSR's three launch sites and was the ultimate symbol of Soviet secrecy. The mysterious spaceport had aroused febrile press speculation ever since a Japanese researcher had traced Sputnik's trajectory back to a

[92] Deputy Administrator to Assistant Administrator for Public Affairs, 'Apollo-Soyuz Exhibit at Paris Air Show', 4 December 1972, Record Number: 14611 'Paris Air Shows 1967-1977', NASA History Office.
[93] George M. Low to Academician N. V. Keldysh, 10 July 1972, Record Number: 7458 'ASTP Moscow Agreement', NASA History Office.
[94] David D. Elliot to General Haig, 'Exhibit at the Paris Air Show of a Mockup of the docked Apollo and Soyuz Spacecraft', 22 December 1972, Folder: EX FG 164 National Aeronautics and Space Administration 1/1/71 2 of 2, Box 2, Subject Files: FG-164 National Aeronautics and Space Administration, White House Central Files, Nixon Administration.
[95] 'Minutes of the technical discussion of the joint exhibition at the 30th International Aviation and Space Salon in Paris, May-June, 1973,', 1 March 1973, Folder: 'USSR Apollo Soyuz Loan', Box 2, Record Unit: 347 National Air And Space Museum US Dept of Space Science and Exploration, Subject Files 1972-198, Smithsonian Institution Archives, Washington DC.
[96] Theodore Shabad, 'Soviets in Break With Secrecy, Names Crews for Space Flight', *New York Times*, 25 May 1973, p. 36.
[97] Clyde H. Farnsworth, 'Paris Air Show Focuses on U.S.-European Rivalry' *New York Times*, 27 May 1973, p. 176.

launch site in the Kazakh SSR.[98] A 1975 *New York Times* article about the nearby city of Leninsk described a ghost town 'omitted from published maps' whose 50,000 inhabitants 'were not even listed in the results of a national census taken in 1970'.[99] The prospect of a glimpse at the secret 'space city' proved irresistible to the American press. At the May 1972 press conference announcing the Apollo-Soyuz mission, journalists failed to get a firm commitment from Lunney and Administrator James Fletcher on whether the cooperative mission would 'finally' allow Americans to visit Baikonur.[100] Visiting Soviet VIPs like Konstantin Bushuev, Soviet Technical Co-Director of the ASTP, found themselves bombarded by press questions about media access to the cosmodrome.[101] To a public weary of space age jargon, the difficult process of ensuring compatibility between American and Soviet life support and docking systems was an arcane and tedious subject. Baikonur's aura of mystery provided journalists with an interesting way to dramatise the space cooperation process; the triumphant entry of the American press corps through the cosmodrome's gates would be an incredible story.

NASA hoped that the press would hail the April 1975 visit of a select group of NASA astronauts and managers to the cosmodrome as a victory against Soviet secrecy. Obtaining permission had been difficult; *The Partnership* euphemistically describes American ASTP Commander Tom Stafford's 'strong desire' to visit the complex as playing an important role.[102] Stafford's memoir is blunter; the astronaut recalls winning Soviet agreement to let him visit the launch site by threatening, 'If I don't get to see inside that Soyuz, I'm not flying this mission.'[103] Their visit was tightly controlled. The Americans inspected the Soyuz spacecraft and made a pilgrimage to the cottages that Gagarin and Sergei Korolev had slept in prior to *Vostok* 1, but certain facilities, individuals and information remained off limits.[104] Despite claiming that his team had seen 'more than any other westerners have seen', Lunney admitted they had not received 'an overall picture of the launch complex' and was stumped when queried about why his group was flown into and out of the site at night. Still, he did observe that the Kazakh steppe surrounding the heavily militarised installation was strangely familiar; it 'kind of looked like West Texas'.[105]

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[98] Phelan, *Cold War Space* Sleuths, (2013), p. 6.
[99] Theodore Shabad, 'Secret Asian Space City Is Not on Russian Maps', *New York Times*, 14 July 1975, p. 41.
[100] Press Conference of The Vice President; Dr James C. Fletcher, Administrator, NASA; Glynn S. Lunney, Assistant To The Manager for Operational, Experiment and Government Furnished Equipment, NASA and Dr Edward E. David Jr., Science Advisor to the President, 24 May 1974, Transcript available Record Number 15579: 'US-USSR cooperation in space 1971-1974', NASA History Office.
[101] 'US-USSR Apollo-Soyuz Test Project Press Conference, 17 July 1972' pp. 8-9 ; 'ASTP Press Conference, May 3 1974'p. 4, Record Number: 17460 'Apollo-Soyuz Test Project ASTP 1974', NASA History Office.
[102] Ezell and Ezell, *The Partnership* (1978), p. 234.
[103] Stafford, *We Have Capture* (2002), p. 181, Stafford's seriousness is corroborated in Slayton, *Deke!* (1995), p. 296.
[104] George M. Low, 'Notes from Visit to the Soviet Union, May 17-23 1975', 5 June 1975, pp. 11-2 Record Number: 4159 'Low correspondence 1975', NASA History Office.
[105] Jim Maloney, 'Russian launch facility called big, strung out', *The Houston Post*, 20 May 1975, clipping in Record Number: 001365 Lunney, Glynn S. (NASA – Bio), NASA History Office.

The Soviet decision to continue to ban foreign journalists from Baikonur overshadowed NASA's breakthrough in gaining limited access to the launch site. Wes Gallagher, the President of the Associated Press, wrote a letter of protest to President Ford's Press secretary Ron Nessen and NASA Administrator Fletcher decrying the 'intolerable' disparity between Soviet journalists' routine visits to NASA facilities and Baikonur's continued secrecy.[106] Aerospace industry journalists felt particularly aggrieved after having their hopes raised when a delegation of American aerospace writers were allowed to visit the Star City space centre in June 1973.[107] Aviation Week and Space Technology complained NASA had been given a 'restricted' tour of Baikonur where 'any activity or hardware directly related to the regular Soviet manned or unmanned space program' had been concealed, comparing it unfavourably with the tours Soviet cosmonauts had been offered at American facilities.[108] Media dissatisfaction over the persistence of Soviet secrecy coloured press coverage of the ASTP. A common press lament was that cooperation had failed to lift 'the secrecy surrounding many aspects of the Soviet programme'. The Soviet decision to transmit live TV footage of the Soyuz launch was poor consolation for the lack of press access to Baikonur.[109] Ultimately, NASA's visit to Baikonur ended up demonstrating the shortcomings of Apollo-Soyuz's 'window' on the USSR.

NASA's 1970s collaboration with the USSR was a survival technique rather than a genuine attempt to transcend space race rivalry. In that sense, it echoes Raymond Garthoff's characterisation of detente as 'a phase of the Cold War, not an alternative'.[110] Because Cold War competition had been central to NASA's identity since its foundation, the agency's detente-era enthusiasm for US-Soviet cooperation would never be entirely convincing. Desperate to remain relevant in a post-Apollo world, NASA portrayed space cooperation as a crucial conduit to the Soviet scientific-technical elite. However, confused, contradictory rhetoric continually undermined the agency's depiction of itself as a valuable diplomatic tool. Cooperation with the Soviets had never been the agency's first choice, that had been STG report's ambitious interplanetary vision. Compelled to turn to the Soviets for support, the agency's apprehension about alienating its traditional cold warrior constituency ensured it would hold its new partners at arm's length as it vacillated over accepting the implications of collaborating with a communist state. The *Partnership* claimed it was possible to evaluate Apollo-Soyuz purely as a test flight, but NASA's struggle with the

[106] Wes Gallagher to Ronald Nessen, 9 October 1974, OS 3 'Space flight 8/9/74-3/31/75', Outer Space 8/9/74 (exec), to Space Flight 7/31/76 (Exec),Box 1, White House Central Subject Files, Ford Library.
[107] Ezell and Ezell, *The Partnership*, (1978), pp. 252-3.
[108] Craig Covault, 'Astronauts' Tyuratam Tour Restricted' *Aviation Week & Space Technology*, 12 May 1975, 19-21.
[109] Christopher S. Wren, 'Soviet Ready for Space Link-Up, But Secrecy Won't Be Lifted', *New York Times,* 13 December 1974, p. 31; Peter Osnos, 'Mission a Soviet Media Event', *The Washington Post*, 15 July 1975, p. A8.
[110] Raymond Garthoff, *Detente and Confrontation (Revised Edition)*, (1994), p. 3; Suri, *Power and Protest* (2002), p. 214.

implications of collaborating with America's rival superpower demonstrates that the project was not and could never have been just an apolitical technical exercise.

Harnessing Space Brotherhood: Nixon, Ford and the Apollo-Soyuz Test Project

'I thought the Russian guy was pretty good at talking American when he did. And, ya know, he doesn't look like a Russian.' –Ten-year-old Nevadan Anne Kosydar on meeting ASTP cosmonaut Alexei Leonov, October 1975.[111]

Soviet propaganda had long used cosmonauts as symbols of peace and progress. During the 1960s, Pablo Picasso, a lifelong fellow traveller and fervent Gagarinophile, had referenced their place in communist iconography in a series of sketches that juxtaposed the first cosmonaut's beatific smile with the dove of peace.[112] This section explores how the Nixon and Ford administrations overcame negative perceptions of the Soviet programme as secretive and militaristic to appropriate this image of the cosmonaut as peace's herald. By 1975, these socialist supermen had been domesticated to the point that the notoriously anti-communist film star John Wayne would describe Apollo-Soyuz cosmonauts Alexei Leonov and Valerii Kubasov as 'pretty good guys after all' after meeting them during their post-mission tour.[113] Space cooperation offered an optimistic and inspirational way to dramatise an intensely controversial foreign policy strategy. Nixon and Ford's rhetoric turned Apollo-Soyuz into a parable for the wider process of US-Soviet detente: a difficult and complicated task undertaken by courageous visionaries who had put aside their ideological rivalry. The ASTP's symbolism exploited the widespread association between outer space and the future to argue space cooperation proved that tomorrow's politics must be defined by cooperation and accommodation.

Space cooperation appealed to Richard Nixon's obsession with Cold War strategising and his appreciation of space technology's symbolic power. Nixon and Kissinger were fixated on improving America's Cold War position; Jussi M. Hanhimaki argues their obsession with 'managing the competitive relationship with Moscow shaped every other aspect of US foreign policy in the early 1970s'.[114] Furthermore, Dominic Sandbrook states that 'selling foreign policy to the public mattered enormously' to Nixon.[115] Inaugurated shortly after the *Apollo 8* triumph, Nixon had witnessed first-hand how space exploration could be a visionary illustration of foreign policy goals. In a letter to Administrator Paine, Secretary of State U. Alexis Johnson had praised NASA's triumph for having done 'more to bolster American prestige than any single event since the

[111] 'Cosmos Dock With Corbett Kids' *Reno Evening Gazette*, 20 October 1975, P. 5 in Washington DC Clipping in 'ASTP/USA Tour 1975' Record Number: 007509, NASA History Office.
[112] Gertje R. Utley, *Picasso: The Communist Years* (New Haven, CT: Yale University Press, 2000), pp. 126-8
[113] Stafford, *We Have Capture*, (2002), p. 198.
[114] Jussi M. Hahnimaki, 'An Elusive Grand Design' in *Nixon in the World* ed. by Andrew Preston and Frederick Longevall (Oxford: Oxford University Press, 2008), p. 26.
[115] Dominic Sandbrook, 'Salesmanship and Substance: The Influence of Domestic Policy and Watergate' in *Nixon in the World* ed. by Preston and Logevall (2008), p. 90.

termination of the Pacific War in 1945'.[116] The President had insinuated himself into the *Apollo 11* mission's pageantry: making a historic phone call to Aldrin and Armstrong at the Tranquillity Base landing site, and greeting the astronauts after their splashdown on the *USS Hornet* (the aircraft carrier that recovered the *Apollo 11* capsule) before embarking on a 'Moonglow' world tour capitalising on the landing.[117] Nixon's keen awareness of human spaceflight's symbolic power informed his January 1972 decision to approve NASA's proposal for a reusable Space Shuttle. Much as Nixon wanted to remove space exploration from its Apollo pedestal, America had to continue manning the space frontier.[118] Nixon may not have entered office with Apollo-Soyuz's exact blueprints, but his interest in using space exploration to sell his foreign policy agenda made him highly receptive to NASA's reports that the Soviets were increasingly amenable to cooperative discussions.

Nixon was fascinated by the idea of flying a European, Japanese or Soviet passenger astronaut aboard one of the later Apollo missions, raising it so frequently that John Logsdon called this Nixon's 'pet idea'.[119] The President had discussed US/Soviet cooperation with Astronaut Borman, Paine and Kissinger during their helicopter ride to the *USS Hornet*.[120] In a January 1970 meeting with the President, Administrator Paine found Nixon offering platitudes in response to his warnings about Soviet 'large booster' progress, but intensely interested in the prospect of flying a 'foreigner' aboard an Apollo mission.[121] Borman had agreed that this scheme would be an 'obvious opportunity to include Soviet participation' but he believed the Soviets would reject any offer due to an inability to reciprocate.[122] Despite presidential enthusiasm, the idea faded away after two prominent shapers of Nixon administration space policy, Clay T. Whitehead, Director of Telecommunications Policy and presidential assistant Peter Flanigan, expressed concern that NASA was attempting to use the idea in its struggle against budgetary reductions.[123] Nixon's pet idea drew upon the astrofuturist discourse of space chivalry by construing space as an optimistic, heroic terrain where old grievances were set aside as spacefarers embraced their common human

[116] U. Alexis Johnson to Thomas Paine, 25 March, 1970, Letter, Folder SP 10 US 3/25/70, Box 2964, Subject Numeric Files, 1970-3 Science, Record Group 59 General Records of the Department of State, NARA.
[117] For Nixon's involvement in *Apollo 11*'s choreography and the Moonglow tour see Muir-Harmony, *Project Apollo, American Diplomacy and the Framing of Global Interdependence*, (2014), pp. 141-190, particularly pp. 173-176, Logsdon, *After Apollo*, (2015), pp. 10-20.
[118] John Logsdon, 'The Decision to Develop the Space Shuttle' *Space Policy*, 2, 2, (1986), pp. 103-119 (pp. 105, 117-9); Joan Hoff, 'The Presidency, Congress, and the Deceleration of the US Space Program in the 1970s', in *Spaceflight and the Myth of Presidential Leadership* ed. by Launius and McCurdy, (1997), p. 109; Roger Handberg, Joan Johnson-Freese and George Moore 'The Myth of Presidential Attention to Space Policy' *Technology In Society*, 17, 4, (1995), pp. 337-348, (pp. 342-3); Heppenheimer *The Space Shuttle Decision, 1965-1972* (2002), pp. 435.
[119] Logsdon, *After Apollo*, (2015), pp. 109-12.
[120] Ibid., p. 22.
[121] Thomas O. Paine, 'Memorandum for the Record: Meeting with the President, January 22, 1970' 22 January, 1970, Folder 3 'Chronological File January 1970', Box 24, Paine Papers.
[122] Frank Borman to Peter Flanigan, 2 December 1969, Folder: EX OS Outer Space 1969-1970 [1 of 2]; Box 1, Subject Files: Outer Space, White House Central Files, Nixon Library.
[123] Logsdon *After Apollo*, (2015), p. 112.

identity. It was space brotherhood's human element which intrigued Nixon rather than the fusion of American and Soviet gadgetry.

The Nixon administration pressed ahead with cooperative negotiations despite perceiving the Soviet programme as secretive and militaristic. In a July 1970 memorandum that Kissinger attached to the President's copy of the ad-hoc committee on cooperation's report, the National Security Advisor described the Soviet programme as 'controlled largely by the military', arguing high-level diplomatic intervention would be necessary alongside NASA-Academy discussions in order to overcome the Soviet leadership's 'great reluctance to risk compromise of [their] military space programme'.[124] Three months later, Peter Flanigan wrote to Kissinger suggesting 'slowing down these meetings' to prevent transferring sensitive information and sending a conciliatory signal in light of 'developments in the Middle East' (US-Soviet tensions had been exacerbated by the 1970 Jordanian Civil War).[125] The intelligence community was even more pessimistic. In *NIE-11-1-71*: *The Soviet Space Program* the CIA justified its 'continued scepticism' about cooperation's feasibility by arguing the Soviets would be unlikely to undermine their competitive space propaganda or open up about past failures and would only cooperate in order to gain 'some insight into US technology and techniques of management'.[126] Given the previous decade's unsuccessful attempts at space cooperation, why did the Nixon administration persevere? Kissinger rejected Flanigan's suggestion by stating that whilst he was 'sensitive' to these factors, space cooperation was an area where 'long-term objectives' could be furthered successfully.[127] The administration chose to overlook the Soviet programme's flaws because space cooperation was a useful diplomatic lever that promised a spectacular propaganda dividend.

After the 1972 Moscow Summit, the administration wasted little time before incorporating space cooperation into its detente sales pitch. The June 1972 visit of President Echeverría of Mexico was interrupted with a 'spontaneous' photo call with the crew of the recently returned *Apollo 16*

[124] Henry A. Kissinger to The President, 'International Space Cooperation: US-Soviet Activities', 6 July 1970, pp. 2-3, Folder: 'Space programs foreign cooperation 1970 [February69-nov 70] 1 of 3', Box 392, Subject Files, National Security Council (NSC) Files, Nixon Library.
[125] Peter Flanigan to Henry A. Kissinger, Memorandum, 7 October 1970, EX OS 3 Space Flight 9/1/1970-10/31/1970, Box 7, Subject Files: Outer Space, White House Central Files, Nixon Library; For Nixon Administration's reaction to the 'Black September' conflict between the Hashemite Monarchy and the Palestinian Liberation Organisation see Boaz Vanetik and Zaki Shalom, *Nixon Administration and the Middle East Peace process, 1969-1973: From the Rogers Plan to the Outbreak of the Yom Kippur War*, (Eastbourne: Sussex Academic Press, 2013), pp. 127-129.
[126] National Intelligence Estimate 11-1-71, *The Soviet Space Program*, 1 July 1971, p. 26 National Security Archive <http://nsarchive.gwu.edu/NSAEBB/NSAEBB501/docs/EBB-18.pdf> [accessed 28 February 2018].
[127] Henry A. Kissinger to Peter Flanigan, 'Space Cooperation with the USSR', 22 October 1970, Folder: 'Space programs foreign cooperation 1970 [February 69-nov 70] 1 of 3', Box 392, NSC Subject Files, National Security Council (NSC),Files, Nixon Library.

mission to highlight the space cooperation agreement.[128] In a November 1972 radio address on foreign policy, Nixon praised the Moscow Summit for ensuring that

> The day is fast approaching when a Russian cosmonaut and an American astronaut will shake hands in space, when a Russian chemist and an American biologist will work side by side to find a cure for cancer. And each time our nations join hands in the works of peace, we advance the day when nations will no longer raise their hands in warfare.[129]

NASA eagerly encouraged Nixon's interest in Apollo-Soyuz. In October 1973, Administrator Fletcher suggested incorporating a visit to Star City on the next presidential trip to the USSR. Not coincidentally, this excursion would also allow the President to form a 'personal impression of the heavy and growing Soviet commitment to manned space.'[130] Nixon never reached Star City but he did charm visiting Soviet space engineers by briefly addressing them in Russian during his March 1974 visit to the Johnson Manned Spacecraft Centre.[131] Space cooperation's peaceful transnational exchanges were the perfect prop to demonstrate detente at work.

Apollo-Soyuz allowed Nixon to harness space exploration's symbolic identification with the future to portray detente as progressive, hopeful development rather than cynical realpolitik. For all its cultural potency, the 'space slump' had not totally obliterated support for space exploration. Robert Michaud's *Reaching for the High Frontier* describes how an American 'Pro-Space Movement' that yearned for larger NASA budgets and ambitious space programmes began coalescing during the early 1970s.[132] The White House's desire to harness the optimism of astrofuturist true believers is exemplified in proposals for an Apollo-Soyuz pen pal scheme. The idea was first suggested in August 1973 by Kevin Steen, a teenage cancer survivor and 'space buff' who had been invited to witness the splashdown and recovery of *Apollo 17* the previous year.[133] In a letter to Nixon, the fourteen-year-old suggested using the mission to organise exchanges, space facility tours and a pen pal scheme between, 'a group of Russians and American young people, like myself, that have been interested in the Space Programs' as way to 'work together for the good of everyone in the world.'[134] Kevin Steen's innocent 'space cadet' enthusiasm

[128] David C. Hoopes to The President, 'Meeting with Apollo 16 Astronauts and Dr James C. Fletcher, Thursday 15, 1972, 12:30 P.M. (5 Minutes), The Oval Office', Memorandum, Folder: EX OS Outer Space [1971-72] 3 of 3, Subject Files: Outer Space Box 1, White House Central Files, Nixon Library.
[129] Richard Nixon: 'Radio Address on Foreign Policy', 4 November 1972, Online via *The American Presidency Project*. <http://www.presidency.ucsb.edu/ws/?pid=3692> [accessed 28 February 2018].
[130] James C. Fletcher to Richard M. Nixon, 31 October 1973, Folder: 'EX OS 3 Space Flight 7/12/1973-12/31/1973', Box 9, Subject Files: Outer Space, White House Central Files, Nixon Library.
[131] Thomas P. Stafford to Richard M. Nixon, 24 April 1974, Folder: EX OS 3 Space Flight 7/12/1973-12/31/1973, Box 9, Subject Files: Outer Space, White House Central Files, Nixon Library.
[132] See Robert Michaud, *Reaching for the High Frontier: The American Pro-Space Movement, 1972-84,* (New York, NY: Praeger, 1986).
[133] 'Astronauts' Fan, 13, Wins Cancer Fight', *Chicago Tribune*, 17 August 1973, p. 2:13.
[134] Kevin Steen to Richard Nixon, 21 August 1973, Folder: EX OS Outer Space [1971-72] 3 of 3, Subject Files: Outer Space Box 1, White House Central Files, Nixon Library.

exemplified the astrofuturist lustre that elevated Apollo-Soyuz's image-making potential above other US-Soviet agreements.

Whilst the Nixon administration seized on Steen's proposal, NASA worried about how their new partners would react. In an internal White House memorandum, Brent Scowcroft, Deputy Assistant for National Security Affairs, described Steen's 'very desirable' proposal as having 'intrinsic merit' in 'adding another favourable dimension' to the ASTP. However, Scowcroft cautioned that NASA had expressed concerns that people-to-people exchanges might encounter the familiar Soviet reluctance to allow outsiders into their space facilities.[135] After discussing the proposal with Jack Matlock, the State Department's Country Director for the USSR, NASA had concluded it 'should not get involved in proposing this project' for fear of fuelling 'Soviet suspicions that we are involved in ulterior political and public affairs purposes'.[136] NASA's concerns were either assuaged or overruled; in February 1974, Frutkin wrote to the Soviet Academy of Sciences proposing discussion of youth exchanges and pen pal programmes.[137] Soviet discomfort over Western access to their space facilities prevented Steen from realising his dream of visiting Baikonur and the archives are silent on whether his less controversial proposals were implemented.[138] Nevertheless, Kevin Steen's proposal demonstrated space cooperation's imaginative draw. Outer space and the future were often coterminous within the American imagination; Apollo-Soyuz's astrofuturist pageantry provided a way to for the Nixon administration to situate detente within that resonant imaginative terrain, elevating US-Soviet cooperation from the negotiating table to the heavens.

By the time the Soviet prime and backup crews for Apollo-Soyuz were first announced in May 1973, Nixon's administration was engulfed in the Watergate scandal, leaving the President little time to fully devote himself to foreign policy, let alone space cooperation.[139] Still, in September 1973, Nixon informed NASA administrator Fletcher that he was 'particularly anxious that you focus your attention on cooperative programmes with the Soviet Union and the European Space Research Organisation'. Nixon had been scheduled to meet cosmonauts Alexei Leonov and Valerii

[135] Brent Scowcroft to Michael J. Farrell, 'Kevin L. Steen's Proposal', 21 September 1973, Folder: EX OS Outer Space [1971-72] 3 of 3, Subject Files: Outer Space Box 1, White House Central Files, Nixon Library.
[136] Oscar E. Anderson 'Proposed ASTP Pen Pal Project' 15 September, 1973, Record Number: 007459 'ASTP 1972-73', NASA History Office.
[137] Department of State to Embassy Moscow, Telegram 023671, 5 February, 1974STATE023671 Central Foreign Policy Files, 1973-79/Electronic Telegrams, RG 59: General Records of the Department of State, National Archives, <https://aad.archives.gov/aad/createpdf?rid=28260&dt=2474&dl=1345> accessed [28 February 2018].
[138] Steen would go on to be a guest of honour at the launch of the Apollo spacecraft for the ASTP see 'Teen-aged Cancer Victims to Watch Launch', *The Argus Press,* 24 June 1975, p. 8. <https://news.google.com/newspapers?id=dHgiAAAAIBAJ&sjid=_KwFAAAAIBAJ&pg=1005%2C5075849> [accessed 28 February 2018]
[139] The Soviet crews would make their first official visit to train in the US in July 1973, see Scott and Leonov p. 344; Sandbrook, 'Salesmanship and Substance' in *Nixon in the World* ed. by Preston and Longevall (2008), p. 95.

Kubasov during their September 1974 visit to Washington, with NASA's John Donnelly describing the meeting as 'an opportunity to dramatise detente in human interest terms'.[140] Nixon resigned on 8 August 1974, but he had rhetorically addressed the cosmonauts that March during his visit to the Johnson Space Centre. The President averred that though both he and Brezhnev understood that Apollo-Soyuz alone would not lead to Cold War ideological divisions 'evaporating', space cooperation nevertheless demonstrated 'that the Russian people are a great people, the American people are a great people, and we can be so much together...let's work together.'[141] Addressing the cosmonauts in their traditional role as surrogates for the Soviet people, Nixon extended the hand of friendship, appealing to an image of superpower grandeur exemplified by their mutual interest in space adventure. After Nixon vacated the stage, Gerald Ford would elaborate on his predecessor's depiction of space cooperation as a means of bridging Cold War misunderstanding by using the cosmonauts themselves.

Gerald R. Ford's use of cosmonauts as charismatic representations of detente was a twist on the astronaut's symbolic role in presidential rhetoric. Ever since John F. Kennedy had claimed the Mercury astronauts as the quintessential 'new frontiersmen', presidents had been enthralled by the courageous aura of space travellers.[142] Ford needed to make the most of Apollo-Soyuz as it represented the final opportunity for presidential involvement in a crewed space mission before the Space Shuttle's first flight. The September 1974 visit of the Soviet prime and backup crews to Washington DC was an early opportunity for Ford to use the exotic visitors to illustrate detente's human side. In a memo to the President, Kissinger, now serving concurrently as National Security Advisor and Secretary of State, argued the visit would not only 'call attention to the importance' Ford attached to space cooperation, but also 'provide another signal to the Soviets of the continuity in US foreign policy.'[143] Ford's predecessors had used the Mercury, Gemini and Apollo astronauts as symbols of courage, technological prowess and the American spirit that would ensure Cold War victory. Ford used the astronauts' Soviet counterparts to illustrate the righteousness of the latest Cold War strategy, detente. Appropriating the cosmonauts' familiar propaganda role as appealing surrogates for the Soviet Union, Ford communicated to both the American public and the Soviet leadership that detente was alive and well despite Nixon's fall.

[140] John F. Donnelly to Ronald Ziegler, 29 July 1974, EX OS 3-1 Astronauts 1/1/1973-[1973-1974], Box 12, Subject Files: Outer Space, White House Central Files, Nixon Library.
[141] Richard Nixon: 'Remarks Following a Tour of the Lyndon B. Johnson Space Center, Houston, Texas.', 20 March 1974, available online via *The American Presidency Project* <http://www.presidency.ucsb.edu/ws/?pid=4392> [accessed 28 February 2018].
[142] John M. Logsdon, 'John F. Kennedy and the 'Right Stuff', *Quest: The Journal of Spaceflight History*, 20, 2, (2013), pp.4-16 (p. 4).
[143] Henry A. Kissinger to The President, 'Meeting with Soviet Cosmonauts', 6 September 1974, Folder: OS 3 Space flight 8/9/74-3/31/75, Box 1 Outer Space 8/9/74 (exec), to Space Flight 7/31/76 (Exec), White House Central Subject Files, Ford Library.

The cosmonauts' visit allowed Ford to use space brotherhood's resonant themes of heroic sacrifice and shared humanity. As well as visiting the typical stops of the DC diplomatic tourist trail, the cosmonauts also paid their respects at the graves of *Apollo 1* astronauts Grissom, Chafee and White.[144] In a less solemn demonstration of US-Soviet friendship, Ford invited cosmonauts Leonov, Kubasov and Shatalov to the Alexandria VA Police Department's annual picnic to show them, in his words, 'a bit of Americana'. The *Washington Star* described how Ford's relaxed demeanour both complemented the event and contrasted sharply with his predecessor's social awkwardness Crucially, though, the picnic provided the perfect opportunity for Ford to argue, 'The Broader we can make our relations in health, in environment, in space... the better it is for us here in America, and for the Soviet Union.'[145] The surreal spectacle of Soviet space heroes enjoying hot dogs, cracked crab and ice tea alongside Virginia police officers was a potent illustration of Ford's argument that detente promoted increased cultural contact and understanding. As cheerful, exotic representatives of the USSR, the cosmonauts were an integral component of Ford's effort to sustain interest in US-Soviet detente.

Leonov and Kubasov's incongruous appearance in suburban Alexandria illuminates how detente had domesticated the Soviet cosmonaut. Gherman Titov had been the first cosmonaut to tour America in 1962, and although the handsome spacefarer had initially attracted fawning editorials and crowds of 'cheering, screaming teenagers', he ended up alienating his hosts with atheistic statements he made during a visit to San Francisco.[146] The *Washington Star*'s denunciation of the 'totally foreign outlook on life' of the 'Soviet man of tomorrow' exemplified the negative media coverage that castigated the cosmonaut as a dour mouthpiece for the communist party.[147] By contrast, the dissipation of Vostok-era 'missile gap' fears meant the Apollo-Soyuz cosmonauts, who unlike Titov were on their best behaviour, were met with a much warmer reception. A *People* photo special on the Soviet crew's September 1974 visit gushed that 'as a cultural exchange, the Apollo-Soyuz programme has soared.' It illustrated its account of the ASTP as an exercise in cultural bridge-building with photos of the crews training and socialising and the cosmonauts interacting with local colour. Valerii Kubasov kicked a football at the Houston Astrodome whilst Leonov capered with a belly dancer and sampled Texas Chilli at the San Antonio Folklife Festival.[148] Leonov and Kubasov were foreign innocents joyously encountering America in all its

[144] 'Tentative Schedule: Visit of Russian Cosmonauts Washington DC September 6-8, 1974', 19 August 1974, Folder: OS 3 Space flight 8/9/74-3/31/75, Box 1 Outer Space 8/9/74 (exec), to Space Flight 7/31/76 (Exec), White House Central Subject Files, Ford Library.
[145] Norman Kempster, 'Ford, Spacemen Eat Crabs', *The Washington Star*, 8 September 1974, p. A.5
[146] For initial positive coverage of Titov see 'Guide For Gulliver' *The Washington Post*, 6 May 1962 p. E4; 'Comrade Titov Meets Manhattan,', 30 *Washington Star*, April 1962, pp. 5-6, 'Titov and Glenn in 'Space Flight' to Top of Washington Monument' *The Washington Post*, 4 May 1962, p. A1.
[147] William Hines, 'Titov: The Soviet Man of Tomorrow', *The Sunday Star,* 13 May 1962, p. 4.
[148] 'The Russians have landed- And Texas says welcome' *People,* 30, September, 1974; for more coverage of cosmonauts encountering Americana see Victor K. McElheny 'Soviet Astronauts Enjoy Flight Into Fantasies

bewildering diversity, 'Russian' tourists as much as 'Soviet' dignitaries. Ford's picnic encouraged this image of Apollo-Soyuz as a triumph of international teamwork as much as technological ingenuity.

Under Ford, NASA continued to capitalise on presidential interest in space cooperation. In October 1974, NASA's Public Affairs Department had drawn up a list of eighteen potential opportunities for high level governmental participation in the upcoming mission. That December, John Donnelly forwarded on six involving Ford to the White House. By this point, proposals for Kissinger to visit Baikonur had been weeded out, but the remaining options were no less dramatic. They included proposing the US crew deliver a symbolic gift from the President to the cosmonauts, a joint post-mission press conference by Ford and Brezhnev and having the President appear at the recovery of the U.S. or the Soviet crews following the mission.[149] This final suggestion was as sensational as it was far-fetched. Ever since the Soviets had attempted to deceive the world that Gagarin had landed in his *Vostok 1* capsule rather than parachuting out, cosmonaut recoveries had been secretive affairs carried out by the Soviet Air Force.[150] NASA's proposals positioned Ford front and centre from the mission's launch to its recovery, revealing the agency's eagerness to demonstrate ASTP's political utility. Having the cosmonauts welcomed back by a grinning American president would have marked a spectacular break from the competitive posturing of the Moon Race.

In April 1975, with the mission looming, the issue of presidential involvement returned to the fore. Proposals involving Ford travelling to the USSR had been rejected and discussion now centred on presidential attendance at the Apollo launch or recovery and how calls to the crew would be coordinated.[151] Ford's predecessor's attempts to monopolise the *Apollo 11* mission's limelight had left a sour aftertaste, and Press Secretary Ron Nessen worried that having the President '[witness] the recovery from the carrier smacks too much of Nixon.'[152] The NSC countered that whilst Ford's presence on the recovery carrier was unwarranted, his attendance at the launch would be 'quite appropriate' given the 'financial and political effort' the US had expended on Apollo-Soyuz, 'the biggest single cooperative project we have carried out with the

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of Disney World', *New York Times,* 10 February 1975, p. 24; Jack Waugh, 'Building US-Soviet space team', *The Christian Science Monitor*, 19 July 1973, pp. 5- 6.

[149] John P. Donnelly to Jerry Warren, 19 December 1974, Folder: OS 3 Space flight 8/9/74-3/31/75, Box 1 Outer Space 8/9/74 (exec), to Space Flight 7/31/76 (Exec), White House Central Subject Files, Ford Library.

[150] Siddiqi, *Challenge to Apollo*, (2000), p. 263; for the controversy over Gagarin's landing see Jenks, *The Cosmonaut who Couldn't Stop Smiling*, (2014), pp. 148-9.

[151] Brent Scowcroft to Warren Rustand, 'Presidential Involvement in the US-USSR Space Mission', 18 May 1975, Folder: OS 3 4/1/75-6/30/75, Box 1: Outer Space 8/9/74 (exec), to Space Flight 7/31/76 (Exec), White House Central Subject Files, Ford Library.

[152] Tribbe, *No Requiem for the Space Age* (2014), p. 143; Ron Nessen to Warren Rustand, 'Apollo-Soyuz Launch' 21 April 1975, Folder: OS 3 4/1/75-6/30/75, Box 1 Outer Space 8/9/74 (exec),to Space Flight 7/31/76 (Exec), White House Central Subject Files, Ford Library.

Soviet Union'.[153] Ford did not attend the *Apollo's* launch at Cape Canaveral, but he did approve a State Department proposal for the 'the Chiefs of the Diplomatic Missions and their wives' to witness the launch, provided they were willing to pay for their own travel expenses.[154] Ford watched the first televised Soviet spacecraft launch from the State Department Auditorium alongside Administrator Fletcher and Ambassador Dobrynin, using the occasion to congratulate the technicians responsible and commend the spacefarers who 'obviously represent the best of capabilities on both sides.'[155] Post-Watergate squeamishness failed to dampen Ford's desire to capitalise on space adventure's image-making potential. His decision to involve the Washington diplomatic corps, his government's diplomatic foot soldiers and the Soviets' earthly ambassador celebrated Apollo-Soyuz as a victory of diplomacy over suspicion.

Ford's communications with the Apollo-Soyuz crews downplayed the previous decade's bitter superpower rivalry to present, instead, a past defined by glorious, mutual achievement. His pre-launch message to the crews presented the superpowers advancing together through the space age's milestones for the betterment of humanity. Ford praised Gagarin and John Glenn for 'realising the dreams of Tsiolkovsky, Goddard and others who believed firmly that man could fly in space' and mentioned *Lunokhod* in the same breath as Apollo as 'both brought back samples of the Moon's surface' to expand human knowledge.[156] Ford's rhetoric appropriated the USSR's illustrious 'Grandfather of Cosmonautics' and most favoured spacefaring son, transforming Tsiolkovsky from Leninist prophet of interplanetary conquest into a de-contextualised space-dreamer and Gagarin from a symbol of a vanished 'missile gap' into John Glenn's equal. Finally, Ford rhetorically disavowed the space race by granting *Lunokhod* the recognition the Soviets craved. Ford's message transformed cosmonauts from competitors to colleagues in a transnational adventure, detoxifying NASA's new partner by eliding its traditional role as herald of communist progress.

Like Nixon's conversations with Apollo astronauts, Ford's phone call to the Apollo-Soyuz crews placed the president at the fore after the crucial challenge, in this case the actual docking itself,

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[153] David Elliott to Jeanne Davis, 'Presidential Involvement in Apollo-Soyuz' 21 April 1975, OS 3 4/1/75-6/30/75 Box 1: 'Outer Space 8/9/74 (exec), to Space Flight 7/31/76 (Exec), White House Central Subject Files: OS, Ford Library.

[154] Jeanne W. Davis to Ambassador Henry E. Catto, Jr., Diplomatic Corps Attendance at Apollo-Soyuz Launch on July 15', 25 June 1975, Folder: OS 3 4/1/75-6/30/75, Box 1, Outer Space 8/9/74 (exec),to Space Flight 7/31/76 (Exec),White House Central Subject Files: OS, Ford Library.

[155] For alternative talking points Ford was presented with, including remarks in the event of a disaster during the launch, see George S. Springsteen to Lt. Gen. Brent Scowcroft, 'The President's Participation in the Apollo-Soyuz Ceremony at the State Department Auditorium', 12 July 1975, P750119-0571-3, Folder P750119-0470 through P750119-0575 Box 119 A, P-Reel Microfilm Printouts, Entry number 454: Central Foreign Policy Files, Record Group:59 General Records of the Department of State, NARA; Gerald R. Ford: 'Remarks on the Launch of the Soyuz Spacecraft', 15 July 1975, Available online via, *The American Presidency Project* <http://www.presidency.ucsb.edu/ws/?pid=5079> [accessed 28 February 2018].

[156] Gerald R. Ford, 'Message to the Crews of the Apollo-Soyuz Test Project Prior to the Launching of Their Spacecraft.', 15 July 1975. Available online via: *The American Presidency Project*. <http://www.presidency.ucsb.edu/ws/?pid=5078> [accessed 28 February 2018].

had been surmounted. In a memo offering light-hearted talking points to use with the cosmonauts ('Valeriy... what is the menu aboard Soyuz?'), Kissinger argued the call would allow Ford to 'congratulate both crews on their successful and historic achievement' and 'provide an opportunity to underscore the importance of the mission for US-Soviet space cooperation, its contribution to the strengthening of US-USSR cooperation generally'.[157] Ford, once again, described the flight as a 'momentous event', the collective triumph of 'thousands of American and Soviet scientists and technicians'. Ford continued, 'It has taken us many years to open this door to useful cooperation in space between our countries'. He looked forward to the 'not far off' day when such cooperative missions 'will be more or less commonplace'.[158] Ford framed the flight as the dazzling culmination of the quieter process of learning to live and work together rather than a one-off spectacular. By doing so he argued that detente took time and effort: Apollo-Soyuz illustrated why patience was a virtue when it came to diplomacy.

Apollo-Soyuz's constituent spacecraft undocked on 19 July with the Apollo craft continuing to perform experiments for another five days before returning to Earth.[159] The Ford administration celebrated the ASTP as a political triumph. Mission Commander Tom Stafford's promotion to Major General was not only a reward for the astronaut's long service to the space programme but a way for Ford, in Kissinger's words, to signal to the Soviets 'and others generally' the importance that Ford attached to 'this extraordinary achievement in the context of US-Soviet relations.'[160] Following the mission's successful conclusion, Ford switched from portraying the project as an ongoing process that demonstrated US-Soviet cooperation at work to inspirational proof that detente was worth the effort and frustration.

A week after the astronauts returned, Ford was in Finland to sign the Helsinki Final Act, the product of the Conference on Security and Cooperation in Europe (CSCE), a multilateral treaty between the US, Canada, the USSR, and all European nations (excluding Hoxhaist Albania) which sought to provide greater structure to East-West relations. Michael Cotey Morgan contends that for 'Ford's critics ...the Final Act embodied everything that was bad about detente. It did nothing for the United States' and 'betrayed the hopes of Eastern Europeans for freedom from Soviet tyranny' by confirming the Europe's territorial status quo.[161] Unsurprisingly, Ford used the recent space spectacular to present a contrary, positive depiction of detente. Speaking to the press, Ford

[157]Henry A. Kissinger to The President, 'Participation in Apollo-Soyuz Test Project.', Tab A: 'Recommended Telephone Call', 14 July 1975, Folder: OS 3 7/1/75-7/23/75, Box 1 Outer Space 8/9/74 (exec), to Space Flight 7/31/76 (Exec), White House Central Subject Files, Ford Library.
[158] Gerald R. Ford: 'Telephone Conversation With Apollo-Soyuz Test Project Crews Following Rendezvous and Docking of the Spacecraft,' 17 July 1975. Available online via, *The American Presidency Project*. <http://www.presidency.ucsb.edu/ws/?pid=5086> [accessed 28 February 2018]
[159] Ezell and Ezell, *The Partnership*, (1978), pp. 345-7.
[160] Henry A. Kissinger to The President, 'Promotion for Astronaut Tom Stafford', 7 August 1975, Folder: 'Stafford, Tom', Box 3, 'National Security Advisor, Presidential Name File, 1974-1977', Ford Library
[161] Michael Cotey Morgan, 'The United States and the making of the Helsinki Final Act' in Preston and Longevall, *Nixon in the World*, (2008), pp. 164-79, (pp. 165-6).

contended that 'the process of negotiation must be sustained'; if the superpowers could 'reach agreement so that our astronauts can fit together in the most intricate scientific equipment, work together, and shake hands 137 miles out in space, we as statesmen have an obligation to do as well on Earth.'[162] Characterising the courageous labours of both nations' spacefarers, inclusively described as 'our astronauts', as far trickier than the mundane task of the 'statesmen' below, Ford depicted Apollo-Soyuz as the exemplary form of US-Soviet cooperation. Ford's rhetoric attempted to use celestial cooperation to elevate earthly detente.

The American and Soviet governments sought to further eke out Apollo-Soyuz's public relations impact with post-flight tours by the crews. In a memo to the President discussing Leonov and Kubasov's October 1975 cross-country American tour, Kissinger reiterated the project's symbolic importance, paraphrasing Brezhnev's description of the mission as the 'embodiment of the striving of the peoples of the two countries for peaceful cooperation'. The National Security Advisor's description of the cosmonauts' itinerary, which included numerous dinners with local notables and national TV appearances, highlighted the Soviet media's 'very positive coverage' of the ASTP astronauts' recent tour of the USSR.[163] Unencumbered by training obligations, the cosmonauts could fully devote themselves to selling detente. NASA's History Office has preserved a selection of news clippings that present the cosmonauts mingling with ordinary Americans. In Chicago, cheering schoolchildren waved signs written in Russian to welcome the cosmonauts who Mayor Richard Daly would make honorary citizens of the city.[164] Large crowds greeted the cosmonauts in Nashville where they took in a performance at the Grand Ole Opry and Leonov told an awestruck young fan 'You're a fine looking boy. You be (sic) a spaceman someday.'[165] Like Steen's pen-pal proposal, encounters between cosmonauts and American children were suffused with optimism; the personifications of space cooperation were portrayed as inspiring the next generation, prompting the hopeful prospect of a world without Cold War antagonism.

Previous space age presidents had spoken of their desire for space cooperation but for Ford and Nixon highly visible and protracted cooperation with the Soviets was a complicated political reality rather than a hazy platitude.[166] Nixon used the image of astronauts and cosmonauts

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[162] James M. Naughton, 'Ford Bids Nations Live Up to Spirit of Helsinki Pact', *New York Times*, 2 August 1975, p. 1.

[163] Henry A Kissinger to The President, 'Meeting with US Astronauts and Soviet Cosmonauts' 13 October, Folder: National Aeronautics and Space Administration (4),10/1/75-8/31/76, Box 14, National Security Adviser, Presidential Agency File 1974-1977, Ford Library.

[164] 'Soviet, U.S. Spacemen Feted in Chicago', *Washington Star*, 15 August 1975, p. A6.

[165] 'Crowd of 800 Greets Apollo-Soyuz Spacemen Upon Nashville Landing' and 'Space Fanatic Goes Into Orbit' *The Nashville Banner*, 17 October 1975, pp. 5-8, The articles cited here detailing cosmonaut encounters with ordinary Americans during their tour can be found in Record Number: 007509, 'ASTP/USA Tour October 1975', NASA History Office.

[166] Kennedy's inauguration had implored the USSR 'Together let us explore the stars' John F. Kennedy: 'Inaugural Address,' 20 January 1961.*The American Presidency Project*. Available online via <http://www.presidency.ucsb.edu/ws/?pid=8032> [accessed 28 February 2018] for another example of Johnson's rhetorical gesturing towards space cooperation Lyndon B. Johnson: 'Remarks at the Presentation

shaking hands as proof that the superpowers were 'great nations' who could accomplish incredible things together if they pooled their efforts. Ford was able to use the cosmonauts themselves, appropriating their traditional propaganda roles as charismatic ambassadors for the USSR to argue Nixon's fall did not invalidate the principles of detente. Thus, for all that was anomalous about Apollo-Soyuz, the joint mission shared important similarities with the space spectaculars that had preceded it. During the detente, the Soviet space programme continued to be used as a rhetorical prop in discussions about the future of the superpower relationship. The ASTP was a novel twist on the patented formula of using space exploration as a visionary symbol for terrestrial goals, one that sought to harness astrofuturist optimism to convince the public that detente was a progressive and hopeful policy rather than a cynical ruse.

'A Showpiece of Detente': Criticism of the Apollo-Soyuz Test Project

'I was a bit surprised to learn that in the United States there were some people who were against the Apollo-Soyuz project, arguing that "their technology is weaker" or something. In the United States, everything is criticised.' - Leonid Brezhnev, Helsinki, 30 July 1975.[167]

In October 1975, the Soviet Embassy in Washington DC held a lavish reception honouring Apollo-Soyuz cosmonauts Alexei Leonov and Valerii Kubasov before they embarked on their post-mission US tour. The cosmonauts and their American crewmates were joined by around 200 members of the capital's political and scientific elite eager to get a glimpse of, and an autograph from, the returning space heroes. However, what attracted the attention of *Washington Star* journalist Joy Billington was not the spacefarers or their admirers, but the reception's absurd centrepiece which lay untouched even as guests demolished the hors d'oeuvres surrounding it: a four foot tall rocketship made from cheese. For Billington, space cooperation was a similarly ridiculous diplomatic prop. There was a 'credibility gap' between the reception's self-congratulatory backslapping and the 'new plateau for detente' exemplified by the fact that no further US-Soviet cooperative crewed missions were scheduled.[168] A 1972 State Department memorandum to Henry Kissinger presented Apollo-Soyuz as 'a highly visible demonstration of US-Soviet ability to cooperate in peaceful projects'.[169] However, this visibility attracted the attention of detente's critics as well as its champions. Opponents of US-Soviet rapprochement used engrained mistrust of the secretive Soviet programme to attack the ASTP as either a technological giveaway or a

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of NASA Exceptional Service Awards Following the Flight of Gemini 4', 17 June 1965, *The American Presidency Project*. <http://www.presidency.ucsb.edu/ws/?pid=27039> [accessed 28 February 2018].

[167] 'Memorandum of Conversation, Helsinki, July 30, 1975, 9:35 AM' in Foreign Relations of The United States, 1969–1976, Volume XXXIX, European Security, ed. by David C. Geyer and Edward C. Keefer (Washington DC: Government Printing Office, 2012), Document 329, Available online via <https://history.state.gov/historicaldocuments/frus1969-76v39/d329>.

[168] Joy Billington, 'Cheese Rocket Stayed on the Pad', *The Washington Star,* 14 October 1975, p. D-3.

[169] Executive Secretary Theodore L. Elliot to Henry A. Kissinger, 'Joint Space Docking Mission and the President's Visit to the USSR', 29 December 1972, Folder: SP-1-1 US-USSR 1/1/71, Box 2973, Subject Numeric Files, 1970-73, Entry 1613, Record Group 59: General Records of the Department of State, NARA.

reckless propagandistic sham. Apollo-Soyuz was a demonstration of detente that had the misfortune to occur at a time when the policy was under increasing criticism; it was a symbol of hope for a cause that seemed increasingly hopeless.

Given that America had expended billions of dollars during the 1960s to defeat the Soviet space challenge, US-Soviet space cooperation was inherently controversial. Whereas detente's supporters argued that the USSR was capable of change, contending that space cooperation would open up and liberalise the Soviet programme, the policy's critics drew on engrained, negative images of the Soviet space programme to stress its continuity. Three principal strands of anti-cooperation rhetoric can be discerned. The first theme, which was present from the beginning of negotiations, drew on fears of Soviet espionage and perceptions of Russian technological backwardness to allege that the project was an unequal exchange that the Soviets were exploiting to steal US technology. The second theme also used images of Russian backwardness to argue the Soviets' lax safety standards would endanger American astronauts' lives. Joy Billington's article drew on the third and final theme: that Apollo-Soyuz was a hollow propagandistic endeavour where America's sober science-oriented programme had been corrupted by Soviet showmanship.

Critics of detente warned that space cooperation would erode America's hard-won "leadership" in space exploration by facilitating technology transfer to the Soviets' militaristic space programme. These criticisms drew on a deep-seated image of Marxism-Leninism as a duplicitous, Machiavellian creed and lengthy history of Soviet scientific-technical espionage. A May 1971 Moscow Embassy report claimed that the Soviets had embraced cooperation so as to better enact Lenin's commandment to appropriate '"all that is useful" from capitalism'. To fulfil their cherished space station dreams before the US launched its *Skylab* station, the Soviets needed American technology. Thus, "the political price of supping with the devil is deemed tolerable if the devil can be persuaded to part with his knowledge."[170] Soviet technicians roaming through NASA facilities roused memories of Soviet spies taking advantage of America's generosity during the WW2 Lend-Lease agreement, or of the treacherous physicists who had stolen atomic secrets for Stalin in the late 1940s.[171] Underpinning these fears was an image of the USSR as a backward nation that could only progress though chicanery, the same image that had informed post-Sputnik grumbling about

[170] American Embassy Moscow to Department of State, 'Soviet Space Effort' Airgram, 20 May 1971, p. 2, 'SP 10-1 USSR 1/1/71', Box 2794, Entry 1614 Subject Numeric Files, 1970-73, Science, Record Group 59: General Records of the Department of State, NARA.

[171] David Kaiser, 'The Atomic Secret in Red Hands? American Suspicions of Theoretical Physicists During the Early Cold War.', *Representations*, 90, no. 1, 2005, pp. 28–60; For Lend-Lease espionage see Katherine A. S. Sibley, 'Soviet Military-Industrial Espionage in the United States and the Emergence of an Espionage Paradigm in US-Soviet Relations, 1941-45', *American Communist History*, 2, 1, (2003), pp. 21-51 (pp. 26-7).

Operation Paperclip having brought the "wrong Germans" to America.[172] To anticommunist conservatives, hungry eyes glinted behind the Soviet programme's cooperative mask.

Even as it began exploring the practicality of space cooperation, the Nixon administration had been plagued by concerns about potential space-related technology transfer. A May 1971 NSC memo refers to Kissinger having instructed NASA to prepare a memorandum on the subject.[173] Following the *Soyuz 11* tragedy, a CIA report warned that the Soviets had 'exploited their hardware to its maximum potential for progress'. Their consequent realisation they had hit this dead end was 'a principal factor behind their current interest in information exchange, docking procedures, etc.'[174] These worries were well founded; during the early 1970s, the KGB and GRU, the Soviet civil and military intelligence organs, were investing considerable resources into discerning American scientific-technical secrets. As an area of American excellence imbued with immense military significance, space technology was a significant target for Soviet spies.[175] Thomas Stafford's response to a 1974 White House query on the issue admitted it was 'a very detailed and complicated problem particularly in view of the fact that in many areas we are 7 to 10 years ahead of them, particularly with respect to computer technology and weapons system development.'[176] Stafford was one of space cooperation's greatest champions, but even he admitted that astronaut-cosmonaut bonhomie would not neutralise the Soviet espionage threat.

Technology transfer was an emotive subject. Legitimate worries about Soviet espionage were exacerbated by fears that treachery would unleash a second Sputnik Crisis. In an *Aviation Week and Space Technology* editorial Robert Hotz coolly deployed the technology transfer critique by comparing the 'relative crudeness' of the Soviet Vostok and Soyuz technology to American Apollo hardware and referencing rumours of persistent problems with Soviet large booster technology.[177] Less calm, was a letter from an enraged constituent that Senator Harrison A. Williams (Dem., NJ) forwarded to the State Department in December 1974. In the letter, Christian F. Scherer furiously assailed the American government for acting as a dangerously naive 'Santa Claus' doling out space technology secrets, 'All the Russians are doing here is picking our brains

[172] Stephen J. Zaloga, *Target America: The Soviet Union and the Strategic Arms Race, 1945-1964* (Novato, CA: Presidio, 1993), p. 148.
[173] Robert M. Behr to David Halperin, 'Post-Apollo Space Cooperation', 18 May 1971, Folder: [EX] OS 3 11/1/71-12/3/71, Box 8, Subject Files: Outer Space, White House Central Files, Nixon Library.
[174] CIA Directorate of Intelligence, 'Death of Soyuz 11 Cosmonauts Prior to Reentry/Fulminant Anoxia as Probable Cause of Death/Antiradiation Drugs/Lower Body Negative Pressure/Complete Recovery of Soyuz-9 Cosmonauts/Acclimation to Stress/Probable Effects of Soyuz-11 Disaster on Soviet Space Programme', 12 November 1971, Folder SP-1-1 US-USSR 1/1/71, Box 2973, Record Group 59, [Obtained under FOIA NARA Case Number NW 49041].
[175] Gus W. Weiss 'Duping the Soviets: The Farewell Dossier' *Studies in Intelligence,* 39, 5, 1996 <https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/csi-studies/studies/96unclass/farewell.htm> [accessed 28 February 2018].
[176] Thomas P. Stafford to John O. Marsh, 29 October 1974, Folder: OS 3 Space Flight 8/9/74-3/31/75, Box 1, OS 3 Space Flight 8/9/74-3/31/75, White House Central Subject Files, Ford Library.
[177] Robert Hotz, 'Soviet Space Problems', *Aviation Week and Space Technology*, 7 May 1973, p. 9

and the most pitiful part about the entire sham is that we are stupid enough to let them do it...The Russians already have our wheat. Why give them our space technology too?'[178] Likening Apollo-Soyuz to the 1972 US-Soviet Wheat Deal was damning; the series of unregulated purchases of American grain by the Soviet Union that had pushed up prices in the United States was also known as 'The Great Grain Robbery' and had come to symbolise detente as a bad bargain.[179] A *Washington Star* opinion piece that attacked space cooperation as dangerously unbalanced concluded by bellowing, 'We, as a nation, are committing suicide with every wheat deal, every SALT talk, every truck plant, and every shred of knowhow we give the Russians.'[180] Technology transfer critiques of space cooperation invoked the reviled Wheat Deal to allege that through Apollo-Soyuz, America was subsidising the struggling communist system.

NASA's responses stressed that Apollo-Soyuz was an exercise in cooperation not collaboration, an arms-length endeavour specifically structured to avoid technology transfer. George Low's 1972 congressional testimony had offered 'a simple analogy...If you say that two automobiles are to get the same point at the same time, you must specify the direction and which road they will take and how fast they will go, but you do not have to specify how the engine is designed.'[181] Gerald D. Griffin, NASA's Assistant Administrator for Legislative Affairs, responded to Senator Bob Packwood's (Rep., OR) concerns about technological espionage by stressing that 'The ASTP is carefully structured to avoid the transfer of technology. Both parties are independently building their own systems to meet design considerations which are jointly developed.'[182] NASA's argument was that the ASTP represented a cautious testing of the water through parallel technological development rather than a true joint programme. The Androgynous Docking Adaptor became another Cold War fortification, one that defended Apollo's inner mysteries from Soviet curiosity. Like Nixon's justification of detente as cooperation between 'realists', NASA sought to dispel charges of appeasement and naivety by subtly implying they were aware that communists would inevitably try to exploit American generosity. This reinforced the contradictory depiction of the Soviet partner, welcome in NASA facilities but never entirely trusted.

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[178] Christian F. Scherer to Harrison A. Williams, 7 December 1974, Folder P750009-0895 through P750009-9956, Box 9B, Entry P454 [Central Foreign Policy File, 1975, 16mm microfilm 'P' Reels, first and second generation copies, Reels 1-198),1975-1975, Record Group 59: Department of State, NARA.

[179] Phil Williams, 'Detente and US Domestic Politics' *International Affairs* (Royal Institute of International Affairs), 61, 3 (1985), pp. 431-447 (pp. 440-41).

[180] Michael Kelly, 'What's the Sense of Apollo-Soyuz Linkup Mission?', *Washington Star*, 27 October 1974, p. B3; The 'Truck Plant' refers to the establishment of deals between American companies and the Soviet government that led to the expansion of the RSSR's Kama Truck Factory, another contentious detente project that prompted worries about technology transfer, see: Department of State, *Soviet-American Relations: The Detente Years, 1969-1972,* (Washington DC: Government Printing Office, 2007), pp. 410, 17.

[181] Congress, Senate, Committee on Aeronautical and Space Sciences*, Space Cooperation Between the United States and the Soviet Union, Hearing Before The Committee on Aeronautical and Space Sciences*, Ninety Second Congress, First Session, 17 March 1971 (1971), p. 10.

[182] Gerald D. Griffin to Sen. Bob Packwood, 29 March 1974, Record Number: 7460 'Apollo-Soyuz Test Project ASTP 1974', NASA History Office.

Perceptions of Soviet technological backwardness also informed the second strand of criticism of Apollo-Soyuz, that the Soviets' cavalier attitude towards crew safety would endanger American astronauts. The mythic 'Failure Programme' of Lost Cosmonaut rumours had rested on depictions of Soviet spacecraft as hastily constructed death traps. Vladimir Komarov's death in 1967 had lent this idea further credence with American media coverage implying the cosmonaut had flown aboard a craft that was not ready for crewed flight.[183] Worries about lax Soviet safety standards took on a new urgency after 30 June 1971 when the three-man crew of *Soyuz 11* were killed during re-entry on their return from a pioneering mission aboard the *Salyut 1* space station. A State Department intelligence analysis of the tragedy argued that in contrast to the 'apathetic' 'World public', the Soviets remained obsessed with space and were 'intensely bothered by their failures in the face of US Apollo successes'; as a result, their 'will not be halted by the deaths of the cosmonauts'.[184] Cosmonaut deaths, both real and rumoured, highlighted the frightening uncertainties that came with trusting non-American technology.

After receiving assurances from the Soviet Academy that the circumstances of the cosmonauts' deaths would not affect the astronauts of the impending *Apollo 15* flight, NASA's response to *Soyuz 11* had stressed US-Soviet space brotherhood.[185] In a *New York Times* opinion piece, veteran astronaut Wally Schirra attacked media coverage of *Soyuz 11* as the work of the 'What-If Gang': a 'hand-wringing society' of luddites inherently hostile to space travel. Schirra's soaring conclusion argued space travel would persist because 'we are alike, astronauts and cosmonauts... These three men will not be forgotten and man will correct the cause of that failure and will continue his quest.'[186] In a poignant demonstration of space brotherhood astronaut Stafford had been invited to Moscow to serve as a pallbearer for the *Soyuz 11* cosmonauts alongside Brezhnev and other Soviet luminaries.[187] Although a State Department memo to Kissinger praised Stafford's unprecedented involvement in a cosmonaut funeral as 'remarkably successful' from a diplomatic and publicity perspective, the *Soyuz 11* tragedy itself provided powerful ammunition for space cooperation's critics.[188]

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[183] Henry Shapiro, 'Chute Lines Tangle on Re-Entry Newest, Heaviest Russian Vehicle Falls Four Miles: Nation in Mourning', *The Washington Post*, 25 April 1967, pp. A1,A16; For Komarov's story being embellished with fiction details to become a lost cosmonaut narrative, see Winslow Peck, 'Electronic Espionage: A Memoir' *Ramparts Magazine,* August 1972, San Francisco, pp. 42-3.

[184] State Department Bureau of Intelligence and Research, 'Intelligence Note: USSR: The Flight of Soyuz 11: The Ecstasy and the Agony' 30 June 1971, p. 2, Folder: SP 10-1 USSR 1/1/71, Box 2974, Entry 1613: Subject Numeric Files, 1970-73 Science, Record Group 59: General Records of the Department of State, NARA

[185] Department of State to American Embassy Moscow, Telegram 'State 126533, Moscow 5030', 19 July 1971, Folder: 'SP 10 US 6/1/71', Box 2966, Entry: 1613 Subject Numeric Files, 1970-73, Record Group 59: General Records of the Department of State, NARA.

[186] Walter Schirra Jr. 'The What-If Gang', *New York Times*, 10 July 1971, p. 23.

[187] See Stafford, *We Have Capture*, (2002), pp. 153-6.

[188] Theodore L. Eliot Jr. to Henry A. Kissinger, 'Astronaut Stafford's Trip to the Soviet Union' 6 July 1972, Folder: SP-10-1 USSR 1/1/71, Box 2974, Entry 1613: Subject Numeric Files, 1970-73 Science, Record Group: 59 General Records of the Department of State, NARA.

The safety critique's most notable exponent was Democratic Senator for Wisconsin, William Proxmire. Proxmire looms prominently in the Apollo-Soyuz historiography because his criticisms are a rare instance where the outside world intrudes on *The Partnership*'s NASA-centric narrative.[189] Proxmire was a tenacious critic of what he saw as NASA's spendthrift ways and his opposition to the Space Shuttle on budgetary grounds had earned him the eternal enmity of NASA's astronaut corps; Stafford's memoir described him as someone who 'liked to kick NASA at every opportunity'.[190] Whilst Proxmire initially supported space cooperation as a way to reduce NASA expenditure by pooling efforts with the USSR, by September 1974 he had become a vocal opponent of US-Soviet space cooperation.[191] In an open letter to Administrator Fletcher, Proxmire assailed the Soyuz spacecraft's 'dismal' safety record.[192] The letter argued that the 1967 and 1971 Soviet tragedies, in addition to docking problems experienced by *Soyuz 10* and *Soyuz 15*, proved that Soviet space technology was demonstrably unreliable. 'Under no circumstances', the Senator declared should astronauts' lives be put at risk for 'some intangible benefits of 'detente''.[193] Proxmire's attacks on Apollo-Soyuz hit home because they harnessed images of Russian technological backwardness and untrustworthiness. The Senator summoned the ghosts of Vladimir Komarov and the *Soyuz 11* crew as verifiable Lost Cosmonauts to incriminate America's new partner and bolster his emotionally manipulative invocation of the astronauts as cherished heroes that needed protecting.

Proxmire was unconvinced by Fletcher's assurances that the Soviets had provided detailed information on the *Soyuz 11* tragedy.[194] A launch failure of a Soviet Soyuz spacecraft intended to dock with the *Salyut 4* on 5 April 1975 reignited Proxmire's crusade against Apollo-Soyuz.[195] In the Senate four days after the failure, Proxmire called on the CIA to produce an assessment of the Soyuz's safety record. Reiterating the points he had made to Fletcher, he criticised Soviet 'quality control' for the Soyuz programme's '28-percent failure rate'.[196] A CIA briefing for Proxmire and the Senate Appropriations subcommittee that he chaired failed to reassure him as the Senator was still demanding the mission be postponed in early July 1975, just weeks before the launches

[189] Ezell and Ezell, *The Partnership* (1978), pp. 282, 308-9; see also James Oberg, *Star-Crossed Orbits* (2002), p.330; Karash, *The Superpower Odyssey*, (1999), p. 120.
[190] Heppenheimer, *The Space Shuttle Decision*, (2002), pp. 183-4, 329; 413; Stafford, *We Have Capture* (2002), p.176.
[191] Robert M. Behr to Henry A. Kissinger, 'Multinational Participation in Future Space Flights', 5 December 1969, Space Foreign Cooperation 1970 (February 69- Nov 70),[2 of 2], Box 392, NSC Subject Files ,National Security Council Files, Nixon Library.
[192] 'Proxmire hesitant on Soyuz-Apollo', *The Baltimore Sun*, 6 September 1974, p. A4.
[193] William Proxmire to James C. Fletcher, 3 September 1974, Record Number: 4158 'George M. Low Correspondence 1974', NASA History Office.
[194] James C. Fletcher to William Proxmire, 19 September 1974, Record Number: 4158 'George M. Low Correspondence 1974', NASA History office; For the information that NASA received relating to *Soyuz 11* see George M. Low to James Fletcher, Gen. Holloway, Chester M. Lee, 23 October 1973, Record Number: 13673 'George M Low Papers US/USSR Affairs', NASA History Office.
[195] Ezell and Ezell, *The Partnership* (1978), pp. 282.
[196] 94th Congressional Record, Daily Edition, 9 April 1975, (Statement of Sen. William Proxmire), p. S5527.

were scheduled.[197] *The Partnership* quotes Tom Stafford's dismissal of Proxmire as an opportunist with no prior record of concern for astronaut safety, but there was more to his critique than the kneejerk opposition of a routine naysayer.[198] Proxmire's disdain for the mission's 'intangible' diplomatic benefits demonstrates that his critique was political as well as fiscal. His focus on astronaut safety was politically astute, playing as it did to a resonant image of Russian technological backwardness and communist callousness. Here was yet another instance where the competitive rhetoric of the 1960s threatened to wreck the cooperation of the 1970s.

The third principal critique of the ASTP alleged that NASA had debased itself by cooperating with the propagandistic Soviets. The American programme was not above grandstanding and showmanship; bringing a golf club or a flag to the Moon had little to do with science, but the dichotomy between Soviet spectacle and NASA's sober-minded focus on science was firmly rooted in the American imagination. A *Chicago Tribune* editorial entitled ''Russian Roulette' in orbit?' contrasted the Soviet programme's 'flamboyance' and 'scientifically worthless' propaganda with America's 'more methodical approach'.[199] Given the emphasis presidential rhetoric and NASA publicity placed on the docking itself, ignorance and confusion abounded as to what the project's purpose was beyond this space 'handshake'. Tellingly, in September 1974, NASA Deputy Administrator Low requested a detailed briefing on the cosmonauts and astronauts' planned activities during the mission after a conversation with the US and Soviet crews had revealed, 'I know very little about what we will do jointly in space while docked.'[200] Symbolic activities dominated the mission's post-docking itinerary; in addition to speaking to President Ford, the crews tried each other's space cuisine, exchanged flags and gifts and described their homelands to television viewers at home.[201] Whilst space symbolism was not new, detente's critics argued that ASTP represented a worrying new nadir for such showmanship: NASA was sullying its glorious Apollo legacy by emulating its new communist partners.

NASA needed congressional support to fund the ASTP. Following an April 1972 meeting with prominent legislators, including Olin 'Tiger' Teague, the Texan Democrat who chaired the House Committee on Science and Astronautics, Administrator Fletcher informed the White House that a US-Soviet docking mission would receive 'large liberal support' and conservatives would fall into

[197] 'CIA Agrees To Brief Proxmire Panel on Soviet Manned Space Program', *Aerospace Daily,* 23 April 1975, p. 25, clipping in Record Number: 7462 'ASTP General April-June 1975', NASA History Office.
[198] Ezell and Ezell, *The Partnership* (1978), pp. 308-9.
[199] 'Russian roulette in orbit?' *Chicago Tribune*, 6 July 1975, clipping in 'NASA Current News July 1975', Record Number: 7497 'ASTP Flight Official', NASA History Office.
[200] George M. Low to Associate John Yardley, 'ASTP Joint Activities', 13 September 1974, Record Number: 7460 'Apollo-Soyuz Test Project ASTP 1974', NASA History Office.
[201] Ezell and Ezell, *The Partnership*, (1978), pp. 329-40.

line 'providing we held to the constant NASA budget during the 70's (sic).'[202] This proved to be wishful thinking as some staunch supporters of the space programme like Teague found cooperating with communists a repugnant prospect.[203] In his insider's history of the committee, Ken Hechler (Dem., WV) describes how 'from the start, committee members were deeply split on the issue' with Teague having opposed US-Soviet space cooperation since Kennedy's 1963 U.N speech proposing a joint lunar mission.[204] In an interview published on the front page of the *Houston Chronicle* on 7 January 1973, Teague described Apollo-Soyuz as 'strictly a political, psychological effort', relating how his August 1972 visit to the USSR had prompted 'strong reservations as to the sincerity of the Soviets in this programme'.[205] Teague's distaste for space cooperation manifested itself in repeated challenges over the mission's lack of scientific content. In May 1973, he wrote to Fletcher demanding that the Apollo mission include enough experiments to be justifiable on its own in the event of a Soviet withdrawal for political or technical reasons.[206] Teague's attempts to increase the Apollo spacecraft's experimental payload were the indulgences he paid to absolve the sin of cooperating with the communists.

Whilst Teague managed to assuage his conscience, other Cold Warriors used Apollo-Soyuz to draw attention to the USSR's sordid human rights record. By 1975, anticommunists such as neoconservative icon Senator Henry 'Scoop' Jackson (Dem. WA) were articulating a moral critique of detente that characterised the policy as a betrayal of totalitarianism's victims, particularly Soviet Jews and dissidents of the intelligentsia. Jackson had co-sponsored the Jackson-Vanik Amendment of the 1974 Trade Act, a touchstone of anti-detente legislation. A response to the decision to grant the USSR 'Most Favoured Nation' status, the Jackson-Vanik Amendment had sought to pressure the Soviet regime into easing its domestic repression by restricting US trade with countries that had poor records on human rights and freedom of movement.[207] On the eve of the mission, the Jewish Defence League (JDL) protested detente by burning a model rocket outside the Soviet mission to the UN in New York, with one protester yelling, 'Just as this rocket does not work, so doesn't detente'.[208] Jackson himself attended a less combative rally at Cape Kennedy on the day of the Apollo launch. A statement released by the protestors referenced the

[202] James C. Fletcher to Hon. Clark MacGregor, 'Conversations with Congressmen Boland, Olin Teague, and Mosher; and Senators Curtis and Allott regarding the Apollo/Salyut docking mission', 14 April 1972, Record Number: 15579 'US-USSR cooperation in space 1971-1974', NASA History Office.
[203] Joan Hoff 'The Presidency, Congress, and the acceleration of the US Space program in the 1970's' in *Spaceflight and the Myth of Presidential Leadership* ed. by Launius, and McCurdy, (1997), pp. 115-6, in 1974 the committee changed its name to House Committee on Science and Technology.
[204] Ken Hechler, *Towards the Endless Space Frontier: history of the Committee on Science and Technology 1959-79*, (Washington DC: US Government Printing Office, 1980), p. 412.
[205] Ibid., pp. 417-8.
[206] For the controversy over ASTP's scientific content and the experiments that were eventually chosen see Karash, *The Superpower Odyssey*, (1997), pp. 116-7; Ezell and Ezell, *The Partnership* (1978)*,* Appendix E. 513-36.
[207] Williams, 'Detente and US Domestic Politics' *International Affairs*, 61, No. 3 (1985), pp. 431-447 (pp. 439-40).
[208] 'J.D.L Burns Rocket Model Here in Protesting Detente', *New York Times,* 16 July 1975, p. 19.

persecution of Jewish dissident scientists in the USSR, arguing, 'Cooperation in space should be matched on Earth'.[209] The JDL and the protestors at the Cape used the attention ASTP attracted to focus attention on the Soviet regime's human rights abuses. To the Jewish protestors, Apollo-Soyuz was a morally compromising charade that presented a falsely benevolent image of the USSR to the world.

Opponents of detente used Apollo-Soyuz's heightened symbolism to deride the project as a fantastical escape from the reality of Soviet oppression exemplified by the plight of dissidents like the exiled novelist Alexandr Solzhenitsyn. A *Chicago Tribune* editorial stated that 'in many ways Mr Solzhenitsyn is the antithesis of all that the Apollo-Soyuz adventure represents'. His persecution symbolised the evil at the heart of the Soviet system that 'cannot be solved by computers and slide rules'. The editorial contrasted the 'earthbound' reality of Solzhenitsyn's persecution with the 'drama' of Apollo-Soyuz, a 'spectacular media event'.[210] In Congress, Robert E. Bauman (Rep., MD) similarly contrasted Solzhenitsyn, 'the closest a human being can come to being an institution of courage and nobility' with Apollo-Soyuz, 'a showpiece of detente'.[211] The *New York Times* was more equivocal arguing that whilst both Solzhenitsyn and Apollo-Soyuz were 'unrepresentative extremes', the dissident's warnings about the Soviet 'dragon' were a timely reminder that detente should not be 'a unilateral expression of fatuous goodwill'.[212] The *Times* later highlighted how Ford had avoided meeting Solzhenitsyn during his 17 July 1975 visit to DC but had nevertheless found the time to call the ASTP crews.[213] Those that invoked Solzhenitsyn argued that he represented a more authentic reality than that presented by space brotherhood. In these juxtapositions, the 'earthbound' dissident shamed the unconvincing 'spectacle' of Apollo-Soyuz's space brotherhood.

As its architects had hoped, the Apollo-Soyuz mission attracted huge media attention. In May 1974, NASA's John Donnelly warned Ford's press secretary that he expected coverage to be 'the heaviest for any mission flown to date, with the exception of *Apollo 11*' with around '3,000 newsmen expected at the Cape for the launch'.[214] Detente's opponents used this media attention to attack space cooperation as a propagandistic charade. A damnatory *Wall Street Journal* editorial by Jonathan Spivak characterised the project as a 'spectacular waste of money', a 'costly

[209] 'Rally for Soviet Jews Marks Cape Liftoff', *The Jewish Floridian*, 17 July 1975, pp. 1A, 3A, available online via <http://ufdc.ufl.edu/AA00010090/02424/1x> [accessed 28 February 2018].
[210] 'Solzhenitsyn and the spacemen' *The Chicago Tribune*, 18 July 1975, P. 2:2 available online via <http://archives.chicagotribune.com/1975/07/18/page/16/article/solzhenitsyn-and-the-spacemen> [accessed 28 February 2018].
[211] 94th Congressional Record, Daily Edition, 15 July 1975, Statement of Robert Bauman H6821-2.
[212] 'Dragon or Handshake?', *New York Times*, 12 July 1975, p. 24.
[213] James M. McNaughton, 'Ford Now Trying to Arrange Solzhenitsyn Meeting', *New York Times*, 18 July 1975, p. 4.
[214] John Donnelly to Ronald Nessen, 7 May 1975, Folder: 'P750152-1437 thru P750157-1537' (55-74), Box 157C, P-Reel Microfilm Printouts, Entry Number 454: Central Foreign Policy Files, Record Group: 59 General Records of the Department of State, NARA.

space circus' accompanied by an 'extraordinarily high pitch' of propaganda that left little time for serious science. He concluded by stating the flight 'demonstrates politics and international PR should be banned from orbit.'[215]

Spivak's vitriol was exceptional but his judgement of Apollo-Soyuz as a triumph of style over substance was widely shared. In a *Washington Post* comment piece, Joseph Kraft highlighted the mission's 'emptiness', a one-off 'space spectacular' that presented a false image of Soviet scientific-technological parity.[216] Kraft's critique implied that NASA had compromised its longstanding commitment to scientific inquiry, a crucial means by which the American programme had differentiated itself from its Soviet counterpart. The *Post*'s editorial on the flight hailed the bravery of its crews but argued the 'joint mission is nonetheless political', and its inspiring imagery could not mask 'the reality ...that space is a theatre for the hopes of man but not an analogy for earthbound affairs.'[217] Even the *New York Times*, which had vigorously campaigned for space cooperation, ran an article in which historian of Soviet science Loren R. Graham contended that Apollo-Soyuz's 'spectacular picture' did not reflect the normal experience of US-Soviet scientific cooperation, so often throttled by Soviet secrecy and bureaucracy.[218] *The Los Angeles Times* editorial cartoon titled '...And One Giant Leap for PR' paraphrased Armstrong's immortal words to argue the American space programme had lost its way. It succinctly captured the prevailing assessment of the flight by depicting the two spacecraft joined together not by the much-vaunted Androgynous Docking Adaptor, but by a briefcase labelled 'Madison Avenue'.[219] NASA had tarnished its legacy of scientific achievement by choosing a partner accustomed to propaganda, secrecy and deceit.

During detente, both NASA and the White House attempted to harness the Soviet space programme's unique role as a surrogate for the socialist superpower. For NASA, an alliance with its Soviet rivals was a way to assert its continued political utility as a crucial diplomatic tool in an era defined by superpower collaboration. Meanwhile, the mission's political sponsors hoped to draw on space cooperation's emotive and symbolic power to present US-Soviet detente as a future-oriented foreign policy. The dramatic spectacle of former competitors working together in the vacuum of space would be a reproach to those who doubted the wisdom of collaborating with America's chief ideological antagonist. Ultimately, though, the onus that detente's architects placed on Apollo-Soyuz as an idealised and inspirational instance of US-Soviet cooperation proved

[215] Jonathan Spivak, 'The First Space Handshake', *The Wall Street Journal*, 22 July 1975, p. 16.
[216] Joseph Kraft, 'Detente in Space', *The Washington* Post, 15 July 1975, p. A19.
[217] 'Apollo-Soyuz', *The Washington Post*, 17 July 1975, p. A26.
[218] Loren R. Graham, 'Other Scientific Exchanges With Russia Are Not So Smooth', *New York Times*, 20 July 1975, p. E8 for the paper's advocacy of space cooperation see: Harry Schwartz, 'Why Not a Soviet-American Gemini?', *New York Times*, 14 June 1965, p. 32; 'Visitors From Moscow', *New York Times*, 25 October 1969, p. 32; 'Cooperating in Space', *New York Times*, 13 December 1971, p. 38; Detente in Space', *New York Times*, 15 February 1975, p. 28.
[219] '...And One Giant Leap for PR' *The Los Angeles Times,* 15 July 1975, p. 113.

to be a difficult burden. Detente's opponents appropriated the mission for their own symbolic use, drawing on the space race's image of the Soviets as envious of American technological superiority and obsessed with 'empty' propaganda goals. NASA claimed Apollo-Soyuz had opened a 'window' to the Soviet Union. Detente's detractors alleged it had opened a Pandora's Box: that by cooperating with the Soviets, America's space programme had left itself vulnerable to both technology transfer and spiritual corruption. As we shall see, the debate over whether Apollo-Soyuz symbolised detente's zenith or nadir continued into the 1980s, though astronauts and cosmonauts would not fly together as comrades until the Shuttle-*Mir* programme of the 1990s.[220]

[220] Von Bencke, *The Politics of Space*, (1997), p. 105.

Chapter Three | The Tortoise Takes the Lead: Constructing Kosmograd during the US Crewed Spaceflight Hiatus 1975-1981

'We believe that permanently manned space stations with interchangeable crews will be mankind's pathway into the Universe'- Leonid Brezhnev, 1978.[1]

On 1 July 1976, the Smithsonian Institution's National Air and Space Museum (NASM) opened its doors to the public, the ribbon across its main entrance cut by a robotic arm activated by a radio signal sent from America's Mars-bound *Viking* spacecraft. Presiding over the Republic's bicentennial celebrations, President Ford described the new museum, crammed to the rafters with artefacts from the nation's glorious history of aerospace innovation, as 'America's birthday gift to itself'.[2] The NASM was a stupendous success. On the bicentennial day itself the museum welcomed 65,000 visitors who queued to touch a real Apollo Moon rock and marvel at artefacts like the *Wright Flyer III* and the full-size Apollo-Soyuz and *Skylab* mock-ups.[3]

Almost three years later at a routine 'Exhibits Status Meeting' the Museum's curatorial staff sat down to discuss updating exhibition signage and how to commemorate the *Apollo 11* lunar landing's 10th anniversary. Amongst the curatorial admin discussed were necessary updates to the 'Apollo to the Moon' gallery's Manned Space Flight Timeline, a display of bronze discs for each crewed spaceflight to date. The meeting's minutes noted that nine new Soviet discs were needed to bring the timeline up to date.[4] American astronauts had not travelled to space since Apollo-Soyuz four years before but the USSR's cosmonauts were visiting their Salyut space stations at a rate that curators had trouble keeping up with. The meaning of these missions divided Americans: some watched with the interested curiosity of the Smithsonian's curators; others saw the disquieting signs of a growing Soviet stranglehold over Low Earth Orbit which the Free World might soon be powerless to resist.

Between the final Apollo flight in July 1975 and the Space Shuttle's first orbital mission, *STS-1*, in April 1981, the American crewed spaceflight programme experienced a hiatus. Whereas

[1] Gerald W. Driggers, 'Space Station: Pathway to the Universe', *L-5 News,* 5, 4, April 1980, p. 5
[2] Emily and Per Ola D'Aulere 'There's No Place Like The Smithsonian', *The Reader's Digest,* October 1976, 'American Scene: Second Hottest Show in Town', *Time Magazine*, 17 January 1977; Clippings available in 'Press, Publicity 1974-1971 (1 of 2)'; Box 11, Record Unit 346: 'Deputy Director NASM C. 1961-1982', Smithsonian Institution Archives, Washington DC (hereafter 'SI Archives'); video footage of the ribbon cutting ceremony can be viewed via Smithsonian Air and Space Museum, 'Ribbon Cutting to Open the National Air and Space Museum - July 1, 1976' <https://www.youtube.com/watch?v=nEKMV-_-k3k> [accessed 28 February 2018].
[3] Marilynn Preston, 'Air and Space Museum touches our flights of fancy', *Chicago Tribune*, 17 February 1977, pp. 1-4, clipping available in, 'Press, Publicity 1974-1971 (1 of 2)'; Box 11, Record Unit 346: 'Deputy Director NASM C. 1961-1982', SI Archives.
[4] 'Exhibits Status Meeting #5-9 April 20, 1979', 30 April 1979, p.6, '*Apollo 11* 10th anniversary museum events July 16.24 1979' in Box 6, Record Unit 348: National Air and Space Museum (U.S.), Dept of Space Science and Exploration, c. 1960-1986', SI Archives.

spaceflight historians have treated this period as an interlude between more significant eras, this chapter uses the hiatus as its temporal limits to actively engage with how the astronauts' absence from orbit affected American space culture. Historians assert the Cold War's continued influence on American space policy during this period by arguing that the Carter administration decided not to cancel the Space Shuttle when the Pentagon defended the spacecraft's military utility.[5] Additionally, a growing literature on US-Soviet cooperation discusses why Apollo-Soyuz was not repeated during the Cold War.[6] However, the juxtaposition between astronaut inaction and concurrent Soviet activity has been underappreciated. The sole reference to the Soviets' Salyut space station programme in Heppenheimer's history of the Space Shuttle's development is as a cautionary tale about the discomfitures of long-duration spaceflight.[7] Although William Burrows highlights the 1974 polemical work of pseudo-cosmokremlinology *Soviet Conquest from Space* to demonstrate continuing concerns about Soviet activities, he belittles the Salyuts as a belated, 'last, sputtering reach' for *Apollo 11*'s prestige.[8] The hiatus is the fulcrum of this thesis because it bridges the ASTP's cooperative bonhomie and Reagan-era fever-dreams of space warfare, providing the necessary context for the 1980s' frantic warnings about the intangible but emotive concept of space 'leadership'.

America's crewed spaceflight hiatus coincided with a string of successful Soviet crewed missions to the *Salyut 5* and *Salyut 6* space stations. In the early 1970s the Soviet programme reached its nadir, enduring a series of misfortunes which evoked the Plagues of Egypt in their catalogue of unrelenting misery. Whilst astronauts explored the Moon and visited their spacious *Skylab* space station, the cosmonauts witnessed the N1 lunar programme's collapse, the *Soyuz 11* tragedy, the April 1973 explosion that crippled the (non-crewed) *Salyut 2* space station and two additional non-crewed space station failures.[9] The visits by *Soyuzes 17* and *18* to the *Salyut 4* station in 1975 are widely held as the turning point that prefigured the Soviet programme's future of carefully and steadily pushing back the limits of human endurance in space.[10] *Salyut 4* was followed by

[5] Hays, 'NASA and the Department of Defense' in *Critical Issues in the History of Spaceflight* ed. by Dick and Launius, (2006), pp. 199-238, p. 226; T. A. Heppenheimer, *Development of the Space Shuttle, 1972-1981* (Washington, DC: Smithsonian Institution, 2002), pp. 351.
[6] Von Benke, *The Politics of Space* (1997), p.87; Karash, *The Superpower Odyssey* (1999), pp. 130-5; Long Callahan 'Sustaining Soviet American collaboration 1957-1989' in *NASA in the World* ed. by Krige, Long-Callahan and Maharaj, (2013), pp. 143-7.
[7] Heppenheimer, *Development of the Space Shuttle, 1972-1981* (2002), pp. 260-1; Neal briefly mentions the impact of Salyut missions in NASA rationales for a permanent space station *Spaceflight in the Shuttle Era and Beyond* (2017), pp. 139-40.
[8] Burrows, *This New Ocean* (1998), pp. 514-6.
[9] Harvey, *Russia in Space* (2001), pp. 15-6; for Skylab see David Shayler, *Skylab: America's Space Station* (Chichester: Springer-Praxis, 2001); Charles D. Benson and William David Compton, *Living and Working in Space: A History of Skylab* (Washington DC: NASA, 1983), available online via <https://history.nasa.gov/SP-4208/contents.htm> [accessed 28 February 2018].
[10] Johnson, *Handbook of Soviet Manned Spaceflight* (1979), pp. 248-9; Oberg, *Red Star in Orbit* (1981), p. 134; Siddiqi, *Challenge to Apollo* (2003), pp. 839-40; Robert Zimmerman, *Leaving Earth: Space Stations, Rival Superpowers, and the Quest for Interplanetary Travel* (Washington DC: Joseph Henry Press, 2003), pp. 91-4.

Salyut 5 the last of the military '*Almaz*' (Diamond) variants in June 1976, but it was with *Salyut 6* between September 1977 and April 1982 that the programme made its greatest leap forward. The station's dual docking ports allowed for robotic '*Progress*' capsules to deliver supplies and for the station's primary crew to receive brief visiting crews, and potentially rotate its personnel.[11] This key innovation pushed mission durations to ever-longer lengths and the USSR seemed poised to realise the astrofuturist dream of constructing a permanent space station.

The hiatus was an ever-present psychic backdrop to American reaction to these activities. NASA launched several highly significant robotic missions between 1975 and 1981. These included the *Viking* missions to Mars and the *Voyager* interplanetary probe which came equipped with an iconic golden disc designed to inform extraterrestrial passers-by about life on Earth.[12] Apollo-era roles were reversed as American propagandists enthused about the esoteric treks of their lonely robotic travellers whilst the Soviet programme beamed back footage of its spacefarers settling the orbital frontier. This lack of reassuring American competition amplified Soviet propaganda, creating a disquieting vision of communist ascendency in space at a time when detente was unravelling. The juxtaposition of Soviet purposefulness and American inaction tapped into a pervasive cultural anxiety over American 'malaise' stymieing efforts to resist communist aggression in the Third World.

This chapter examines three facets of American reaction to Soviet space activities during the hiatus. It begins by using declassified documents from the Ford and Carter Presidential Libraries to explore how space cooperation curdled into mistrust and recrimination by charting the demise of Apollo-Soyuz's would-be successor: the Shuttle-Salyut project. Its second section tells a parallel story of how mounting anxiety about the Soviet antisatellite (ASAT) weapon and space station programmes fuelled fears of America losing its hard-won space leadership. These fears resurrected claustrophobic Sputnik-era visions of outer space as a military high-ground that could be used to dominate the Earth. Fears of Soviet space ascendency helped convince President Carter to reaffirm the government's commitment to NASA's struggling Space Shuttle. Finally, this chapter concludes by discussing how certain members of America's 'pro-space movement' sought to reconcile the growing Soviet presence in Low Earth Orbit with their belief that outer space was America's next great frontier. In addition to illuminating space exploration's place at a critical juncture of the Cold War, this chapter demonstrates how worries about the Soviet space threat continued to flare with increases in superpower tension and periods of astronaut inactivity long after its Sputnik-Vostok golden age.

[11] Oberg, *Red Star in Orbit* (1981), pp. 169-170, 179; Zimmerman, *Leaving Earth* (2003), pp. 141-162.
[12] Burrows, *This New* Ocean (1998), pp. 468-93.

The End of the Space Circus: Shuttle-Salyut and the Collapse of Space Detente

'Let me say this as fairly and gently and diplomatically as I can: In terms of who gained what from the Apollo-Soyuz mission, we were had!'- Apollo 7 Astronaut Walter Cunningham, 1977.[13]

In September 1976, a little more than a year after Leonov and Stafford's orbital embrace, Henry Kissinger informed President Ford that superpower relations were 'dangerously sour'.[14] The following May, both nations managed to extend the 1972 Space Cooperation Agreement for another five years with NASA and the Soviet Academy of Sciences pledging to explore the feasibility of a docking mission between the Space Shuttle and a Salyut space station. However, cooperative discussions became increasingly difficult to sustain in an atmosphere of mounting Cold War tensions. By 1980, the Shuttle-Salyut scheme had withered and died.[15] US-Soviet space cooperation persisted in several fields, most notably the BION biological satellite programme which continued to orbit American experiments aboard modified Soviet Vostok capsules throughout the chill of the 'second Cold War' of 1979-1984.[16] Additionally, Soviet research ships would visit NASA's Wallops Island facility in Virginia to participate in collaborative meteorological sounding rocket experiments.[17] Although these exchanges deepened transnational ties between scientists across Cold War boundaries, such unobtrusive projects largely flew under the media radar. Shuttle-Salyut negotiations attracted greater attention, and thus criticism, because they discussed crewed programmes. The human element inevitably led to unflattering comparisons with Apollo-Soyuz, increasingly derided as an extravagant spectacular that had fuelled technology transfer. This section explores why Shuttle-Salyut never made it out of the initial exploratory studies phase; it argues that the project was damned with the supposed sins of its forebear as the collapse of US-Soviet detente encouraged the idea that space cooperation was a dangerous fantasy.

US-Soviet relations declined precipitously during the Ford and Carter administrations. Detente's failure to energise and engage the American public was exemplified by Ford's decision to purposefully excise 'detente' from his vocabulary during the 1976 presidential election

[13] Nicholas C. Chriss, 'U.S., Russians to Begin Discussions on Resuming Cooperative Space Missions' *Los Angeles Times,* 10 November 1977, p. 1.
[14] H. A. Kissinger to The President, 'Your Meeting With Gromyko', 30 September 1976, 'USSR (44)', Box 19, Country File: USSR (32), Presidential Country Files for Europe and Canada, National Security Adviser Files, Ford Library.
[15] Office of Technology Assessment, *US-Russian Cooperation in Space* (OTA-ISS-618), (Washington DC: Government Printing Office, 1995), p. 43, available online via: <https://www.princeton.edu/~ota/ns20/alpha_f.html> [accessed 28 February 2018].
[16] Kristen Edwards, 'The US-Soviet/Russian Cosmos Biosatellite Program', *Quest*, 7,3,(1999), pp. 20–35; Long-Callahan, 'Sustaining Soviet-American Collaboration 1957-1989' in *NASA in the World* ed. by Krige, Long-Callahan, Maharaj (2013), pp. 143-7; Richard C. Mains and Eric Toldi, 'The Bion Story: A U.S. Status Report', American Institute of Aeronautics and Astronautics (AIAA),SPACE 2015 Conference and Exposition, AIAA SPACE Forum, (AIAA 2015-4616),2015.
[17] 'Soviet Ship Arrives Next Month for Joint Rocket Tests' in 'NASA Press Kit: Joint American-Soviet Particle Intercalibration Project Release No: 78-71', 15 May 1978, Record Number 1558: 'US-USSR Cooperation in Space 1975-1979', NASA History Office.

campaign.[18] Drawing on recent scholarship's emphasis on the global nature of the Cold War, Daniel J. Sargent argues that 'Detente did not resolve Cold War rivalries; it stabilised them and displaced their violence to the Third World'.[19] During the late 1970s, American policymakers were forced to confront this fact. The USSR's increasingly 'adventurist' foreign policy which sought to fortify Marxist political forces in the Third World culminated in an invasion of Afghanistan in December 1979 to shore up a struggling client regime. The Afghan Crisis and fears of a Soviet strategic weapons build-up vindicated neoconservative depictions of the USSR as a megalomaniacal power bent on world domination and detente as an elaborate communist deception.[20] Pressure from the right eventually compelled Carter to abandon his wavering commitment to detente and embrace a more confrontational strategy of containing communism.[21] Mounting American disgust at Soviet behaviour substantially reduced the appeal of crewed spaceflight cooperation. With the Soviet Union transformed from partner to pariah, astronaut-cosmonaut handshakes became difficult to justify.

NASA championed a symbolic union between the shuttle and Soviet space station to prove crewed spaceflight's continuing utility as a diplomatic tool. Furthermore, the scientific dividend from accessing Salyut's long-duration spaceflight capabilities would hopefully rebuff criticisms that Apollo-Soyuz had been a frivolous propaganda spectacular. NASA's spokespersons had always stressed that Apollo-Soyuz was a single mission commitment but a 1975 CRS report had correctly observed that much of ASTP's 'justification would be lost if nothing further was planned'.[22] Intra-agency discussions about the feasibility of a Shuttle-Salyut sequel to the joint flight had begun in May 1975, and George Low received 'very positive indications' of Soviet interest during his visit to Baikonur.[23] In the year following Apollo-Soyuz, Ford's NSC Staff expressed concern at the lack of Soviet-NASA contact but this silence was broken with a meeting between Arnold Frutkin, NASA's Acting Administrator Dr Alan Lovelace and Academicians Boris

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[18] Jussi M. Hahnhimaki, *The Rise and Fall of Detent American Foreign Policy and the Transformation of the Cold War* (Washington DC: Potomac Books, 2013), p. 77.

[19] Daniel J. Sargent, *A Superpower Transformed: The Remaking of American Foreign Relations in the 1970s* (Oxford: Oxford University Press, 2015), p. 247.

[20] Garthoff, *Detente and Confrontation* (1994), pp. 1145-6; Anne Hessing Cahn, *Killing Detente: The Right Attacks the CIA* (University Park, PA: The Pennsylvania State University Press, 1998), pp. 68, 185-6;Keith L. Nelson, *The Making of Detente* (Baltimore, MD: The Johns Hopkins University Press, 2007), pp. 149-50; Hahnhimaki, *The Rise and Fall of Detente* (2013), p. 149.

[21] Yael S. Aronoff, 'In like a Lamb, out like a Lion: The Political Conversion of Jimmy Carter.', *Political Science Quarterly*, 121, 3, (2006), pp. 425–449 (p. 426); Dan Caldwell, 'The Demise of Detente and US Domestic Politics' in *The Fall of Detente: Soviet American Relations during the Carter Years* ed. by Odd Arne Westad (Oxford: Scandinavian University Press, 1997), pp. 95-117 (p. 109-11).

[22] Vikki A. Zegel, *Background and Policy Issues in the Apollo-Soyuz Test Project (Eksperimental'ney Polet Appolon-Soyuz),*75-19-SP (Washington DC: Congressional Research Service, 1975), p. 45, available in Record Number 007459 'ASTP 1972-73', NASA History Office.

[23]Arnold W. Frutkin to Mr William G. Hyland, 'Pending Bilateral Space Agreement', 31 January 1977, Record Number: 15527 'Shuttle Salyut Documentation', NASA History Office; George M. Low to Henry A. Kissinger, 30 May 1975, National Aeronautics and Space Administration(2),5/1/75-6/30/75, Box 14, Presidential Agency File, National Security Advisor Files, Ford Library.

Petrov and Vladlen Vereshchetin of the Intercosmos Council in October 1976. The delegations discussed a Shuttle-Salyut mission as a medium term goal which might eventually result in a possible 'international space platform'. NASA, reluctant to set a course until after the 1976 election had been decided, avoided signing any definitive commitment.[24] Shuttle-Salyut reflected the central argument of 1970s detente: that USSR could be socialised through agreements that encouraged it to form cooperative habits. Unfortunately, this required a patience that was in increasingly short supply.

An ambitious cooperative programme would also provide an additional political rationale for the Space Shuttle. During the 1974 negotiations for its FY 1976 budget, NASA had argued that cancelling the shuttle would not only cede the prestigious field of human spaceflight to the Soviets, but also damage superpower relations by removing a vehicle for cooperative programmes.[25] After the 1976 election saw Ford ousted by the Democrat challenger, former Governor of Georgia Jimmy Carter, NASA quickly began selling space cooperation's benefits to the new administration. In January 1977, Arnold Frutkin informed NSC staff that though any space agreement would focus on feasibility studies rather than a binding commitments, a mission to Salyut would allow the American programme to profit from the station's 'much longer stay-times in orbit', potentially paving the way towards a dedicated joint, or independent, 'space platform'.[26] A speech he gave the following month characterised Shuttle-Salyut as the next logical step in a cooperative programme. Frutkin acknowledged criticism of the ASTP by emphasising scientific as well as diplomatic benefits; cooperation, he argued, had 'to mean something'. Space cooperation 'couldn't help but be an educational process for both sides', but this did not mean allowing technology transfer.[27] Motivated by its need to sustain the Space Shuttle through its lengthy and expensive development process, NASA argued Shuttle-Salyut would realise Apollo-Soyuz's ideal: a mission of rigorous science and tangible diplomatic benefits that capitalised on its participants' unique capabilities.

Carter's May 1977 decision to renew the 1972 US/Soviet cooperative agreement suggested that the road to Shuttle-Salyut would be paved with memoranda of understanding and grandiose toasts to future cosmic adventures. It would not. The Carter administration turned out to be more sceptical of space cooperation's diplomatic rationale and began using space cooperation

[24] Robert McFarlane to Gen. Scowcroft, 'Joint US-Soviet Space Mission', 29 July 1976, 'USSR – Space 1976 WH', Box 37, Country File: USSR-Soviet Jewry, 1974 WH, NCS Europe, Canada, and Ocean Affairs Staff, National Security Advisor Files, Ford Library; Portree, *Thirty Years Together* (1993), pp. 24-7.
[25] Ronald M. Konkel, 'Issue Paper, National Aeronautics and Space Administration: Space Shuttle and Alternatives in the U.S. Manned Space Flight Program' 25 November, 1974; NASA, 1974: Budget for FY 1976 (1), Box 20, 'Glenn R. Scheede Associate Director for Energy and Science Files: 1974-77', Domestic Council Files, Ford Library.
[26] Arnold W. Frutkin to Mr William G. Hyland, 'Pending Bilateral Space Agreement', 31 January 1977, Record Number: 15527 'Shuttle Salyut Documentation', NASA History Office.
[27] Dale Rodebaugh, 'U.S.-Russian Space Projects Valuable, Says NASA Official', *San Jose Mercury*, 2 February 1977, clipping in Record Number 726: 'Frutkin, Arnold W.', NASA History Office.

discussions in its more aggressive pursuit of 'linkage' between different areas of the US-Soviet relationship. Carter's National Security Advisor Zbigniew Brzezinski believed that Apollo-Soyuz was an empty 'Spectacular' that had facilitated Soviet technological espionage. Under Brzezinski, the NSC became the loudest voice within the administration calling for the project's cancellation. The Office of Science and Technology Policy (OSTP) failed to mount a convincing defence of space cooperation and the White House began punishing bad Soviet behaviour by postponing Shuttle-Salyut meetings, just the sort of 'stonewalling' that Frutkin had previously criticised the USSR for. Shuttle-Salyut's Joint Working Groups were no longer oases of gentlemanly respect between apolitical engineers, but a way to send opaque smoke signals of diplomatic displeasure. In the early 1970s, cooperation in crewed spaceflight's visibility and symbolic resonance had been its principal attraction; the collapse of detente turned this into a critical liability.

Brzezinski viewed space cooperation almost entirely through the negative prism of potential technology transfer and this profoundly influenced NSC views of Shuttle-Salyut. In a May 1977 memo, Robert A. Rosenberg, the NSC's resident space expert, attempted to assuage his superior's concerns by echoing NASA's view that such fears were overstated. If anything, he contended, space cooperation had provided a 'wealth of information' about the secretive Soviet programme. Rosenberg reiterated space cooperation's diplomatic rationale: the ability to perform scientific experiments together 'of benefit to mankind' was 'basically a political benefit'.[28] Brzezinski's anxieties resurfaced the following month when he received a memo from Presidential Science Adviser Dr Frank Press that noted the technological disparity between what the Soviets could offer with Salyut and the 'enormous technical leap' that the shuttle represented. Press also worried that NASA might be pushing Shuttle-Salyut as a precursor for a 'large and expensive' joint US-Soviet space station programme.[29] The shuttle's involvement exacerbated engrained anxieties about technological espionage. As well as having been designated the principal carrier for American military satellites, NASA's reusable spacecraft had been sold on hyperbolic promises that it would revolutionise space travel.[30] Ill-considered cooperation risked compromising a symbol of America's future as well as its security. Informing Carter of his concerns, Brzezinski referenced 'public unease over the previous collaboration in space' and quoted Press on the

[28] Robert A. Rosenberg to Zbigniew Brzezinski, 'NASA/Soviet Shuttle/Salyut Agreement', 17 May 1977, Folder, 4, Box 59, Brzezinski Material: General Odom File, RAC Number: NLC-12-59-3-54-2, Jimmy Carter Presidential Library, Atlanta GA (hereafter 'Carter Library'),NOTE: citations including an 'RAC Number' designation are declassified documents derived from the Remote Archives Classification (RAC), project terminal accessible at the Carter Library. For more information see <https://www.archives.gov/presidential-libraries/declassification/status.html> [accessed 28 February 2018] For Rosenberg's career see US Air Force Website, <http://www.af.mil/About-Us/Biographies/Display/Article/105798/major-general-robert-a-rosenberg/> [accessed 28 February 2018].

[29] Zbigniew Brzezinski to Cyrus Vance, 'US-USSR Agreements on Cooperation in Space', TAB A 'Frank Press to Zbigniew Brzezinski, 19 May 1977', 6 June 1977, Folder 2, Box 152, NSC Staff Material, RAC Number: NLC-17-152-2-4-9, Carter Library.

[30] Kay, *Defining NASA* (2005), p. 112.

technological disparity between the Shuttle and Salyut. The National Security Advisor promised to 'monitor this issue more closely because it could be a source of political embarrassment.'[31]

Nixon had pursued space cooperation because of its image-making potential. Under Carter interest centred on whether Shuttle-Salyut negotiations could be used as leverage to achieve specific strategic goals. A September 1977 report by an Interagency Committee on US-Soviet Space Cooperation chaired by Frank Press argued that it could, but that this was by no means a certainty.[32] The State Department concurred with NASA and the Pentagon that cooperative activities should be maintained at their present level, but disputed the idea that cooperation in crewed spaceflight could be used for leverage in extracting an ASAT arms control agreement from the Soviets.[33] Though cooperative discussions would improve the 'atmospherics' of ASAT talks, Soviet unilateral space capabilities, including a rumoured 'somewhat competitive' shuttle programme 'underway for the early 1980s', would ensure the communists maintained 'room to manoeuvre'.[34] Brzezinski accepted the report's findings: discussions would continue as trade-offs between cooperation and ASAT talks were explored and the NSC–led interagency committee would be able to veto the implementation or extension of cooperative projects.[35] This strategy exemplified Brzezinski's policymaking approach, particularly his belief that foreign policy decision-making should be consolidated within the NSC apparatus at the expense of the State Department and his willingness to use 'measured' pressure to extract Soviet concessions.[36] Inspirational imagery was no longer enough; space cooperation must begin paying its way by reducing the Soviet military threat from space.

Even factors that seemed to be arguments in favour of Shuttle-Salyut reflected the return of more competitive rationales. In May 1977, the Carter administration had decided to reverse Nixon and Ford's 'policy decision to keep the Intelligence Community out of the cooperative process'.[37] The NSC may have been unimpressed by the political case for space detente but its intense curiosity about the capabilities of the Salyut stations was a powerful argument for continuing cooperation. In March 1978, cosmonauts Romanenko and Grechko completed a marathon ninety-six-day mission aboard *Salyut 6,* having beaten *Skylab*'s record by eight days.[38] A CIA report the following year catalogued *Salyut 6*'s technological wonders: its ability to rotate crews, its pioneering use of

[31] Zbigniew Brzezinski to The President, 'NSC Weekly Report #13', 20 May 1977, Folder 8, Box 125, Brzezinski Material: Brzezinski Office File, RAC Number: NLC-15-125-8-1-8, Carter Library.
[32] *Review: US-USSR Agreement for Cooperation in Space,* 19 September 1977, p. 1, Folder 6, Box 30, NSC Staff Material, RAC Number: NLC-17-30-6-5-9, Carter Library.
[33] Ibid., pp. 11-2.
[34] Ibid., p. 35.
[35] Zbigniew Brzezinski to Frank Press, 'US-USSR Space Cooperation', 7 November 1977, Folder 11, Box 1, NSC Staff Material: Science and Technology, RAC Number: NLC-30-1-11-10-4, Carter Library.
[36] Hahnhimaki, *The Rise and Fall of Detente*, (2013), p.105.
[37] Robert A. Rosenberg to Zbigniew Brzezinski, 'U.S.-USSR Agreements on Cooperation in Space', 31 May 1977, Folder 2, Box 152, Staff Material: Office RAC Number: NLC-17-152-2-4-9.
[38] Zimmerman, *Leaving Earth*, (2003), pp. 114-135.

robotic 'Progress' resupply vehicles and the materials processing experiments carried out in its '*Splav*' and '*Kristall*' electro-furnaces which might 'enable the Soviets to determine the feasibility of establishing space factories.'[39] Interest in Shuttle-Salyut's potential intelligence dividend testifies to a view of space cooperation as a mask for technology transfer; less a means of defusing Cold War tensions than the venue for a zero-sum game of scientific-technical espionage.

Declassified documents indicate that Shuttle-Salyut Joint Working Group activities were used as intelligence gathering opportunities to probe *Salyut 6*'s secrets. During detente, NASA regularly consulted the Committee on Exchanges (COMEX), an interagency body which advised government agencies involved in exchanges with communist countries and judged whether cooperative projects might result in a net gain for US intelligence.[40] In June 1978, Arnold Frutkin received a confidential memo from the CIA informing him of COMEX's positive verdict on a proposal for the JWG on Space Biology and Medicine to collaborate on experiments studying Hypokinesia (a medical term for slowed or diminished muscle movement). Both the Air Force and the CIA's Office of Scientific Intelligence recommended NASA proceed as 'the US could possibly gain more than the USSR because this is an area in which the USSR has been working for some time.' Collaboration might also produce 'insight into future objectives of Soviet manned spaceflight, both scientific and military.'[41] This was a different window to the USSR from that lauded by Chester M. Lee, one more concerned with revealing Soviet secrets than cooperation's transformative power. CIA interest in *Salyut 6* testifies to how the hiatus amplified the impact of Soviet activities. With America's *Skylab* floating listlessly (its last crew had departed in February 1974), Soviet propaganda about *Salyut 6's* cosmonauts pushing the human body to its limits as they constructed the foundations for orbital industry could not be so easily discounted.

The increasingly acrimonious tone of Soviet-American dialogue threatened Shuttle-Salyut because it damaged the image of the USSR as a responsible potential partner. Garthoff argued that detente collapsed because of the unrealistic expectations that its advocates fostered. This 'myth of detente' crumbled in the face of a 'greatly exaggerated image of relentless Soviet build-up and use of power in a single-minded offensive expansionist policy'.[42] In December 1977, *Apollo 7* astronaut Walt Cunningham had attacked Apollo-Soyuz for fostering dangerous technology

[39] National Foreign Assessment Center, Central Intelligence Agency, *Soviet Salyut-6 Scientific Space Station: The First Manned Phase - September 1977-March 1978*, August 1979. [Secret] pp. iii, 25, <http://nsarchive.gwu.edu/NSAEBB/NSAEBB501/docs/EBB-29.pdf> [accessed 28 February 2018]
[40] For COMEX's establishment and role see Richmond, *Raising the Curtain*(2003), pp. 214-5; For its role in advising NASA see Director of Central Intelligence, 'Committee on Exchanges 1978 Report' Accessed via CIA CREST Database ESDN: RDP80M00596A000300010020-1.
[41] Douglas George to Director of International Affairs National Aeronautical and Space Administration, 'Proposal for a Joint Program Involving Study of Hypokinesia under US-USSR, Joint Working Group on Space Biology and Medicine (BL 04.01)' 7 June 1978, Folder: Bilats Space biology and Medicine, Box 3 (of 5)'1978 Bilats NSC/OSTP Huberman Review)', Accession Number: 255-81-0619, Record Group 255: National Aeronautics and Space Administration, NARA, College Park, MD.
[42] Garthoff, *Detente and Confrontation*, (1994), p. 1141.

transfer. Cunningham argued the Soviet programme 'is for military purposes... it's run by the military, manned by the military... we've always held the edge militarily. So why give the Russians any help in gaining a lever they could possibly use against us?'[43] Cunningham's familiar critique took on a new urgency amidst a perceived Soviet thrust to subjugate the Third World. In March 1978, *Today* juxtaposed a story about Shuttle-Salyut JWG meetings scheduled for that spring and summer with an item noting 'Soviet-American relations appear to have reached their lowest point in more than a year' as the superpowers clashed over 'issues ranging from the Horn of Africa to the neutron bomb.'[44] Shuttle-Salyut talks appeared increasingly anomalous, a belated retread of an earlier mistake rather than a glimpse of a cooperative future.

Zbiginew Brzezinski had never been entirely convinced by Shuttle-Salyut's political-diplomatic rationale and sought stronger linkages between space cooperation and progress in vexatious areas of the US-Soviet relationship. On 1 March 1978, Frank Press responded to Brzezinski's query about agreements which could be cancelled or delayed by describing Shuttle-Salyut as one of the 'agreements we could most easily do without'.[45] The media impact of a major scoop by the aerospace magazine *Aviation Week* later that month reinforced Brzezinski's growing ambivalence about cooperation's ability to dispel Soviet secrecy. In 1977, *Aviation Week* journalist Craig Covault had been allowed to attend several top-secret briefings on the Soviet space effort in return for not publishing a story about a highly classified American spy satellite. During these briefings, Covault learned about early aeronautical tests of a Soviet delta-winged space shuttle prototype and managed to convince his Intelligence Community contacts to let him to publish a story about it.[46] Brzezinski mentioned this article in a March 1978 memo to President Carter, adding he had been delaying Shuttle-Salyut talks because 'I find it hard to see why we should cooperate with the Soviets on this when they have yet to inform us of their space shuttle program.'[47] With Shuttle-Salyut's potential intelligence bounty thrown into question, Brzezinski saw little reason in continuing with negotiations.

In the summer of 1978, the NSC and OSTP discussed delaying Shuttle-Salyut meetings as a way of signalling American displeasure. The Soviet decision to put Anatoly Shcharansky and Aleksandr Ginzburg, dissident scientists who belonged to the 'Helsinki Watch' human rights network, on trial

[43] Jay Silverberg, 'Ex-Astronauts Clash on Space Cooperation', *Today*, 15 December 1977, p. 1A.
[44] Gordon Harris, 'Soviets, U.S Talking Future Joint Ventures, Other Relations Falter', *Today,* 23 March 1978, p. 10A.
[45] Frank Press to Zbigniew Brzezinski, 'Agreements with the USSR', 1 March 1978, Folder 5, Box 215, Donated Historical Material: Mondale, Walter F., RAC Number: NLC-133-215-5-4-6.
[46] Craig Covault, 'The Inside Story of How Aviation Week's Decision to Sit on One Cold War Blockbuster led to Another' AmericaSpace.com, 22 March 2016, <http://www.americaspace.com/?p=93593> [accessed 28 February 2018]; Craig Covault, 'Soviets Build Reusable Shuttle' *Aviation Week and Space Technology*, 20 March 1978, pp. 14-5; John Noble Wilford, 'Soviet Union has Built and Tested Space Shuttle, Magazine Reports', *New York Times*, 21 March 1978 p. 12.
[47] Zbigniew Brzezinski to The President, 'Information Items', 22 March 1978, p. 3, Folder 46, Box B9, NSC Staff Material: Office, NLC-SAFE 17 B-9-46-2-3, Carter Library.

had prompted outrage in the West.[48] Carter had cast himself as a vocal defender of universal human rights and the Communist Party's persecution of dissident scientists was particularly embarrassing given US-Soviet scientific cooperation agreements. Although Frank Press was reluctant to cancel the Shuttle-Salyut studies outright, he recognized that the Soviets regime's continuing recalcitrance meant America should not be seen as chasing cooperation. In June 1978, with Shcharansky and Ginzburg's trial looming, Press suggested delaying a scheduled Shuttle-Salyut JWG meeting whilst hinting 'that this is for reasons connected with the trials'.[49] By this point Carter and Brzezinski had become enthusiastic practitioners of triangulation, using rapprochement with the PRC as a way of compelling Soviet concessions.[50] Brzezinski seized on Press' other proposal to respond to the trials and Soviet intervention in the Ogaden War by extending triangulation into the realm of technology. Postponing a Shuttle-Salyut JWG meeting could be coupled with a proposal to send a high-level delegation to the PRC to discuss scientific-technical cooperation.[51] Brzezinski obtained Chinese agreement during his May 1978 visit to the PRC and the following month it was announced that Press would lead a fourteen member delegation, including NASA Administrator Dr Robert Frosch, to Beijing in July.[52]

As had been intended, cooperative gestures towards China infuriated the Soviets. In July 1978, Frutkin's replacement Norman Terrell received a cable from Jack Matlock, now deputy head of the Moscow Embassy, describing a recent visit by Intercosmos Vice Chairman Vereshchetin. The Soviet official had raged against US 'foot dragging' over Shuttle-Salyut, the 'keystone' of bilateral space cooperation. Vereshchetin had 'sardonically' noted that Press' visit to China demonstrated the double standards of Carter's human rights rhetoric before remarking that the USSR's ongoing space projects with Warsaw Pact nations could be expanded in response to further American obstinacy. According to Matlock, this idea and Vereshchetin's 'acerbic' tone 'set a new mark'.[53] To Soviet observers, insult was added to injury that December when Dr Frosch welcomed a visiting delegation of Chinese scientists and diplomats to Washington with a banquet in the NASM's Space Hall, toasting Sino-American cooperation surrounded by 'reminders of the achievements of

[48] Sarah B. Snyder, *Human Rights Activism and the Cold War: A Transnational History of the Helsinki Network* (New York, NY: Cambridge University Press, 2011), pp. 92-4.
[49] Frank Press to Zbigniew Brzezinski, 'Meeting of the US-USSR Joint Commission on S&T Cooperation' 19 July, 1978, p. 3, Folder 4, Box 31, NSC Staff Material: Far East, NLC-26-31-4-3-1, Carter Library.
[50] Hahnhimaki, *The Rise and Fall of Detente* (2014), pp. 118-9.
[51] Frank Press to Zbigniew Brzezinski, 'Agreements with the USSR', 27 February 1978, Folder 5, Box 215, Donated Historical Material- Mondale, Walter F., RAC Number: NLC-133-215-5-6-4, Carter Library; For the Ogaden War's context see Westad, *The Global Cold War* (2005), pp. 261-279; Garthoff, *Detente and Confrontation* (1994), pp. 695-719.
[52] Henry S. Bradsher, 'China Trip set for High-Level U.S. Scientists', *The Washington Star,* 27 July 1978, clipping in folder: 'China (PRC), General (Space)', Box 4 of 5 '1978- Congressional- Inquiries 'Bilats - Meteorology (satellites)', Accession Number: 255-81-0619, Record Group 255: National Aeronautics and Space Administration, NARA, College Park, MD.
[53] Jack Matlock for NASA Terrell 'US-USSR Space Cooperation', 13 July 1978, Reference: State 172119, folder:'Bilats Space Science Planetary' Box 3 (of 5)'1978 Bilats NSC/OSTP Huberman Review)', Accession Number: 255-81-0619, Record Group 255: National Aeronautics and Space Administration, NARA, College Park, MD.

our predecessors in the exploration and utilisation of space'.[54] One of those reminders was a full scale mock-up of the Apollo-Soyuz Test Project whose Apollo component had graced the Paris Air Show five years before.[55]

Academician Vereshchetin's pointed allusion to intra-bloc cooperation had referred to the Intercosmos Programme. Like Sino-American space cooperation Intercosmos further complicated Shuttle-Salyut negotiations by provoking irritation amongst the former Apollo-Soyuz partners. On 13 July 1976, nine communist nations signed an agreement on space cooperation, establishing a cosmic Comintern which authorised each non-Soviet signatory to send a guest cosmonaut on a Soyuz mission. Named after of Vereshchetin and Petrov's organisation, this programme flew non-Soviet guest cosmonauts for brief visits to Soviet space stations from *Salyut 6* onwards.[56] The agreement came just five days after NASA announced its 'Payload Specialist' programme which opened the Shuttle to foreign astronaut participation by allowing companies or nations who contributed experiments to send an astronaut-operator along. However, the guest cosmonaut programme's real impetus had been the realisation that *Salyut 6*'s extra docking port and the need to regularly replace the station's Soyuz 'lifeboat' would allow for brief visiting missions perfect for utilising in space cooperation.[57] Inaugurated with the February 1978 flight of Czechoslovakia's Vladimir Remek, the Intercosmos programme orbited cosmonauts from the entire Soviet Bloc, including Vietnam, Cuba and Afghanistan, and from nations the Soviets desired closer relations with such as India, France and Syria.[58] Significantly, Intercosmos' first seven guest cosmonauts flew during the American crewed spaceflight hiatus.

American observers ridiculed Intercosmos programme as a propagandistic farce. The *New York Times* saw it as part of a Soviet effort to shore up support behind the Berlin Wall as Western European communist parties drifted towards Eurocommunism.[59] Writing in the pro-space movement magazine *L-5 News*, James Oberg, a NASA Mission Control technician and promising cosmokremlinologist, characterised the missions as 'political 'hitch-hiker stunts' whose participants were handpicked from the 'communist ruling class'. Oberg recounted a joke purportedly circulating in Czechoslovakia that recalled the mordantly cynical a*nekdot* of Soviet satire. Apparently, Vladimir Remek had returned from space with red hands baffling practitioners

[54] 'Suggested Toast by Dr Frosch', 28 November 1978, in Ibid.
[55] Michael Collins to John Donelly, 17 April 1975, Folder: 'ASTP Exhibit', Box 2, Department of Space Sciences and Exploration Subject Files, c. 1972-1985, RU 347, Smithsonian Institution Archives.
[56] The signatories of the 1976 agreement were Bulgaria, Cuba, Czechoslovakia, The German Democratic Republic, Hungary, Mongolia, Poland, Romania and the USSR, TASS News Briefing 'Intercosmos Participants Hold Meeting In Moscow, 14 September 1976, FBIS clipping in 'Clippings: Soviet Space 1976', Box 4, Sheldon Papers.
[57] Colin Burgess and Bert Vis, *Intercosmos: The Eastern Bloc's Early Space Program* (Chichester, Springer Praxis, 2016), pp. 1-10.
[58] For a table of guest cosmonaut missions see Burgess and Vis, *Intercosmos* (2016), pp. 310-11.
[59] Tom Ferrell, 'Ideas and Trends: Russia to take Friends to Space' *New York Times,* 19 September 1976, p. 158

of space medicine; until, that is, he revealed 'Well, in space, whenever I reached for this or that switch, the Russians cried 'Don't touch that!' and slapped my hands.'[60] The United States soon ceded this particular foothold on the moral high ground when NASA's crewed missions resumed during the 1980s. The flight of Prince Sultan Abdel Aziz Al-Saud, a scion of Saudi Arabia's ruling dynasty, as a payload specialist aboard *STS-51-G* in 1985 demonstrated that America was not above rewarding repressive regimes with a seductive taste of spaceflight.[61] During the hiatus, though, American commentators used Intercosmos to reinforce the familiar dichotomy of NASA soberly pursuing science whilst the Soviets ran a chaotic space circus predicated on hollow stunts.

The State Department closely monitored how guest cosmonauts were received in their homelands, worried that the vicarious thrill of witnessing a fellow countryman fly in space might bolster support for Eastern Europe's sclerotic dictatorships. Discussing reaction to Remek's flight, the Prague Embassy cabled that although the 'press has, of course gone wild, while never forgetting to give Soviets top billing... our impression is that the people of Prague are viewing this event mainly with an accustomed cynicism.'[62] In July 1978, Warsaw Embassy staff reported that whilst a 'reasonably large crowd' had turned out, 'the enthusiasm of the average Warsovian' for *Soyuz 30* Cosmonaut Hermaszewski's homecoming was 'dampened' as a result of the presence of Soviet Cosmonaut Pyotr Klimuk.[63] Conversely, when *Soyuz 31*'s guest cosmonaut Sigmund Jähn returned to East Germany, the Berlin Embassy discerned glimmers of sincerity amidst the official media's bombast. 'The man in the street did not need to be prodded. His curiosity and pride in this GDR achievement seemed genuinely spontaneous'.[64] The Embassy also noted that even though a poster acclaiming *Soyuz 31* had been quickly defaced with Soviet cosmonaut Bykovskii's picture of torn down, Jähn's portrait had remained, tellingly, unmolested.[65] Embassy staff did not delude themselves that guest cosmonauts would erase thirty years of oppression, but their

[60] James Oberg, 'Russia's 'Guest Cosmonaut' Program: A Commentary', *L-5 News* 3, 11, November, 1978, pp. 1-2; It is difficult to substantiate Oberg's claim that this is a genuine example of underground Czech humour, however, it does recall an earlier Soviet *anekdot* about a cosmonaut belonging to the Siberian Chukchi ethnic group: Seth Graham, *A Cultural Analysis of the Russo-Soviet Anekdot*, (Unpublished Doctoral Dissertation, University of Pittsburgh 2003), available online via <http://d-scholarship.pitt.edu/9560/1/grahamsethb_etd2003.pdf> [accessed 28 February 2018] p. 291.
[61] Burrows, *This New Ocean* (1998), p. 553.
[62] American Embassy Prague to Department of State, 'Soyuz 28 Carries Czech Cosmonaut', 6 March 1978, PRAGUE 00587, Electronic Telegrams, 1978, Department of State Central Foreign Policy Files, available online via <https://aad.archives.gov/aad/createpdf?rid=81753&dt=2694&dl=2009> [accessed 28 February 2018].
[63] American Embassy Warsaw to Department of State 'Poland's 1978 National Day Celebrations: A Heavy Soviet Overlay Contribute to Popular Apathy', 26 July 1978, WARSAW 06348, available online via <https://aad.archives.gov/aad/createpdf?rid=188146&dt=2694&dl=2009> [accessed 28 February 2018].
[64] American Embassy Berlin to Department of State, 'The Return of Sigmund Jaehn', 26 September 1978, BERLIN 06291, Electronic Telegrams, 1978, Department of State Central Foreign Policy Files, available online via <https://aad.archives.gov/aad/createpdf?rid=239394&dt=2694&dl=2009> [accessed 28 February 2018].
[65] American Embassy Berlin to State Department, 'GDR Spaceflight Berlin' BERLIN 05613, Electronic Telegrams, 1978, Department of State Central Foreign Policy Files, available online via <https://aad.archives.gov/aad/createpdf?rid=217724&dt=2694&dl=2009> [accessed 28 February 2018].

attention to domestic reaction demonstrates Intercosmos' unsettling effect. Spontaneous enthusiasm, no matter how slight, for home-grown socialist space heroes was troubling.

NASA used Intercosmos as proof that space exploration remained an important weapon in the battle for Cold War prestige. A July 1978 internal NASA memo on *Salyut 6*'s milestones highlighted Remek's flight, the first 'international crew', and contended that the station's enhanced 'the Soviet scientific and technical image' by underlining their 'status as one of two major space powers.'[66] A similar document from January 1981 cautioned that the Soviets could now claim to have orbited the 'First Asian in space' (Vietnamese Cosmonaut Pham Tuan) and the first Latin American and Black cosmonaut (Arnaldo Tamaro-Mendez of Cuba). The memo noted these flights were doubly significant for occurring as the USSR 'was attempting to strengthen its influence in Asia, Africa, and Latin America'.[67] The late 1970s were a time of intense American anxiety over the Soviet adventurism in the Third World. The collapse of South Vietnam was compounded by Soviet support for leftist factions in both the Angolan Civil War and Ethiopian Revolution, prompting Spenglerian visions of global communist ascendency. California Governor Ronald Reagan's unsuccessful campaign for the 1976 Republican nomination had damned detente as 'appeasement' that allowed the Soviets to rampage through the Third World unhindered.[68] During the 1960s, cosmonauts Yuri Gagarin and Gherman Titov had stood before Cuban and Vietnamese crowds in immaculate white uniforms, declaiming on communism's inevitable triumph.[69] Intercosmos allowed the Soviet space programme to forge a closer connection with the Third World masses. By breaking the white monopoly on space travel, Tuan and Tamaro-Mendez were not just representatives of their respective firebrand communist regimes, but powerful symbols of socialist liberation.

When the Carter administration postponed scheduled Shuttle-Salyut JWG meetings in the second half of 1978, NASA faced an uphill struggle justifying the project. In a July memo to Brzezinski, Administrator Frosch argued in favour of continuing with Shuttle-Salyut studies because of the programme's scientific potential, but warned this was a long-term commitment; changing to a unilateral programme 'mid-course.... could occasion additional expense'. Ultimately, though, NASA's preferences had to yield to 'the President's foreign policy objectives towards the Soviet

[66] Lynne Yow, 'Memorandum for the Record: Salyut 6 Missions- Summary of Highlights', 5 July 1978, 'US-USSR Manned Space Flight March-Dec' Box 1 of 5 '1978 USSR-Indian Space Coop- US-USSR-French Space', Accession Number: 255-81-0619, Record Group 255: National Aeronautics and Space Administration, NARA, College Park, MD.
[67] P. Diane Rausch, 'Memorandum for the Record: Summary of Soviet 1983-Day Manned Mission on Salyut 6', 7 January 1981, pp. 1, 7-8, Record Number: 15539 'USSR Salyut 6 Part 1', NASA History Office.
[68] Sargent, *A Superpower Transformed* (2015), pp. 220-5; Westad, *The Global Cold War* (2005), pp. 282-3; Hessing Cahn, *Killing Detente* (1998), pp. 54-57.
[69] 'Gagarin Arrival in Cuba To Set Off Huge Celebration', *The Washington Post*, 24 July 1963, p. A4; Titov was Chairman of the Soviet-Vietnamese Friendship Committee for many years and the communist country recently unveiled a statue honouring the second cosmonaut 'Statue of Soviet Cosmonaut Titov revealed in Haiphong Bay', 14 September 2015 <http://en.vietnamplus.vn/statue-of-soviet-cosmonaut-titov-revealed-in-ha-long-bay/81654.vnp> [accessed 28 February 2018].

Union'.[70] Frosch's reluctance to make a diplomatic case for Shuttle-Salyut contrasted markedly with NASA's prior justifications for superpower space cooperation. The project's increasingly moribund appearance also posed a public relations conundrum. In September 1978, NASA Public Affairs Officers were informed that Shuttle-Salyut discussions were postponed until a 'comprehensive review of the entire subject' was completed, though the agency's headquarters 'cannot predict when this review will be completed or what the outcome will be.'[71] While an interagency group reviewed space cooperation, Brzezinski continued to disparage Shuttle-Salyut as a relic of a bygone era. In an October 1978 memo to Carter, he claimed that although bilateral technical cooperation 'may have had a symbolic importance at the outset of detente', Shuttle-Salyut's 'political and substantive benefits' had since been revealed as 'modest'.[72] Apollo-Soyuz had become a controversial blueprint, its inspirational pageantry transformed from a prophetic image of a collaborative tomorrow into yesterday's stale symbolism.

The Interagency Group on US-Soviet Space Cooperation's final decision paper, submitted 11 December 1978, was a detailed consideration of Shuttle-Salyut's political, diplomatic and financial pros and cons.[73] Shuttle-Salyut's ability to induce 'direct linkages demanding Soviet concessions' and reveal Soviet space secrets was debatable. American participants might gain information on Soviet 'operational procedures' and scientific data on the effect of long-duration spaceflight on the human body, but they were unlikely to be exposed to Salyut's 'new systems and capabilities' like its automatic resupply systems. The Soviets would no doubt guard their most valuable technology 'just as we would'.[74] There was also the ubiquitous threat of technology transfer: given their 'anxieties about [its] anti-satellite capabilities' the Soviets were surely desperate to gain access to the Shuttle. The paper argued that rumours that the Soviets were developing their own reusable spacecraft should not dissuade the US from proceeding with Shuttle-Salyut, but it did mean that 'special precautions' against technology transfer would have to be taken.[75] In return for debatable linkage or intelligence gains NASA would have to remain constantly vigilant against Soviet efforts to steal shuttle technology.

The decision paper also considered the implications of cancelling the project. The benefits of cancelling the project included preventing technology transfer and avoiding 'spending $50 million in mission-unique hardware' as well as conveying a 'political message if we wish to do so'.[76]

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[70] Robert A. Frosch to Zbigniew Brzezinski, 13 July 1978, Record Number: 15527 'Shuttle Salyut Documentation', NASA History Office.
[71] Portree, *Thirty Years Together*, (1993), p. 26.
[72] Zbigniew Brzezinski to The President, 'A First Look at the Summit', Undated October 1978, P. 10, Folder 4, Box 216, Donated Historical Material- Mondale, Walter F., RAC Number: NLC-133-216-4-2-8, Carter Library.
[73] NSA/OSTP Interagency Group on US-USSR Space Cooperation, 'Decision Paper on Shuttle-Salyut', 11 December 1978, Record Number: 15527 'Shuttle Salyut Documentation', NASA History Office.
[74] Ibid., pp. 7-9, 12.
[75] Ibid., pp. 13-14.
[76] Ibid., p. 15.

Conversely, resuming the JWG meetings and pressing ahead would result in the largely unspecified 'political benefits' of maintaining cooperation while avoiding the diplomatic fallout and acrimony that would follow cancellation.[77] NASA noted that the costs of cancellation, both in financial terms and potential disruption to its overall program, would only increase from this point onwards.[78] The outlook for Shuttle-Salyut was grim. The negative caricature of Apollo-Soyuz as an empty spectacle had neutralised crewed spaceflight cooperation's political rationale. In return, policymakers were left with an expensive and complicated concept that might disrupt America's unilateral space capability and was highly vulnerable to mounting Cold War tensions.

The Carter administration continued to postpone Shuttle-Salyut JWG meetings but the halt in study activity failed to silence allegations of technology transfer. A February 1979 *Washington Star* article alleged there had been a terrifying Soviet 'Raid' on American missile guidance technology and miniaturisation techniques, with former head of USAF Intelligence Gen. George J. Keegan commenting 'There is no way that I can exaggerate what it is that the Soviet Union have done in picking up our technology for free.'[79] Such allegations reinforced the image of the Soviet scientist as a KGB infiltrator gleefully exploiting America's suicidal lapse in judgement. Space cooperation's political toxicity was clearly articulated in an internal NSC memo that suggested possible responses for Carter if Brezhnev raised 'US stonewalling' on Shuttle-Salyut at the US-Soviet Vienna summit scheduled for June 1979. The memo noted that project would 'not only...lead to a space spectacular and to accusations of technology giveaway', but would also prompt criticism in the Senate of assisting the USSR's shuttle programme. Besides, with its own 'shuttle schedule ... in such disarray' NASA's enthusiasm for the project had cooled.[80] Four years after Apollo-Soyuz, high profile space cooperation was a political liability and Shuttle-Salyut languished in a purgatory of continual postponement, not quite dead but far from alive.

When discussing Shuttle-Salyut's failure to materialise, historians of space cooperation often reference the Carter administration's decision to suspend several US-USSR exchange agreements in the wake of the Soviet intervention in Afghanistan in December 1979.[81] The Soviet Union's decision to engineer the bloody downfall of its prodigal client, Afghan President Hafizullah Amin, precipitated a brutal and protracted conflict that lasted for almost a decade. For Carter and many

[77] Ibid., pp. 17-8.
[78] Ibid., pp. 7-9, 14.
[79] John J. Fialka, 'Soviet 'Raid' on U.S. Technology Spurs Review of Controls', *The Washington Star,* 14 February 1979, pp. A1,C7.
[80] Steve Larrabee and Ben Huberman to Zbigniew Brzezinski and David Aaron, 'Shuttle Salyut at Summit', 16 May 1979, Folder 3, Box 26, NSC Staff Material: Europe, USSR, and East/West, RAC Number: NLC-23-26-3-51-9, Carter Library.
[81] Karash, *The Superpower Odyssey* (1999), p. 133; Von Bencke, *The Politics of Space* (1997), p. 88; Oberg, *Star-Crossed Orbits* (2002), p. 68; Richmond, *Cultural Exchange and the Cold* War, p. 70; Long-Callahan, 'Sustaining Soviet American collaboration 1957-1989' in Krige et al., *NASA in the World* (2013), pp. 146-7.

other horrified American onlookers communist aggression had crossed a final Rubicon.[82] Hahnhimaki describes the 'Carter Doctrine', the President's 1980 State of the Union pledge to defend American interests in the Persian Gulf, as the 'basis on which Reagan built his foreign policy of renewed global containment.'[83] The Afghan Crisis may have been the final nail in Shuttle-Salyut's coffin, but the project was in dire health long before Soviet paratroopers landed in Kabul. By the time cooperation was officially suspended in December 1979, Shuttle-Salyut had already been dormant for over a year. The USSR's 'adventurist' foreign policy and its domestic repression of dissidents had opened up a chasm between the image of the USSR projected by Apollo-Soyuz and that which Americans saw on the news every evening. With Apollo-Soyuz's blueprint of highly visible crewed cooperation tarnished, space cooperation was easily caricatured as a Nixonian gimmick that now appeared deeply inappropriate.

Orbital Blockade: Fears of a Cosmic Iron Curtain during the Crewed Spaceflight Hiatus

'The Soviet Union cannot disregard the fact that American imperialists subordinate space research to military purposes and that they plan to use space to accomplish their aggressive purpose- A surprise nuclear attack on the Soviet Union and other socialist countries.' -Marshal Vasilii Danilovich Sokolovskii, 1963.[84]

Skylab was falling. By the summer of 1978, the orbital decay of NASA's gigantic, pioneering space station was occurring more quickly than had been expected and the station would soon re-enter Earth's atmosphere.[85] This news prompted alarm in South Asia, a potential crash site. In Mumbai, police attempted to calm a fearful populace whilst in Islamabad, students protested outside the American Embassy by singing '*Skylab* keeps falling on my head.'[86] In December 1978, NSC Advisor Zbigniew Brzezinski and Science Advisor Frank Press wrote to President Carter summarising the available policy options. The delays plaguing the Space Shuttle programme prevented a simple rescue mission to boost the station into a higher orbit from being mounted in time. Amongst the options that NASA had considered, and subsequently rejected, was approaching the Soviets to see if their antisatellite (ASAT) system could be used to destroy the station. The space agency argued the US should instead resign itself to Skylab's random re-entry, dealing with any collateral damage

[82] For the context of Soviet intervention see Artemy Kalinovsky, 'Decision-Making and the Soviet War in Afghanistan: From Intervention to Withdrawal.', *Journal of Cold War Studies* 11, 4 (2009), pp. 46-73; Westad, *The Global Cold War* (2005), pp. 299-330, for immediate American reaction see Bruce Riedel, *What We Won: America's Secret War in Afghanistan, 1979–1989* (Washington DC: Brookings Institution Press, 2014), pp. 103-119; Garthoff, *Detente and Confrontation* (1994), pp. 1046-75 .

[83] Hahnhimaki, *The Rise and Fall of Detente, (*2013), pp. 135-8.

[84] Vasilii Danilovich Sokolovskii, *Soviet Military Strategy,* trans. By Herbert S. Dinerstein, Leon Goure and Thomas W. Wolfe (Santa Monica, CA: RAND Corporation, 1963).

[85] Benson and Compton, *Living and Working in Space* (1983), pp.364-6 available online via <https://history.nasa.gov/SP-4208/contents.htm> [accessed 28 February 2018].

[86] T. Thornton to Zbigniew Brzezinski, Evening Report, 10 July 1979, Folder 5, Box 100, NSC Staff Material: North-South, RAC Number: NLC-24-100-5-22-5, Carter Library.

as best it could. Carter inquired as to whether less aggressive Soviet assistance might be sought?[87] The NSC responded with numerous technical reasons precluding a Soviet rescue attempt. Furthermore, although such a request would 'generally help improve the bilateral atmosphere' between the countries, this would be balanced by 'the obvious propaganda gains that the Soviets will reap from merely attempting to correct a US failure in space.'[88] Carter ended up agreeing with NASA and *Skylab* burned up in the atmosphere in July 1979, scattering debris across the Australian Outback.[89]

In many respects *Skylab* was a more sophisticated station than *Salyut 6* but its inglorious demise came at a time when the Soviet station appeared to point the way towards the permanent occupation of space. The debate over whether to seek Soviet help in order to rescue *Skylab* encapsulates American anxieties during the crewed spaceflight hiatus: feelings of paralysis caused by delays to the Shuttle, wariness about Soviet space station progress and the menacing presence of a Soviet ASAT weapon. The following section explores these anxieties and the vision of a cosmic Iron Curtain that they shared. If the Soviets seized America's space leadership then they could use their military space technology to implement an orbital blockade that would cut America off from its rightful destiny in space. This fear had profound effects on American space policy, informing Jimmy Carter's decision not to cancel the Space Shuttle and preparing the way for the visions of space warfare that underpinned Reagan's SDI project.

From the space age's earliest days, military technologists had puzzled over how to neutralise enemy satellites in the event of a conflict. The US Army's Redstone Arsenal in Huntsville, Alabama had begun investigating satellite interceptor concepts five months before Sputnik's launch.[90] The 1960s and 1970s saw NATO and Warsaw Pact generals become increasingly reliant on space technology for their reconnaissance, missile targeting and communications needs. Achieving 'Space Control' by denying the enemy the use of their satellites emerged as a critical strategic goal, compelling the superpowers to theorise, design and test various ASAT concepts. America's initial nuclear Nike-Zeus ASAT missile system, 'Mudflap', was replaced following the 1967 Outer Space Treaty with the non-nuclear 'Programme 437', which was itself decommissioned in the mid-1970s.[91] The USSR had also recognised antisatellite weapons' strategic potential, conducting its first satellite interceptor tests in the fall of 1968. After a two year pause, another four successful ASAT tests took place in 1970 and 1971 followed by a five year, self-imposed moratorium with the

[87] Frank Press and Zbigniew Brezinski to The President, 'Skylab Decision' 14 December 1978,Folder 7, Box 62, Brzezinski Material: Subject File, RAC Number: NLC-7-62-7-34-2, Carter Library.
[88]Reg Bartholemew, Ben Huberman and Bob Rosenberg to Zbigniew Brzezinski, 'Skylab', 20 December 1978, Box 2, Folder 1, NSC Staff Material: Science and Technology, NLC-30-2-1-13-1, Carter Library.
[89] Zimmerman, *Leaving Earth* (2003), p. 80.
[90] Paul B. Stares, *The Militarisation of Space U.S Policy, 1945-84* (Ithaca, NY: Cornell University Press, 1985), p. 49.
[91] Matthew Mowthorpe, 'US Military Space Policy 1945-192', *Space Policy*, 18, 1, (2002) pp. 25-36 (pp. 25-7).

onset of detente.[92] A Soviet ASAT capability was an alarming prospect, American press coverage warned that American satellites could be 'blinded' during a superpower conflict's crucial early moments.[93] The fear of a devastating ASAT-assisted first strike exemplified the nuclear feat that lurked beneath the space age's techno-utopian optimism.

The ASAT nightmare receded during the early 1970s only to return with frightening clarity when Soviet tests resumed in 1976. In February 1976, The USSR launched a military satellite, Cosmos 803, into an orbit reminiscent of the type used by target satellites in its earlier ASAT tests. Two months later, the interceptor satellite Cosmos 814 was orbited using a 'pop up' launch profile that halved the launch-to-intercept time to a single orbit, a development that Matthew Mowthorpe contends was a 'a significant new enhancement of the system'.[94] A Soviet ASAT capability would threaten America's critically important reconnaissance satellites, vital tools for monitoring strategic arms agreements such as SALT 1. In a May 1976 memo to Scowcroft's Military Assistant Robert 'Bud' McFarlane, CIA Director George H. W. Bush wrote 'US Satellite vulnerability and the evolving Soviet antisatellite threat is of great concern to me and to the rest of the Intelligence community'.[95] An NSC panel on safeguarding US electronic communications had already warned Ford in late 1975 that crucial American satellites were 'largely defenceless' against Soviet countermeasures.[96] Cosmos 803/Cosmos 814 threw this vulnerability into sharp relief and Ford quickly ordered the NSC and CIA to prepare studies on the threat posed by ASAT weaponry.[97]

The NSC study panel, chaired by Dr Solomon J. Buschbaum, spent much of 1976 investigating how to ease these concerns. Its October 1976 report argued that the US must prevent a Soviet ASAT monopoly from emerging, arguing that 'real-time space capabilities will become increasingly important –even essential to the effective use of military force.'[98] The need for an American ASAT capability stemmed not from the need to 'respond in kind' to the Soviet system 'but rather from the necessity to counter the growing military use of space by the USSR. The fact of reciprocity would be a fortuitous benefit.' The Soviets' Electronic Intelligence (ELINT) and Radar Ocean

[92] Matthew Mowthorpe, 'The Soviet/Russian Antisatellite (ASAT), programme during the Cold War and Beyond' *The Journal of Slavic Military Studies*, 15, 1, (2002) pp. 17-26 (pp. 17-20).
[93] George C. Wilson, 'Soviet Target Shooting in Outer Space Hinted', *The Washington Post*, 9 April 1969, p. A15; Richard D. Lyons, 'Soviet Satellite Destroyer is Believed to Be in Orbit', *New York Times*, 6 February 1970, p. 1; 'Soviets Said Testing Satellite Destroyer', *The Hartford Courant*, 3 November 1970, p. 3.
[94] Mowthorpe, 'The Soviet/Russian Antisatellite (ASAT), programme during the Cold War and Beyond' *The Journal of Slavic Military Studies*, 15, 1, 2002, pp. 17-26 (pp. 21-2).
[95] George Bush to Assistant to the President for National Security Affairs, 'NSC Report on Soviet Anti-Satellite Capability', 12 May 1976 Folder: NSA Scowcroft Daily Work Files (Codeword),(4),Ford Library Project File for Documents Declassified through the Remote Archive Capture (RAC), program),Box 55, Ford Library
[96] Stares, *The Militarisation of Space* (1985), p. 169.
[97] Brent Scowcroft to The President, 'Follow-Up on Satellite Vulnerability', 15 March 1976, Folder: 'NSA Kissinger-Scowcroft West Wing Office Files Box 24', Box 24: Declassified Documents from the National Security Adviser. Kissinger-Scowcroft West Wing Office Files', Documents Declassified Through the Remote Archive Capture (RAC), program: Photocopies 1969-1977, Ford Library.
[98] 'Report of the NSC Ad Hoc Panel on Technological Evolution and Vulnerability of Space: Part II US Anti-Satellite Capabilities', October 1976, Executive Summary pp. 1, 3.

Reconnaissance Satellite (RORSAT) systems were highlighted as particularly effective military force multipliers.[99] Ford endorsed the panel's conclusions and issued a National Security Decision Memorandum on ASAT technology in his administration's final days in a bid to influence his Democrat successor.[100] NSDM-345 directed the US to begin developing an ASAT capability whilst at the same time remaining within the boundaries of the OST and seeking an ASAT arms control agreement with the USSR. This decision was justified entirely in response to the 'direct military threat' posed by the Soviet space programme.[101] In public, the Ford administration lionised visiting Apollo-Soyuz cosmonauts and extolled space cooperation's ability to heal Cold War wounds. Privately, it watched the development of Soviet's military space technology with a sense of mounting dread.

The Carter administration was ambivalent about crewed spaceflight cooperation but treated ASAT limitation negotiations as an urgent priority from almost the moment it moved into the White House. On 15 February, CIA Director Stansfield Turner sent the NSC a report that argued 'Soviet ASAT testing threatens a 'space-war competition'' and proposed a thorough review of American civil and military space policy.[102] The superpowers agreed to set up ASAT negotiation working groups following Secretary of State Cyrus Vance's March 1977 trip to Moscow. Despite almost two decades of theoretical and development work on ASAT weapons, little thought had been devoted to how they might be negotiated out of existence. The State Department and the Arms Control and Disarmament Agency (ACDA) favoured a total ban whilst the Pentagon desired a less comprehensive 'rules of the road' agreement.[103] Eventually, Presidential Directive 37 (PD-37) was issued in May 1978 as a comprehensive statement of American space policy. It pledged to devise contingency plans, enhance satellite survivability and develop a US ASAT capability 'as a hedge against Soviet breakout' of any future ASAT treaty.[104] This 'two-track' strategy hoped that the threat of an American ASAT capability would compel the Soviets to continue negotiating.[105]

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[99] Robert L. Smith to Brent Scowcroft, 'Final Report of the Ad Hoc NSC Space Panel—Part II: U.S. Anti-Satellite Capabilities', 3 November 1976, Folder: NSDM 333 Enhanced Survivability of Critical US Military and Intelligence Space Systems (3),Box 66, US National Security Council Institutional Files 1974-1977, Ford Library.

[100] Stares, *The Militarisation of Space*, (1985), pp. 179.

[101] National Security Decision Memorandum-345 'US AntiSatellite Capabilities', 18 January 1977, available online via https://www.fordlibrarymuseum.gov/library/document/0310/nsdm345.pdf [accessed 28 February 2018]

[102] The Director of Central Intelligence to David Aaron, 'Proposed Space Policy Presidential Review Memorandum (PRM)', 15 February 1977, Folder 6, Box 41, NSC Institutional Files, 1977-81 RAC Number: NLC-132-41-6-5-8, Carter Library.

[103] Peter Hays, *United States Military Space: Into the Twenty-First Century* USAF Institute for National Security Studies Occasional Paper 42, (Maxwell AFB, AL: Air University Press, 2002), p. 87 for DoD/NSC disagreements see Policy Review Committee Meeting 'PRM/NSC-23 Coherent Space Policy' 4 August 1977, pp. 2, 4, Folder 12, Box 116, Brzezinski Material: Brzezinski Office File, RAC Number: NLC-15-116-12-6-8, Carter Library.

[104] PD-37 'National Space Policy', 11 May 1978, available online via <https://www.jimmycarterlibrary.gov/assets/documents/directives/pd37.pdf> [accessed 28 February 2018]

[105] Stares, *The Militarisation of Space*, (1985), pp. 180-81.

Nevertheless, a month later on the eve of the first round of US-Soviet ASAT negotiations, Brzezinski warned Carter that 'there is still considerable interagency disagreement over some of the fundamental issues we intend to raise with the Soviets.'[106] ASAT weaponry was inherently controversial; following familiar 'deterrence' logic risked invalidating years of rhetoric that had cast America as the defender of the OST's vision of space as a de-weaponised 'sanctuary'.

The resumption of Soviet ASAT tests focused greater media attention on the issue of space militarisation, reinforcing perceptions of Soviet space technology as a military tool designed to extend communism's stranglehold over the globe. Eight Soviet ASAT tests took place between 1976 and 1978.[107] Though not the sole reason for American anxieties about the Soviet space presence during the hiatus, these tests fuelled fears that Earth's orbit might become a future battleground as portrayed in countless science fiction stories. The acronym and jargon-littered discourse of Cold War military bureaucracies has been likened to Orwell's Newspeak for the subtle linguistic manipulation that lurked beneath its dispassionate exterior.[108] In press parlance, however, the ASAT was transformed into a 'Satellite Killer', a 'Killer Satellite' or, even more aggressively still, a 'Hunter-Killer Satellite'.[109] Used interchangeably throughout the late 1970s, these terms gave writers evocative alternatives to ASAT's anodyne abbreviation and strengthened the menacing image of antisatellite weaponry. The *New York Times* contended the Soviet 'Hunter Killers' reflected 'a Russian Penchant for Secrecy' and speculated they might be aimed at 'paralyzing the American 'strategic nervous system'... in a time of war'.[110] An article on space law in a 1980 issue of TransWorld Airlines' in-flight magazine described the Soviets 'testing their own version of *Star Wars'* Death Star – a 'hunter-killer satellite''.[111] With ASATs perceived as interlopers threatening the sanctuary of outer space, comparisons with George Lucas' fictional, planet-obliterating superweapon were not as unreasonable as they might initially seem.

Under Carter, three rounds of ASAT talks took place, the first in June 1978, the second in January/February 1979 and a final round in April and June of that year.[112] Everett C. Dolman's *Astropolitik* argues that the cooperative de-weaponised international legal regime for space,

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[106] Zbigniew Brzezinski to The President, 'US/Soviet Meeting on Anti-Satellite Matters', 6 June 1978, Folder 2, Box 1, NSC Staff Material: Defense/Security, RAC Number: NLC-31-1-2-7-7.
[107] Mowthorpe, 'The Soviet/Russian Antisatellite (ASAT), programme during the Cold War and Beyond', *The Journal of Slavic Military Studies*, 15, 1 (2002), pp. 21-4.
[108] R. M. Keils, 'Pentagon English Is a Sort of Newspeak.', *College Composition and Communication*, 24, 5, (1973), pp. 386–391 (pp.387-9).
[109] Walter Pincus, 'US Seeks One-Year Satellite-Killer Test Ban', *The Washington Post*, 11 April 1979 p. A8; 'Satellite Killer From Jet Being Developed by U.S', *New York Times*, 2 March 1980, p. 40; Thomas O'Toole, 'Soviets Test 'Killer Satellite', *The Washington Post,* 18 December 1976, p. A1; Richard D. Lyons, 'US Officials Fear Soviet's Lead in Hunter-Killer and Spy Satellites', *New York Times*, 30 January 1978, p. 9.
[110] Richard Burt, 'New Killer Satellites Makr 'Sky-War' Possible', *New York Times*, 11 June 1978, p. E3.
[111] John A. Jenkins, 'Are Lawyers Ready for Space Suits', *TWA Ambassador*, January 1980, p. 25, clipping in Folder: 'NASA-- Space Shuttle', Box 44 'Space Shuttle through NASA Weekly Reports 1/14/80-12/22/80' Special Projects Stern, Staff Offices Domestic Policy Staff, Carter Library.
[112] Hays, *United States Military Space* (2002), p. 87.

exemplified by the 1967 OST, reflected the Cold War rivals' desires to deny each other the ability to monopolise space's potentially incalculable strategic benefits.[113] Ford's NSC had expressed concern about an ASAT agreement 'that would 'lock in' whatever advantage the Soviets might have gained' and this danger increased incrementally with each successful Soviet ASAT test.[114] Though ASATs jeopardised the carefully constructed OST regime, any legal effort to control them had to allow the US to maintain its space leadership in an uncertain future. What constituted a 'hostile act' against a satellite was a considerable point of contention as Soviet negotiators doggedly insisted that the Space Shuttle was an ASAT weapon.[115] This accusation outraged the space programme's congressional supporters such as congressman, and future Space Shuttle passenger, Bill Nelson (Dem., FL) compelling the administration to respond that the shuttle would never be used as a bargaining chip.[116] Locking in an enemy advantage or gambling away a strategic edge were familiar concerns when it came to US-Soviet Arms control discussions. ASAT negotiations, however, reawakened anxieties dating back to Sputnik. An agreement which threatened the shuttle or granted the Soviets ASAT superiority would jeopardise America's access to space, negating the basis for the international regime for outer space that the US had painstakingly constructed.

The Space Shuttle's design had been shaped by Cold War considerations. A reusable 'spaceplane', the shuttle was the sole element of the 1969 Space Task Group Report's vision to survive NASA's bruising Apollo-era battles with the Nixon administration over its budget.[117] Struggling to adapt to the new budgetary reality, NASA claimed that the shuttle was a flexible, cost-effective vehicle which would usher in a golden age of routine space travel by substantially reducing the cost of spaceflight. To realise these hubristic promises NASA needed enough payloads to help push down the cost per-shuttle-flight and political support to defend the programme from budget cuts.[118]

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[113] Everett C. Dolman, *Astropolitik* (London: Frank Cass, 2002), pp. 169-170.

[114] Richard T. Boverie to Brent Scowcroft, 'Ad Hoc NSC Space Panel Report on US ASAT Capabilities', undated (circa 1976), Folder: NSDM 333 Enhanced Survivability of Critical US Military and Intelligence Space Systems (3), Box 66, US National Security Council Institutional Files 1974-1977, Ford Library.

[115] Secret Memorandum from Cyrus Vance to The President, 17 June 1978, p. 2, Folder 9, Box 13, NSC Institutional Files, 1977-81, RAC Number: NLC-128-13-9-13-2 Carter Library.

[116]Richard Burt, 'Soviets Said to Ask Space Shuttle Halt' *New York Times,* 1 June 1979, p. A6; Suzanne Vance to Office of the Staff Secretary National Security Council, 'Reply to Congressman Bill Nelson on ASAT', 25 June 1979, Folder 3, Box 84, Staff Material: FOI/Legal, RAC Number: NLC-21-84-3-1-2, Carter Library.

[117]A voluminous literature has emerged examining the shuttle's approval and development process: Roger. D. Launius, 'NASA and the Decision to Build the Space-Shuttle, 1969-72', *Historian,* 57 (1994), 17-34; Ray A. Williamson, 'Developing the Space Shuttle' in *Exploring the Unknown: Selected Documents in the History of the US Civil Space Program, Volume IV: Accessing Space*, ed. by John M. Logsdon (Washington, DC: US Printing Office, 1999); Heppenheimer, *The Space Shuttle Decision, 1965-1972* (2002) and *Development of the Space Shuttle, 1972-1981* (2002); L. Parker Temple III, 'Committing to the Shuttle Without Ever Having a National Policy.', *Air Power History*, 22, September 2005, <http://www.thefreelibrary.com/Committing+to+the+shuttle+without+ever+having+a+national+policy.-a0135843066> [accessed 28 February 2018]; Brian Woods, 'A Political History of NASA's Space Shuttle: The Development Years, 1972–1982' in *Space Travel and Culture* ed. by David F. Bell, and Martin Parker (2009).

[118] Neal, *Spaceflight in the Shuttle Era and Beyond* (2017), pp. 37-45.

The Pentagon proved to be a vital ally in both respects but its support came at a price.[119] The DOD's first demand was for the shuttle to be designed with a triangular 'Delta Wing' configuration that would give it a cross-range of over 1000 nautical miles. This would allow it to be launched into a polar orbit from Vandenberg Airbase, CA and return after a single-orbit mission enabling quick reconnaissance flights over Soviet territory and the ability to intercept, and capture, Soviet spacecraft.[120] The second criterion was a payload bay of at least sixty by forty feet, capacious enough to accommodate 'the next generation' of reconnaissance satellites.[121] In Soviet eyes the shuttle was no sluggish space-freighter; instead, it was a highly manoeuvrable military spacecraft capable of interfering with sensitive 'Cosmos' satellites.

The Soviet invasion of Afghanistan complicated the ASAT arms control effort considerably. The final round of negotiations had seen movement towards agreement on a mutual 'no use' ASAT pledge frustrated by American unwillingness to include the Shuttle within discussions and Soviet demands for a get-out clause that would allow it to destroy military satellites which threatened 'national sovereignty'.[122] Even after Afghanistan, there was still a case for keeping the option for future ASAT talks open. An internal NSC memo from March 1980 agreed with the State Department's desire to persist with ASAT negotiations. The Soviets had not tested their system since May 1978, and further talks would complement 'the administration's position that despite our intensifying competition with the Soviets, there are still important areas where we should cooperate.' However, negotiations would 'be noticed by the outside world' and thus had to be reconciled with Carter and Brzezinski's 'overall game plan for handling Afghanistan/Iran/Soviet relations'.[123] The State Department also interpreted the resumption of Soviet ASAT tests the following month as a move intended to compel the US to return to the negotiating table.[124] Although declining superpower relations during 1980 prevented the ASAT delegations from meeting again, there was a sense that unlike Shuttle-Salyut – a 'feelgood' frivolity better suited to sunnier times - here was an issue which might necessitate continued US-Soviet dialogue. A Soviet ASAT monopoly threatened America's spacefaring future by imperilling the basis of American space power: its military satellite constellations and the Space Shuttle that would be used to launch and maintain them.

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[119] Hays, 'NASA and the Department of Defense' in *Critical Issues in the History of Spaceflight* ed. by Dick and Launius, (2006), pp. 199-238 (p. 222);.Heppenheimer, *The Space Shuttle Decision, 1965-1972* (2002), pp. 422-3

[120] Heppenheimer, *The Space Shuttle Decision, 1965-1972* (2002), pp. 214-5.

[121] Ibid., p. 221.

[122] Steve Weber, *Cooperation and Discord in US-Soviet Arms Control* (Oxford: Princeton University Press, 1991), pp. 267.

[123] Victor Utgoff to Zbigniew Brzezinski and David Aaron, 'VBB Item- ASAT' 21 March 1980, Folder 12, Box 223, NSC Staff Material: Defense/Security, RAC Number: NLC-31-223-12-2-4.

[124] William E. Odom to Zbigniew Brzezinski, 'Evening Report', 18 April 1980, Folder 6, Box 28, Brzezinski Material: Staff Evening Reports File, RAC Number: NLC-10-28-6-6-8, Carter Library.

Alongside the tangible danger posed by Soviet ASAT tests was the broader challenge posed by a seemingly resurgent Soviet crewed space programme. In a *New York Times* article on the eve of the 1980 Presidential Election, John Noble Wilford described *Salyut 6* as 'the centrepiece of an active manned space programme whose pace, style and apparent priority stand in sharp contrast to the American program of recent years.' Wilford dissected the Salyut programme's achievements and speculated about a Soviet space shuttle, weaving in alarming quotes from Dr Charles S. Sheldon II. The veteran analyst's description of the 'very impressive' Soviet manned programme reiterated his characterisation of the Soviet programme as 'conservative in its technology' but determinedly 'grinding away in a number of areas'.[125] This was one of many articles published during the hiatus which contrasted Sheldon's depiction of the Soviet programme, where technological crudeness was compensated for with determined effort, with NASA, seemingly unable to recapture its Apollo-era glories.[126] A *New York Times* review of Tom Wolfe's nostalgic masterpiece *The Right Stuff*, published amidst these warnings in 1979, mused that 'we have always felt that the sky was America's special domain'.[127] *Salyut 6'*s steady progress symbolized the Soviet determination to seize America's cosmic birthright.

Behind the misdirection of the Shadow Programme, cosmonauts often found long-duration flights aboard Salyut psychologically punishing. In the summer of 1976, Vitalii Zholobov fought off waves of nausea as he grew distressed by the 'bottomless abyss' of space surrounding his *Salyut 5* space station.[128] Two years later, *Salyut 6* cosmonauts Yuri Romanenko and Georgi Grechko found themselves arguing continuously, the friction of their clashing personalities exacerbated by having to contend with an onerous workload, insomnia caused by the incessant hum of scientific equipment and the stress of dealing with a terrifying electrical fire.[129] These incidents were hidden from American experts, who depicted *Salyuts 5* and *6* as proof that the USSR was clawing its way back from the humiliation of the Apollo defeat.

One such expert was James E. Oberg, a NASA mission control technician who had written numerous articles on Soviet space activities for space enthusiast magazines like *L5 News*, *Omni* and *Spaceflight*.[130] In 1980 Oberg cemented his status as one of America's foremost cosmokremlinologists with *Red Star in Orbit*, an engrossing expose of the Soviet programme's

[125] John Noble Wilford, 'Major Powers Travel Along Divergent Paths Toward Life in Orbit', *New York Times*, 14 October 1980, pp. C1, 3.
[126] Thomas O'Toole, 'Soviet Space Feat Causes Speculation on Future Plans', *The Washington Post*, 5 November 1978, p. A6; 'A Space Record for the USSR', *Time*, 14 August 1978, p. 48; H. S. 'A New Soviet Space Exploration Challenge for the 1980s?', *Astronautics and Aeronautics*, January 1979, pp. 10-11; Howard Benedict, 'Soviet Union Rockets Back in High-Stakes Space Race', *Today*, 30 Sept 1979, pp. 1A.
[127] C. D. B. Bryan, 'The Sky is Our Domain', *New York Times*, 23 September 1979, p. BR1, 34
[128] Zimmerman, *Leaving Earth* (2003), pp. 107-108.
[129] Ibid., pp. 127-30.
[130] See James Oberg, 'The Russians Meant to Win the "Moon Race"', *Spaceflight*, May 1975, pp. 163-171; 'Soviet Spacecraft Mysteries Intensify' *L5 News*, 3, 5, May 1978, pp. 4-5; 'Red Star in Orbit', *Omni*, May 1979, pp.76-79.

Stalinist censorship regime, wherein rocket failures were covered up and failed cosmonaut candidates were airbrushed out of history.[131] Oberg described the physical stresses and psychological pressures of long duration spaceflight, but he portrayed cosmonauts and technicians overcoming such difficulties in an exemplary fashion.[132] Echoing his mentor, Charles Sheldon, Oberg concluded *Red Star* by stressing the Soviets were serious about space colonisation and interplanetary conquest. Their pledges to build 'Kosmograds' (space cities) were 'more than just daydreams: cosmonauts and space engineers are doing their homework now to allow those dreams to be realised.'[133]

Whilst the Soviets diligently did their homework, America's post-Apollo space policy appeared complacent and confused. Cold War hawks responded by resurrecting Vostok-era depictions of the Soviets methodically ticking off milestones on their checklist for cosmic domination. In 1962, Senator Barry Goldwater's anticommunist manifesto, *Why Not Victory?* had described Yuri Gagarin's flight as 'an act of war- a calculated effort to secure an advantage that might be exploited militarily.'[134] Addressing Congress in September 1978, the Arizona Senator once again implored his fellow Americans to pay attention to the Soviet space menace. Goldwater found post-Apollo space policy wanting: 'Our complacency in recent years has given the Russians a decided advantage in the space race. This is a dangerous prospect, because the Soviet Union is clearly taking this opportunity to develop its space technology for military purposes.'[135] The similarities between Goldwater's warnings are remarkable. The Salyuts did not inspire the same level of awe and apprehension as early Soviet spectaculars, but neither were they ignored. The hiatus compounded the Salyut programme's propaganda impact by transforming the superpowers' space rivalry from a chivalric competition to a worrying Soviet monopoly. If astronauts were flying, then at least the heavens were being contested. Without this psychological reassurance, the propaganda impact of the Salyut programme was magnified and warnings about American complacency suddenly seemed more credible.

The Carter administration had entered office agreeing that American space policy lacked coherence and purpose. A report prepared for Carter's transition team had described NASA's mission as 'unclear' and lamented that the agency found it 'unusually difficult' to convincingly relate its programmes to broader national goals.[136] Presidential Review Memorandum (PRM) 23 'A Coherent US Space Policy', issued in April 1977, directed an NSC-chaired interagency review to

[131] Oberg, *Red Star In Orbit* (1980), pp. 60-63.
[132] Ibid., pp. 172-180.
[133] Ibid., pp. 224, 229-30.
[134] Barry Goldwater, *Why Not Victory?* (New York, NY: McGraw Hill, 1962), p. 31.
[135] Congressional Record, Daily Edition, (Statement of Sen. Goldwater), 27 September 1978, p. H 10966.
[136] Nick MacNeil to Stuart Eizenstat, Al Stern, David Rubenstein, Barry Blechman, Dick Steadman, 'NASA Recommendations', 15 January 1977, Folder: 'National Aeronautics and Space Board (NASA)', Box 109 'Key issues – Foreign Defense Policies through Organising the White House, 11/76-12/79', Domestic Policy Staff, David Rubenstein's Transition Files, Carter Library.

'develop a coherent, inclusive statement of national policy' for space and to untangle the 'different yet interrelated goals of our civil, military and national intelligence' space programmes.[137] The resulting Presidential Directive, PD-37, contained the usual, vague pledges to continue pursuing space exploration and cooperation projects that furthered national interests. However, it also broke new ground by discussing potential responses to the Soviet ASAT threat and by attempting to clearly delineate the space-related responsibilities of the DOD and Intelligence community.[138] PRM-23 and PD-37 reflect a perception that, twenty years of making space policy on the fly had resulted in a chaotic and ill-focused effort. The Soviets might not be ahead, but with their true goals occluded by secrecy, the contrast between American confusion and their supposed single-mindedness appeared even starker.

*Salyut 6'*s successes were a symbolic reproach to America's post-Apollo vacillation. Shortly after PD-37 was issued, domestic policy advisor Stuart Eizenstat told Frank Press of his worries that although America's post-Sputnik policy had always been 'reactive', it was becoming 'clear that the Soviets have the ability to continuously man ... Salyut... if they connect several Salyut units, maintaining them in permanent orbit, they can plausibly say that they have the first permanent space station. [Emphasis in original]'. Meanwhile, the impending de-orbit of *Skylab* projected American 'space weakness' and was a 'prestige defeat for the US when we can ill afford it.'[139] In its report to Carter, the Policy Review Committee (Space), a group set up by PRM-23, characterised the Salyuts as the centrepieces of a 'highly-visible, public-relations-oriented, manned space programme... that will strive to surpass- or try to be seen surpassing- the US in space prowess'. The committee expected 'our overall leadership in space to be maintained in the decade ahead' as a result of the Space Shuttle, but warned 'the Soviets may lead the US in some select areas'.[140] It is important to emphasise that *Salyut 6* was not seen as a second Sputnik. Concern did not stem from a belief the USSR had already stolen America's space leadership; instead, *Salyut 6* inspired warnings that America risked squandering its Apollo advantage through complacency.

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[137] PRMs were the Carter Administration's replacement for the old NSSM system and fulfilled a similar function, identifying a problem that would be studied by the NSC and other relevant agencies resulting in a Presidential Directive (a replacement of the old NSDMs), see The Jimmy Carter Presidential Library and Museum, Presidential Review Memoranda (PRM),and Presidential Directives (PD), 25 April 2016 <https://www.jimmycarterlibrary.gov/documents/prmemorandums/pres_memorandums.phtml> [accessed 28 February 2018]; PRM 23 'A Coherent National Space Policy' 15 April 1977 available online via https://www.jimmycarterlibrary.gov/documents/prmemorandums/prm23.pdf [accessed 28 February 2018].

[138] PD-37 'National Space Policy', 11 May 1978, available online via https://www.jimmycarterlibrary.gov/documents/pddirectives/pd37.pdf [accessed 28 February 2018].

[139] Stu Eizenstat and Al Stern to Frank Press, 'Civil and Space Aeronautics Policy', 22 May 1978, Memos and Correspondence- Internals, 4/10/78-5/25/78, Box 1 'Memos and Correspondence-Presidentials, 1/28/77-5/20/77 through memos and Correspondence- Presidentials, 4/3/79-6/5/79', Science and Technology Advisor to the President Frank Press, Staff Offices, Carter Library.

[140] Chairman, Policy Review Committee (Space) to The President, 'Civil Space Policy', Undated [Circa Fall 1978] p.3, Folder 13, Box 10, Domestic Policy Staff, RAC Number: NLC-41-10-13-1-0, Carter Library.

As the defender of America's space leadership, NASA hoped to capitalise on the unease the Salyuts inspired. Even at the height of space-detente, competitive rhetoric had awkwardly coexisted alongside sermons on space brotherhood. Justifying continued funding for the Space Shuttle in November 1974, NASA administrator Fletcher not only highlighted the spacecraft's potential for enhancing international cooperation, but also stressed the importance of not 'leaving the field entirely to the Soviets'. Doing so would 'be another disillusionment to a population that is increasingly cynical about what the government can do' by raising 'some awkward and probably unanswerable questions' about why the communist system could financially justify crewed spaceflight and America could not.[141] Five years later, with the likelihood of Shuttle-Salyut dwindling with each passive-aggressive postponement of a JWG meeting, Fletcher's successor reprised the theme. Testifying before a Senate appropriations subcommittee in March 1979, Administrator Frosch stated the Soviets' goal was a 'permanent presence' in space. Given the 'strong military flavour' of the Soviet programme and the 'severe' psychological impact this would have, this was a troubling proposition.[142] Justifying costly projects by playing on Cold War anxieties was second nature to NASA. The decreasing likelihood of a Shuttle-Salyut mission taking place did not inconvenience the agency as much as might be expected; if Salyut was no longer a suitable cooperative destination for the shuttle, then it could become a competitive threat.

The shuttle programme's greatest test came during the Carter administration as it attracted intense criticism for running over budget and behind schedule. The space flagship's first crewed flight had initially been scheduled for March 1978, but budget cuts and problems with its main engine and thermal protection tiles ended up pushing its debut back by three years.[143] During an April 1979 meeting with Administrator Frosch, OMB director James T McIntyre Jr. had expressed his irritation with the shuttle project's financial and scheduling woes. NASA had managed to obtain an extra $220 million for its FY1980 budget in order to keep the project going. This extra funding succeeded only in postponing Carter's decision. That November it became apparent that more funds would be needed to prevent further delays.[144]

The shuttle appeared particularly vulnerable given Carter's suspicion of costly high-tech projects sold on hyperbolic claims. Although he often exaggerated his scientific expertise, Carter had firsthand experience on the frontline of military technology having served as an officer aboard a nuclear submarine and as a protégé of Admiral Hyman Rickover, the 'Father of the Nuclear

[141] David Elliot to General Scowcroft, 'NASA Views on the Value of Manned Space Flight and the Shuttle', 12 November 1974, National Aeronautics and Space Administration 8/9/74-4/30/75 (1), Box 14 'Joint Chiefs of Staff – Presidential briefing 8/74 (1)', National Security Advisor Presidential Agency File, 1974-1977, Ford Library.
[142] Chris Collins, 'Russian Space Flavor is Military', *Today*, 30 March 1979, p. 1A.
[143] Heppenheimer, *Development of the Space Shuttle, 1972-1981* (2002), p. 354.
[144] John Noble Wilford, 'Space Shuttle's Delays Facing Carter Review; Outlay May Be Raised', *New York Times*, 5 November 1979, pp. A1, D10.

Navy'.[145] On the presidential campaign trail Carter had pledged to cancel the Air Force's B1 Lancer bomber programme, prompting concerns the shuttle might also be axed. Space historians argue that Carter ultimately reaffirmed his commitment to the shuttle in November 1979 because he recognised the need for an effective means of verifying the SALT 2 arms reduction treaty.[146] Carter keenly appreciated space technology's intelligence gathering capabilities. In October 1978 he was the first president to officially confirm the existence of America's spy satellite programme by stating 'photoreconnaissance satellites have become an important stabilizing factor in world affairs in the monitoring of arms control agreements'.[147]

During its hour of need, the shuttle's greatest champion was Secretary of the Air Force Hans Mark, a nuclear physicist and former director of NASA's Ames Research Centre with a passionate interest in space travel. In his memoir, *The Space Station: A Personal Journey*, he recalls 'doing my best to persuade people that the Space Shuttle would eventually have extremely important applications related to national security'. Eventually, he managed to convince both Defence Secretary Harold Brown and Undersecretary of Defence William Perry to back the shuttle.[148] Historians assert that Mark's cheerleading for the shuttle, and particularly his arguments that cancelling NASA's spaceplane would profoundly disrupt the American reconnaissance satellite programme, played a pivotal role in convincing Carter that the reusable spacecraft was a national security necessity.[149] Although aerospace historians have done excellent work by detailing the importance of DoD support and the arms control verification rationale in saving the Shuttle from cancellation, they have underplayed the NSC's influence and failed to situate this debate within a context of worries about the Soviet threat to America's cherished leadership in space.

The debate over the shuttle's future took place against a backdrop of mounting concern about the Soviet crewed spaceflight programme. NSC worries about the threat that *Salyut 6* posed to American prestige had intensified throughout 1979. In late August, Robert Rosenberg had forwarded Brzezinski the CIA's report on the Salyut station remarking that the station's 'accomplishments are significant, and until shuttle becomes a reality, we can expect to see the

[145] Nicholas Wade. 'Carter as Scientist or Engineer: What Are His Credentials?' *Science*, 193, 4252, (1976), pp. 462–463.
[146] See Heppenheimer, *Development of the Space Shuttle, 1972-1981*(2002), pp. 350-1; Thomas H. Johnson, 'The Natural History of the Space Shuttle' *Technology and Society,* 10, (1988), pp. 417-424 p. 421; Burrows, *This New Ocean* (1998), p. 523; Eric Berger, 'A Cold War Mystery: Why Did Jimmy Carter Save the Space Shuttle' *ArsTechnica*, 14 July 2016, <https://arstechnica.com/science/2016/07/a-cold-war-mystery-why-did-jimmy-carter-save-the-space-shuttle/> [accessed 28 February 2018].
[147] Jeffrey Richelson, 'Declassifying the 'Fact of' Satellite Reconnaissance: National Security Archive Electronic Briefing Book No. 231', 1 October 2007, <http://nsarchive.gwu.edu/NSAEBB/NSAEBB231/> [accessed 28 February 2018].
[148] Hans Mark, *The Space Station: A Personal Journey* (Durham NC: Duke University Press, 1987), pp. 100-1.
[149] Parker, 'Committing to the Shuttle Without Ever Having a National Policy', Air *Power History*, 22, (2005); Craig Covault, 'Blame It on Nixon; Space Policy Failures Bred NASA Shuttle Promises That Were Unattainable.', *Aviation Week & Space Technology*, 19 March 2007 pp. 83-4; Hays, 'NASA and the Department of Defense' in *Critical Issues in the History of Spaceflight* ed. by Dick and Launius (2006), pp. 226-7; David, *Spies and Shuttles*, (2015), pp. 211-2.

Soviets outshine the US for its propaganda and political value.'[150] On 2 November, the NSC asked the CIA to investigate rumours that Soviets were planning on unveiling their own space shuttle during the 1980 Moscow Olympics 'to politically outdo the US'.[151] *Salyut 6* had not been crewed since cosmonauts Riumin and Liakhov had left the station in August.[152] Had it been vacated to make way for its successor? The need to maintain a competitive crewed spaceflight programme had been hardwired into justifications for the shuttle since the project's inception. In 1972, similar arguments made by OMB Deputy Director Caspar Weinberger that America must maintain some form of crewed spaceflight capability for prestige purposes had been a crucial reason for Nixon's decision to develop the shuttle.[153] The damage to US prestige that an indefinite extension of the crewed spaceflight hiatus might cause was an unspoken but ever-present undercurrent to NSC discussion of Soviet space activities.

The NSC feared Carter might inadvertently cede leadership in space to the Soviets by cancelling or scaling back the shuttle programme on cost grounds. Several external reviews of the shuttle programme had been conducted and a meeting where Carter would discuss their findings with Administrator Frosch, NSC staff, OMB director Jim McIntyre, Frank Press and Mark was scheduled for 14 November. Ahead of this meeting, NSC staffers discussed what to do if Carter suggested 'Why don't we terminate or severely cut back on the shuttle?' To head off such a suggestion, Robert Rosenberg had drawn up two briefing papers to be distributed to high-ranking meeting attendees. The first considered 'Why [the] Shuttle is Needed'; the second discussed the Soviet 'Manned Military Space Programme' utilising data from 'the most recent Intelligence Community' studies of the subject.[154] Hans Mark's memoir describes the difficulties he and former ASTP astronaut Tom Stafford experienced convincing Air Force staff jaded by Nixon's cancellation of the Manned Orbiting Laboratory programme of crewed spaceflight's military utility.[155] The NSC, though, readily accepted the idea that crewed spaceflight was a critical military activity. Rosenberg depicted the USSR's programme as a tenacious, competitive threat to American space leadership that exemplified the Soviet strategy of exploiting American weaknesses wherever they could be found. Four years into the crewed spaceflight hiatus and with US-Soviet relations deteriorating, it was a persuasive image.

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[150] Robert Rosenberg to Zbigniew Brzezinski, 'Soviet Salyut 6', 28 August 1979, Folder 2, Box 54, Brzezinski Material: Brzezinski Office File, NLC-15-54-2-13-0, Carter Library. The attached document was National Foreign Assessment Centre, Central Intelligence Agency, *Soviet Salyut-6 Scientific Space Station: The First Manned Phase - September 1977-March 1978*, August 1979 available online via <https://www.cia.gov/library/readingroom/docs/DOC_0000251131.pdf> [accessed 28 February 2018]

[151] Intelligence Coordination to Zbigniew Brzezinski, 'While You Were Away Report', 2 November 1979, Folder 1, Box 25, Brzezinski Material: Staff Evening Reports File, NLC-10-25-1-4-8.

[152] Zimmerman, *Leaving Earth* (2003), pp. 148-51.

[153] Ibid., pp. 364-6, 406-9; Launius 'NASA and the Decision to Build the Space-Shuttle', (1994), p. 29.

[154] Robert Rosenberg to Zbigniew Brzezinski & David Aaron, 'Prebrief with NASA and OSD on Space Shuttle' 13 November, Folder 10, Box 117, Brzezinski Material: Brzezinski Office File, NLC-15-117-10-10-4, Carter Library.

[155] Mark, *The Space Station a Personal Journey* (1987), p. 101.

The first document portrayed the shuttle as an urgent necessity unless America wished to endure the catastrophic consequences of a loss of space leadership to the Soviets. Rosenberg set the scene by stating America had 'no current manned space operating capability' and any programme based solely on expendable launch vehicles would be incapable of competing effectively with the Salyut programme. *Salyut 6* had 'led to significant advancements' in demonstrating 'man-in-space liveability and workability' and would doubtlessly soon be followed by a '*Salyut 7* space base' supplied by 'Shuttle-type' spacecraft. Not developing the shuttle would result in a loss of space leadership comparable to 'losing the US lead in the airline industry' in its devastating effect on America's economy and international prestige. Rosenberg also invoked the ASAT threat; the shuttle was 'required to counter the growing Soviet space threat to deny others the use of space'. The paper defined space control as a crucial Cold War goal: 'If we do not expend the thought, the effort, and the money required, then another and more progressive nation will. It will dominate space, and it will dominate the world.'[156] Rosenberg's deterministic language recalled the crude astropolitics of the Sputnik Crisis. In 1958, Senate Majority Leader Lyndon B. Johnson had updated Themistocles' dictum on the pre-eminence of sea power by claiming 'Control of space means control of the world'.[157] The NSC resurrected this idea to argue that the shuttle was all that stood in the way of communist schemes for cosmic, and consequently global, domination.

The second document elaborated on the military implications of the USSR's 'very ambitious and aggressive' crewed space programme. The paper used information derived from reconnaissance satellites, most probably photographs of the Baikonur cosmodrome; consequently some passages on expected Soviet military aerospace innovations remain classified. However, the sanitised version still demonstrates the NSC's apprehension about the scale and direction of the Soviet effort. The Soviets were serious about crewed spaceflight. Expenditure on crewed programmes was estimated to account for approximately 20 percent of the total 1974-1978 Soviet space budget, or $1.8 to $2 billion per year. Disquietingly, it was impossible to separate the 'two operational Salyut space station programmes – one military and the other scientific' because the Soviets used ''scientific research' as a cover for the military program'. After drawing attention to the 'valuable biomedical and psychological data' that long-duration Salyut missions had provided, Rosenberg concluded with some near-term predictions. As mission durations lengthened and a new ferry spacecraft came into service, it was only a matter of time before the Soviets would begin 'docking two or more Salyut stations together to form a space complex.'[158] Colossal modular stations had been a crucial step in the path to interplanetary flight envisaged in Werner

[156] Robert Rosenberg, 'Why Shuttle is Needed', 13 November 1979, Folder 10, Box 117, Brzezinski Material: Brzezinski Office File, NLC-15-117-10-10-4, Carter Library.
[157] McCurdy, *Space and the American Imagination*, (2011), p. 83.
[158] Robert Rosenberg, 'The Soviet Manned Military Space Program', 13 November 1979, Folder 10, Box 117, Brzezinski Material: Brzezinski Office File, NLC-15-117-10-10-4, Carter Library.

von Braun's *Colliers* articles in the 1950s, a sacred text within the American Astrofuturist canon.[159] Salyut, a militaristic programme masquerading as a scientific effort, supposedly laid the foundation for achieving this dream. Kosmograd dominated the horizon; the United States could not allow such a space fortress to go unchallenged.

On 14 November 1979, Jimmy Carter reaffirmed America's commitment to the shuttle programme. Carter was definitely given a copy of the first of Rosenberg's briefing papers, but it is unclear whether he received a copy of the second.[160] Whether the President saw the second paper or not, its depiction of the Soviet programme still formed the backbone of the NSC's case for the shuttle. Carter's decision was motivated by considerations that ranged from the need to verify arms control treaties like SALT II to Hans Mark's support for the shuttle as principal carrier of DoD satellites. Acknowledging the influence of the NSC's depiction of the Soviet programme's resurgence in no way diminishes the importance of these other factors; rather, it situates the Shuttle decision within a context of growing anxiety about the Soviet space threat that was intensified by the crewed spaceflight hiatus. Carter's July 1979 speech on the Energy Crisis had famously diagnosed America as suffering from an enervating spiritual 'malaise', an 'erosion of our confidence in the future is threatening to destroy the social and the political fabric of America'.[161] Faced with a domestic crisis of confidence and an increasingly belligerent Soviet adversary abroad, the shuttle's supporters provided Carter with a way to redeem the American future. The shuttle would not just usher in an era of cheap spaceflight, it would also be an instrument of cosmic 'Rollback'. By effectively confronting the USSR's space station and ASAT programmes, the shuttle would extend the Carter doctrine from the Persian Gulf into outer space.

Orbital Bolshoi: Astrofuturist Reaction to the Communist Space Presence

'The first true colonist of space is already an adult...if some doubt exists about his or her professional speciality, little doubt remains about his or her nationality: Russian.' –James Oberg, 1979.[162]

Not all Western observers saw a permanently occupied Soviet space station as a jackboot on America's windpipe. Writing in the March 1982 edition of *L-5 News*, the mouthpiece of space colonisation pressure group the L-5 Society, the science fiction author Isaac Asimov enviously recounted the Salyut programme's progress. Asimov, born in the Russian SSR but raised in

[159] McCurdy, *Space and the American Imagination* (2011), p. 187.
[160] Office of Management and Budget, Background Paper, 'Meeting on the Space Shuttle', 14 November 1979, in *Exploring the Unknown: Selected Documents in the History of the US Civil Space Program Volume IV: Accessing Space* NASA SP: 4407 ed. by John Logsdon, (Washington DC: NASA, 1999), pp. 294-305 available online <via https://history.nasa.gov/SP-4407/vol4/cover.pdf> [accessed 28 February 2018].
[161] Jimmy Carter: 'Address to the Nation on Energy and National Goals: "The Malaise Speech"', 15 July 1979, *The American Presidency Project* <http://www.presidency.ucsb.edu/ws/?pid=32596> [accessed 28 February 2018]
[162] James Oberg, 'Red Star in Orbit', *Omni,* May 1979, p. 76.

America, hoped that the country of his birth might once again spur his adoptive homeland on to reach for the stars:

> Nevertheless, if America backs away, I'd rather that the Soviet Union establish a space-centred society and civilisation than that no one does. If the Soviet Union tries to do so, the hopes of humanity rest with its success, Good Luck, Comrades.[163]

To many American space enthusiasts like Asimov, the Salyuts were an irresistible spectacle that demonstrated their dream of space colonisation was feasible. However, the American pro-space movement of the 1970s and 1980s had a strongly libertarian streak. Space, after all, was a realm without limits.[164] This posed a political conundrum: how to reconcile the Salyuts' achievements with the collectivist ideology of the nation that launched them? This chapter's final section explores this problem by focusing on Gerard K. O'Neill, a prominent American astrofuturist who became known as the 'Guru' of space colonisation. O'Neill optimistically argued that communists would not conquer space, instead, the freedom of outer space would ultimately conquer communism.

O'Neill was a restless, charismatic professor of physics at the University of Princeton whose interests had turned from particle accelerators to space colonisation during the Apollo years. Inspired by a 1969 discussion about space colonisation with the students of his Freshman Physics 103-104 course, O'Neill gradually came to believe space colonies offered a technological solution to the problems that 'The Limits to Growth' thesis had called attention to: diminishing resources and spiralling population growth.[165] Refining his ideas over the next seven years, O'Neill's 1977 book *The High Frontier* argued that it was both technologically possible and economically desirable for America to mine materials from the Moon in order to construct a series of progressively more ambitious orbiting space colonies. He proposed locating these space habitats at 'LaGrange points': locations which, because of the interplay between the gravitational pull of the Earth and Moon and Sun, offered stable orbits that could be accessed from either Earth or the Moon with minimal fuel expenditure. In addition to being self-sufficient settlements, these colonies would double as orbital workshops and space-based solar power stations to help solve Earth's energy, overpopulation and environmental crises.[166] O'Neill was a firm believer in capitalism and an early draft of his futurological treatise *2081: A Hopeful View of the Human*

[163] Isaac Asimov, 'From Russia With Hope', *L-5 News* 7, 5, March 1982, p. 4.
[164] Michaud, *Reaching for the High Frontier* (1985), pp. 97.
[165] Kilgore, *Astrofuturism* (2003), pp. 150-9; McCray *Visioneers* (2012), pp. 41-52 (for the importance of the intellectual context of 'Limits to Growth' and the Club of Rome's work see pp. 26-33).
[166] Gerard K. O'Neill, *The High Frontier: Human Colonies in Space*, (Princeton, NJ: Space Studies Institute Press, 1989), pp. 275-310.

World depicted multinational corporations as a force for good.[167] The *High Frontier* did not just offer a better life for the inhabitants of its edenic space colonies, it also offered capitalism a future of eternal, unfettered expansion by freeing it from terrestrial limits. Rather than choking to death on an ever-more-crowded, polluted and exhausted Earth, the free enterprise system would expand across the solar system.

Space colonisation was not a new idea, but as O'Neill publicised his theories through magazine articles, lectures, seminars and media interviews, the concept began to find an enthusiastic audience among the burgeoning 'pro-space movement'.[168] O'Neill preferred talking about 'humanising' rather than 'colonising' space and argued the increased opportunities for social liberation and experimentation were a crucial attraction of the endeavour.[169] Unsurprisingly, his 'far out' vision of autonomous, self-sufficient communities blessed with abundant clean energy proved intoxicating to refugees of the 1960s counterculture.[170] The L-5 Society was a particularly vocal group of supporters who took their name from LaGrange point 5, a perfectly stable orbital location locked between the Earth and the Moon's gravity wells that would provide the ideal location for a future space colony. Their publication, the *L-5 Newsletter* became a vibrant hub of space colonisation discussion.[171] Robert Michaud's 1985 book *Reaching for the High Frontier* argued that groups like the L-5 Society emerged during the 1970s because they saw it as a 'lost decade'.[172] The enthusiasts and activists that made up the pro-space movement were simultaneously future-oriented and nostalgic. They eagerly anticipated the shuttle-era's promise of cheap reusable space technology whilst looking wistfully back at Apollo as they strove to return space exploration to its rightful position of cultural and political prominence.

As the American space enthusiasts waited for the shuttle, they found themselves fascinated by Soviet space activities. NASA's promises of reusable space transportation providing low cost access to space had been central to O'Neill's calculations about the economic feasibility of space colonisation.[173] As the shuttle's debut was repeatedly postponed, the Salyut programme proved to be an engrossing diversion. Magazines like *L-5 News* and *Omni* covered the Salyut programme as the Soviet Union's first, tentative steps towards space colonisation, devoting particular attention to the station's life support systems and botanical experiments and Soviet cultural

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[167] Gerard K. O'Neill, *2081 (Draft)*, p. 391, Folder 3: '2081' copy of 1979 draft 2 of 2, Box 37, Gerard K. O'Neill Papers, Smithsonian Institution National Air and Space Museum Archives, Chantilly, VA [Hereafter O'Neill Papers].
[168] O'Neill's 1974 article in *Physics Today* was a major catalyst in this process: Gerard K. O'Neill, 'The Colonization of Space', *Physics Today*. (September 1974), 27 (9), pp. 32–40; For representative TV coverage of the idea see '60 Minutes: Space Colonisation', TV Segment Transcript WTOP (CBS), 7:20 PM, 9 October 1977, Folder: SSI Misc 1977-1995, Box 9, O'Neill Papers.
[169] McCray, *Visioneers* (2013), p. 52.
[170] O'Neill, *The High Frontier*, (1989), p. 236; Kilgore, Astrofuturism (2003), p. 152.
[171] Michaud, *Reaching for the High Frontier:* (1986), pp. 41-79.
[172] Ibid., p. 20.
[173] O'Neill, *The High Frontier* (1989), pp. 163-4.

enthusiasm for space travel.[174] *L-5 News'* January 1979 issue was a special edition devoted to the Soviet space programme which reprinted Soviet space propaganda including a 'Fanciful Soviet cartoon of future space gardens' (a smiling cosmonaut floating amidst a cornucopia of space-grown vegetables) and a translated TASS interview with veteran cosmonaut Feoktistov on the future of space based solar power.[175] Admiration for Soviet competence was cut through with envy. In May 1978, Richard Stutzke of Colorado Springs complained to the letters page of *L-5 News* that the superpowers were re-enacting Aesop's famous race: 'The US 'hare' while capable of great speed, dawdles, while the Soviet 'tortoise' plods stolidly along.... Will the 'hare' lose again?'[176] American space enthusiasts saw Salyut as exactly the sort of incremental, forward-thinking programme that their government should be undertaking.

To make their case for space colonisation, space popularisers drew on idealised images of the American West heavily indebted to Frederick Jackson Turner's 'Frontier Thesis'. Writing shortly after the closing of the Western Frontier in 1890, Turner elegised the frontier as a place of place of spiritual and economic renewal: the crucible that forged a resourceful and freedom-loving people.[177] O'Neill argued that space colonisation would solve the problem that America was 'a frontier society lacking a frontier'. Conquering the 'High Frontier' would enrich both the American economy and the American soul.[178] However, there was another frontier society looking towards space. Russia's history had also been shaped by gradual transcontinental expansion and colonisation driven by 'Manifest Destiny', in its case southwards towards Central Asia and the Caucasus and eastward towards the Pacific Ocean.[179] Soviet space propaganda acknowledged this heritage by using frontier analogies within its space propaganda. Cosmonauts became pioneers who were rhetorically associated with the effort to cultivate the Kazakh steppe; from Gagarin onwards they were awarded that campaign's associated medal 'For the Development of the Virgin Lands'.[180] US space enthusiasts did not remark on the ubiquity of pioneer imagery; for space to remain the nation's birthright, America's frontier past had to remain exceptional.

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[174] The Soviet space presence is mentioned in almost every issue of *L-5 News*, for examples see: James Oberg, 'Soviet Mission Cut Short' *L-5 News*, 2, 4, April 1977 p. 9; Phil Parker, 'Salyut-6/Soyuz26 Joined by Soyuz-27', *L-5 News*, 3, 3, March, 1978, pp. 10-11; James Oberg, 'Salyut-6 Facts & Figures' *L-5 News*, 3,4, April 1978, pp.9-11; Gerald W Driggers, 'Space Station- 'Pathway into the Universe'' *L-5 News*, 5,4, April 1980, pp.4-5; for *Omni* coverage see James Oberg, 'Red Star in Orbit', p. 75-6, 79,117; Fred F. Durant, 'Visions of the Cosmos' p.80-87 both in *Omni,* May 1979.

[175] 'Soviets in Space' p. 2, 'Heading for Unknown Worlds' pp.9-11 *L-5 News*, 4, 1 January 1979.

[176] 'Letters', *L-5 News* 3, 5, May 1978, pp. 16-7.

[177] Michaud, *Reaching for the High Frontier* (1986), p. 298; McCurdy, *Space and the American Imagination* (2012), p. 161; McCray, *Visioneers* (2012), p. 72; Kilgore, *Astrofuturism* (2003), p. 184

[178] Gerard O'Neill, Draft of '2081' p. 11, Folder 2 '2081' copy of 1979 draft 1 of 2 1979,Box 37, O'Neill Papers

[179] Michael Khordarkhovsky, *Russia's Steppe Frontier: The Making of a Colonial Empire, 1500-1800* (Bloomington, IN: Indiana University Press, 2002), p. 2.

[180] Jenks, 'The Fiftieth Jubilee: Yuri Gagarin in the Soviet and post Soviet Imagination' in *Spacefarers* ed. by Neufeld (2011),81-106; 'Biography of Yuri Gagarin', Energia Corporation Website, <http://www.energia.ru/en/history/gagarin/gagarin_bio.html> [accessed 28 February 2018]

Soviet space propaganda's images of space as virgin earth, like its dreams of Martian orchards, harked back to cosmism: the mystical 19th century Russian philosophy that conceived of space conquest as a transcendental endeavour. The Influential early rocket theorist Konstantin Tsiolkovsky had been a disciple of cosmist philosopher Nikolai Fedorov who had viewed space colonisation as a 'problem of sanitation' once humanity had conquered death.[181] With Tsiolkovsky canonised by the Bolshevik regime as the 'Grandfather of Cosmonautics', cosmism lived on through Tsiolkovsky's expansive writings about humanity's beautiful destiny in space. The October 1982 issue of *Soviet Life* celebrating *Sputnik 1*'s 25th anniversary depicted the Salyut programme as the realisation of Tsiolkovsky's dreams. An article on 'Tsiolkovsky and Lenin' highlighted the Soviet state's rhetorical linkage of the scientist and the revolutionary by depicting both men as farsighted prophets who had boldly refused to conform to the stultifying Tsarist social order.[182] The issue brought the reader up to date with a feature on the Intercosmos programme, interviews with cosmonauts and their wives and an article where Academician Vsevolod Avduevskyii asserted 'the penetration of outer space and the colonisation of its near-Earth regions are already yielding great economic benefits'.[183] Tsiolkovsky's most famous quote 'Earth is the cradle of humanity, but one cannot live in the cradle forever.' could have doubled the American pro-space movement's motto.[184] It was this cosmist-inflected depiction of space exploration as humanity's inevitable destiny that resonated most with American space enthusiasts.

Convinced that he had stumbled across a world-saving idea, O'Neill searched for 'evidence that others before me had come to the same realization'. Eventually he found this affirmation in Tsiolkovsky's writings.[185] Both *2081* and *The High Frontier* hail Tsiolkovsky as a remarkably prophetic thinker whose only flaw was being too conservative in predicting when humans would first travel into space.[186] W. Patrick McCray characterises Tsiolkovsky and O'Neill as kindred spirits, 'visioneers' who strove to realise expansive techno-utopian visions through activism and carefully nurturing networks of space enthusiasts.[187] O'Neill complemented his Soviet predecessor in one of *The High Frontier*'s fictionalised depictions of life aboard space colonies by naming one of the huge spacecraft transporting colonists to their new orbital home the *Konstantin Tsiolkowsky* (sic).[188] Michael Hagermeister has unmasked Tsiolkovsky as a much more eccentric and troubling thinker than Soviet hagiography allowed for, one whose writings encompass not

[181] Young, *The Russian Cosmists* (2012), pp. 10-11.
[182] 'Lenin and Tsiolkovsky' *Soviet Life*, October 1982, pp. 16-7.
[183] Vseveolod Avduyesky, 'Space Research Pays Off for the Earth', *Soviet Life*, October 1982, p.39.
[184] For analysis of Tsiolkovsky's original remark and its implications see Siddiqi, *The Red Rockets' Glare* (2010), pp. 371-2.
[185] O'Neill *The High Frontier* (1989), p. 60-1.
[186] Gerard K. O'Neill, *2081: A Hopeful View of the Human Future* (New York, NY: Simon and Schuster, 1981), pp. 26, 62.
[187] McCray, *Visioneers* (2012), pp. 49-50, Visioneer is defined p.9.
[188] O'Neill, *The High Frontier* (1989), p. 6.

just rocketry equations but racist eugenics and bizarre theories of 'conscious' atoms.[189] Soviet propagandists filtered away this pseudoscientific dross, leaving only his dazzling mathematics and gleaming futurist aphorisms. O'Neill's image of Tsiolkovsky was similarly selective, depoliticising the rocket theorist much like President Ford's speech prior to Apollo-Soyuz's launch. O'Neill appropriated Soviet propaganda's depiction of the immortal space dreamer but erased Tsiolkovsky's gratitude to his communist patrons. Jettisoning Tsiolkovsky's Bolshevik baggage allowed O'Neill claim his own space colony vision transcended place and time.

Nevertheless, a communist presence in space complicated O'Neill's astrofuturist dream. O'Neill did occasionally appeal to competitive rationales to justify his vision. In a 1978 interview with the SETI (Search for Extra-Terrestrial Intelligence) newsletter *Cosmic Search* he warned: 'We're going to find one nation getting ahead of somebody else in that field, as Russia is getting ahead of the United States now, and that then someone else will begin to play catch up.'[190] O'Neill's heart was never truly in such space race justifications; these were short-sighted distractions from the *real* reasons to seize the High Frontier. His writings consistently presented a dichotomised vision of the future in which humanity must choose between salvation in space, a deeply American terrain of limitless freedom, abundance and technological innovation, or planet-bound oppression and despair. *The High Frontier* argued that if humanity remained shackled to Earth then a 'Steady State' dictatorship would inevitably arise to monitor and ration the planet's dwindling resources.[191] Brushing up on his futurist literature as he researched *2081*, O'Neill had been perturbed to realise that much of the technology underpinning the thirty-first-century surveillance society of Evgenii Zamiatin's *We* was already in use by twentieth-century police states.[192] The oppression, squalor and backwardness that O'Neill saw as central to Soviet totalitarianism were an anathema to the space frontier. O'Neill's depiction of Soviet space colonists in the science fiction interludes he used to illustrate his predictions reveals his solution to this problem. As the Soviets colonised space they could not help becoming less Soviet.

One of O'Neill's key literary techniques was to interweave his argument with brief fictionalised narratives depicting the blissful life awaiting space colonists, often in the form of letters from space colonists to earthbound acquaintances. Kilgore argues that these 'common man epistles' were intended to broaden space colonisation's appeal by proving 'that the future is not limited to a small elite - an accusation commonly levelled at the spaceflight community of the 1960s - but

[189] Hagermeister, 'The Conquest of Space and the Bliss of Atoms: Konstantin Tsiolkovsky' in *Soviet Space Culture* ed. by Maurer, Richers, Rüthers and Scheide, (2011), pp. 27-41.
[190] Gerard K. O'Neill 'Space Colonisation and SETI transcript' 26 September 1978 , p. 13 enclosed in John Kraus to Gerard K. O'Neill, 2 October 1978 p.13, Folder 12: '2081 Reference matter +Notes- Star Wars/ The Gods', Box 38, O'Neill Papers.
[191] O'Neill, *High Frontier* (1989), pp. 39-40, 263-4.
[192] O'Neill, *2081* (1980), pp. 30-1; O'Neill's notes on Zamiatin can be found in Folder 4:'['2081'] Reference Material and Notes Pt 1- The Prophets 1 Preface, 1978-1979', Box 37, O'Neill Papers.

welcomes ordinary folk as well.'[193] Much of *2081* takes the form of a letter from Eric Rawson, a second generation space colonist describing his first impressions of life on Earth at the end of the twenty-first century. Eric's grand tour includes a visit to the USSR, a totalitarian society struggling to maintain control in the face of mass emigration to space colonies which have become enclaves of enlightened scientists seeking to escape the suffocation of communist society. 'Innovative Russians who had wanted to escape the bureaucrats had volunteered for work in Siberia... But now the same sort of people chose the Russian colonies in space, where the living conditions were a good deal more pleasant'.[194] O'Neill rationalised the Soviets' presence in space by arguing that their outdated communist ideology would be incapable of competing with the libertarian promises of space colonisation.

O'Neill's reference to Siberia alluded to Akademgorodok (literally 'Academyville'), a city of research institutes and laboratories established by Krushchev in the forests south of Novosibirsk that had gained a reputation in the West as an oasis of comparative scientific freedom within the USSR.[195] A 1969 CIA report on Soviet science characterised the city as an escape from Soviet reality where 'The scientists appear to be in charge of affairs and party influence remains in the background.'[196] O'Neill had enjoyed pleasant visits to Akademgorodok in 1963 and 1965 at the invitation of Professor Andrei Budker, a jovial Soviet high energy physicist. During his first visit, O'Neill and Budker had debated the merits of communism and capitalism in 'the spirit... of a sports match' on a cruise along the Novosibirsk Reservoir; on his second, arcane discussions about storage ring technology for particle accelerators were leavened with cross-country skiing excursions.[197] Given his boundless confidence in the space frontier's rejuvenating power, it is easy to see why O'Neill imagined any Soviet space colony would reflect his happy memories of Akademgorodok and the transnational scientific comradeship he had encountered there. O'Neill was confident that regardless of the Kremlin's motivations for establishing space colonies, these too would eventually become refuges for Soviet nonconformists.

The principal mention of future Soviet space colonisation within *The High Frontier* occurs in a reference to a Russian space ballet company. O'Neill was unconvinced by the idea that space was the ultimate military high ground and believed 'space habitats will seem rather unpromising as sites for weapons or military bases.' He argued space colonies' vulnerability to ASAT attack and

[193] Kilgore, *Astrofuturism* (2003), p. 174.
[194] O'Neill, *2081* (1980), pp. 211-2.
[195] For the limits of Akademgorodok's political and scientific freedom see Paul R. Josephson, *New Atlantis Revisited: Akademgorodok, the Siberian City of Science* (Princeton NJ: Princeton University Press, 1997), particularly pp. 263-304.
[196] CIA Directorate of Intelligence, 'Weekly Summary Special Report no 724: Kremlin and Scientist: Dependence and Disaffection', 28 March 1969, pp. 3-4, available online via <https://www.cia.gov/library/readingroom/docs/CIA-RDP85T00875R001500010001-0.pdf> [accessed 28 February 2018].
[197] Gerard K. O'Neill, 'Recollections of Professor Andrei Budker' December 1984, in Folder 4: 'Historical Documents Misc. 1972-1984', Box 6, O'Neill Papers.

their orbital location at distant LaGrange points meant they 'can never be used as effective sites for an attack on the home planet.'[198] In addition to the economic arguments for space colonisation, O'Neill contended that almost any conceivable pastime, from swimming to sex, would be more enjoyable in a low gravity environment.[199] One of his colonist correspondents enthuses about the grace of low gravity ballet:

> I could never get Dad to a ballet back home, but the Russian company from one of their communities was here last week...It was one tenth gravity of course, and we both realised that ballet was really meant to be done that way...We came away just stunned.[200]

O'Neill's enthusiastic depiction of the visiting ballet company allowed him to illustrate his sales pitch with a colourful example, but it also recalls his personal exposure to Russia's signature art form. During his 1965 visit to the USSR, O'Neill's hosts had treated their guest to performances of *Swan Lake* at Moscow's Kremlin Palace Theatre and an adaptation of Pushkin's *The Fountain of Bakhchirasay* in Novosibirsk.[201] O'Neill's depiction of Soviet space colonists as artists testifies to his belief that humanity's experience in space would be defined by pleasure and cultural exchange rather than warfare and suspicion. O'Neill was confident that the Soviet presence in space would not threaten America's cosmic destiny. The professor sought to reassure his countrymen that there was space enough for everyone on the High Frontier, what mattered was the political will to reach for it. Totalitarianism would be powerless in the face of space colonisation's siren song; it would be *Russian* scientists and artists rather than *Soviet* commissars and bureaucrats who would fulfil Tsiolkovsky's dream.

Although NASA's planetary exploration and space shuttle programmes exhibited technological complexity far surpassing comparable Soviet efforts, the late 1970s saw mounting anxiety about an apparently resurgent Soviet space programme. In addition to reflecting the more general sense of 'malaise' pervading contemporary discussion of the future and America's place in it, these anxieties were also specifically informed by the 1975-1981 American crewed spaceflight hiatus. The lack of astronaut flights focused attention onto the deficiencies of American space policy whilst magnifying the impact of the USSR's space activities at a time of growing concern about Soviet geopolitical aggression. As US-Soviet detente grew evermore discredited as a viable 'structure for peace', so too did the Apollo-Soyuz blueprint for US-Soviet space cooperation. With space detente increasingly derided as a Nixonian spectacle, it seemed that superpowers' future in space would be defined by ASAT warfare and prestige rivalry rather than cooperation. The American pro-space movement could not help but be affected by this political context. During the

[198] O'Neill, *The High Frontier* (1989), p. 111.
[199] Ibid., p. 97.
[200] Ibid., p. 214.
[201] Ticket stubs for both performances can be found in Folder 1:'Ephemera from trip to Russia 1965 1 of 2', Box 52, O'Neill Papers.

1980s as space-based ballistic missile defence concepts entered mainstream discourse, Gerard O'Neill would watch with horror as 'High Frontier' became a byword not for the peaceful humanisation of space, but for a militaristic vision of space control.

Chapter Four | Seizing the High Ground: Space Control, the Red Shield and Reagan's Strategic Defence Initiative

'The United States cannot and will not ignore the value of the military use of space and allow the Soviet Union to dominate the "ultimate high ground."'- Major General Thomas C. Brandt, chief of the joint planning staff for space, Office of the Joint Chiefs of Staff, 1984.[1]

During the early 1980s, Gerard K. O'Neill and his friend and lawyer, Philip Friedman attempted to capitalise on phenomenal success of George Lucas' 1977 space opera *Star Wars* by exploring whether *The High Frontier* might be adapted into a feature film or television miniseries.[2] Unfortunately, the evocative term 'High Frontier' was slipping from O'Neill's clutches amidst rising Cold War tensions. In 1982, the professor was dismayed to discover that Lt. Gen. Daniel O. Graham, former CIA Deputy Director and DIA Director, was publicising the findings of the 'High Frontier Panel', a pressure group promoting a bellicose vision of space-based ballistic missile defence. O'Neill resented his vision being conflated with a scheme that he believed was technologically spurious and launched a protracted legal attempt to stop Graham from using the term.[3] Correcting those who deployed Graham's usage of 'High Frontier' became almost impossible after President Reagan announced his multi-billion dollar effort to investigate BMD technologies, the Strategic Defence Initiative (SDI), in March 1983. In a June 1983 letter to *Newsweek,* Friedman argued 'High Frontier' was a valuable trademark like 'Xerox or Coca Cola', contrasting Graham's militaristic vision with O'Neill's hopeful dream:

> The real High Frontier offers new hope and possibilities for all people on the planet. Like the earthbound frontiers we've been familiar with, the High Frontier is going to create a new generation of pioneers and ultimately enrich us all. And this time there's even a chance we can leave guns behind.[4]

O'Neill's placid space colonies and Graham's laser-equipped based battle stations were more similar than they initially appear. Looking to space for solutions to pressing earthly problems, both visions feared a future of oppressive constraints if America remained confined to the planet's surface. The crucial difference was what they identified as the constricting threat. For O'Neill, it was a steady state world order based on the Malthusian ideology of the Limits to Growth thesis. For Graham and his fellow BMD-believers, it was a Soviet orbital blockade that would rob America

[1] Thomas C. Brandt, 'The Military Uses of Space' in National Defense University, *America Plans for Space* (Washington DC: National Defense University Press, 1986), pp. 81-91 (p. 91).
[2] Philip Friedman to Patty Blau, 17 January 1980, Folder 4 'Friedman/film selected material re: The High Frontier' 1978-80, Box 32, O'Neill Papers.
[3] O'Neill, *The High Frontier*, (1989), pp. 111; Philip Friedman to Daniel O. Graham, 5 February 1982, Folder 7 'Trademark- Graham 1980-5, Folder 2 of 3', Box 32, O'Neill Papers.
[4] Philip Freidman to the Editor of *Newsweek*, 5 April 1983, Folder 6: 'Trademark- Graham 1980-5 Folder 1 of 3'Box 32, O'Neill Papers.

of its free access to space, depriving it of a 'historic, but fleeting opportunity to take its destiny into its own hands.[5] Both visions appealed to Turner's Frontier Thesis to argue that America must seize the initiative in space in order to survive. Graham used an Old West analogy to delineate the Federal Government's role in opening the space frontier; besides developing the necessary transport infrastructure 'it should protect the early settlers so they won't be scalped by the Indians- in this case, the Soviets.'[6] Whereas O'Neill predicted Marxist-Leninism would wither as humanity embraced its spacefaring destiny, Daniel O. Graham stressed the seriousness of the Soviet space challenge. He underscored this by comparing America's Cold War foe to its first existential enemy: the bestial Indian waiting in ambush. For supporters of Graham's space control vision, the Soviet space programme was a crucial obstacle to realising their dream of harnessing the space frontier's promise.

Popularly dubbed 'Star Wars', SDI sought to research BMD technologies to shift America's strategic posture from one of Mutually Assured Destruction (MAD) towards a more defence-oriented stance. Launched during a March 1983 televised address on the Soviet strategic threat, Ronald Reagan framed missile defence as a moral imperative by asking 'wouldn't it be better to protect the American people rather than avenge them?'[7] Intensely controversial from the moment it was announced, the SDI profoundly affected the political discourse surrounding space technology, military strategy and missile defence during the 1980s. A 1987 SDI research guide listed over 1,000 citations.[8] Although Reagan's initial speech did not mention space, it was space-based missile defence that captured the American public's imagination. With proponents of space-based missile defence depicting outer space as the battleground in which the Cold War would be won or lost, it seemed that the night sky would soon be crowded with American and Soviet BMD satellites.

Iwan Morgan's recent biography of Reagan contended that one of the fortieth president's most notable achievements was the consistent clarity with which he articulated a powerfully optimistic vision of America's future.[9] SDI was in integral part of this vision: it was more than a military R&D project; it was a dream of deliverance. The 1972 US-Soviet Anti-Ballistic Missile (ABM) Treaty had limited the superpowers to the protection of only two sites: their capital and a single missile

[5] Daniel O. Graham, *The High Frontier* (New York, NY: TOR, 1983), p.25.
[6] 'Selling the High Frontier', *Defense Electronics*, 4 November 1982, p. 9-F, Box 392, Papers of The Committee on the Present Danger, Hoover Institution Archives, Stanford University, CA.
[7] Ronald Reagan, 'Address to the Nation on Defense and National Security,' 23 March, 1983. Available online via *The American Presidency Project*.<http://www.presidency.ucsb.edu/ws/index.php?pid=41093&st=&st1=> [accessed 28 February 2018]
[8] Robert M. Lawrence, *Strategic Defense Initiative: Bibliography and Research Guide* (Boulder, CO: Westview Press, 1987).
[9] Iwan Morgan, *Reagan: American Icon* (London: IB Taurus, 2016) pp. 326-7.

field.[10] This severely restricted the scope for the testing and deployment of BMD systems forcing the Reagan administration to construe the SDI as a research programme charged with investigating, but not actually testing or deploying BMD technology.[11] Vaguely defined and malleable, SDI existed in the intangible realm of symbolism as much as it did in laboratories and Beltway think tanks. Like the Kingdom of Heaven or Full Communism, the mirage of an operational BMD system that would protect the American population was forever shimmering on the horizon. As such, it cannot be understood purely in terms of funds allocated to the Strategic Defence Initiative Organisation (SDIO), or the evolution of its proposed components from the nuclear powered X-ray laser battlestations initially suggested by the Livermore Laboratory's 'Project Excalibur' to the miniaturised 'Brilliant Pebbles' interceptor satellites of the late 1980s.[12] Linenthal characterises SDI as a vision of 'restorative and transformative power' which would dispel the shadow of Hiroshima by morally redeeming American technology.[13] Space-based BMD schemes presented a redemptive vision of the future that relied on the gleam of high technology; SDI was an astrofuturist solution to the nuclear quandary.

Aside from a few notable exceptions, aerospace historians have proved remarkably uninterested in SDI, preferring, instead, to discuss developments that resulted in more tangible hardware like NASA's shuttle programme.[14] Fortunately, a robust historical literature on SDI has emerged that supersedes much of the earlier technical or polemical writing on missile defence. The SDI historiography focuses on four aspects of the policy: its genesis and heritage, its political symbolism, its detractors in the scientific community and the enthusiasm it prompted within the military-industrial complex.[15] The Cold War space rivalry makes several notable appearances within this literature. Space control theories are described as a key influence on the High Frontier Panel's argument that America must establish itself as the preeminent spacefaring nation in order

[10] Baucom, *The Origins of SDI* (1992), p. 74.
[11] For BMD activists hostility to the ABM Treaty see Pratt, *Selling Strategic Defense Interests* (1990), pp.31-45; For the Reagan Administration's attempts to tortuously redefine what was permissible as 'research' under the Treaty's terms see Kevin C. Kennedy, 'Treaty Interpretation by the Executive Branch: the ABM Treaty and 'Star Wars' Testing and Development.', *The American Journal of International Law*, 80, 4, (1986), pp. 854–877; Frances FitzGerald, *Way Out There in the Blue: Reagan, Star Wars, and the End of the Cold War* (New York : Simon & Schuster,2000), pp. 82-3, 114-146, 289-304.
[12] By 1989, total budgetary requests by the SDIO and DOE for SDI related funds totalled $24,974 million, of which $16,246 million was allocated: Reiss, *The Strategic Defence Initiative* (1992), p. 92; for Project Excalibur and Brilliant Pebbles see William J. Broad, *Teller's War: The Top Secret Story Behind the Star Wars Deception* (New York, NY: Simon and Schuster, 1992), pp. 145, 246-7.
[13] Edward Tabor Linenthal, *Symbolic Defense: The Cultural Significance of the Strategic Defense Initiative* (Chicago Il: University of Illinois Press, 1989), pp. 4- 9.
[14] Andrew J. Butrica's essay on the 'conservative space agenda' is the most notable exception, '"The Right Stuff": The Reagan Revolution and the U.S. Space Program' in *Remembering the Space Age,* ed. by Steven J. Dick (Washington DC: NASA, 2008), p. 121-134; See also Burrows, *This New Ocean* (1999), pp. 534-54; DeWitt, *Astrofutrism* (2003), pp. 201-12; McCurdy *Space and the American Imagination* (2011), p. 88.
[15] For standout examples of each particular strand see Donald R. Baucom, *The Origins of SDI: 1944-1983* (Lawrence, KS: University Press of Kansas, 1992); Linenthal, *Symbolic Defense* (1989); Gerald M. Steinberg ed. *Lost in Space: The Domestic Politics of the Strategic Defense Initiative* (Lexington, MA: Lexington Books, 1988); Erik K. Pratt, *Selling Strategic Defense: Interests, Ideologies and the Arms Race* (London: Riener, 1990).

to deploy a space-based defence system.[16] As Pratt shrewdly points out, underlying these visions of 'Pax Americana' through spacepower was 'a mounting fear that the USSR would achieve similar goals first and subjugate the world to a "Pax Sovietica"'.[17] Furthermore, both Paul B. Stares and Senator Larry Pressler depict the congressional debates over whether America should develop an ASAT capability during the late 1970s and early 1980s as rehearsals for those surrounding SDI, with a significant overlap in participants and rhetoric.[18] Finally, historians have highlighted the increasingly prominent role that Soviet BMD research played in pro-SDI rhetoric as criticism of the Policy intensified. To deflect criticism of the SDI as an unwarranted and destabilising provocation, the Reagan administration began framing the policy as a prudent response to the Soviets' menacing 'Red Shield' BMD programme.[19]

This chapter builds on the themes the SDI historiography has identified. It describes how Reagan's signature strategy refocused political attention onto the superpower space rivalry, fuelling anxieties about leadership in space exploration that had surfaced during the hiatus. Focusing on SDI supporters both inside and outside of government, it explores how the Soviet presence in space both necessitated and complicated the goal of 'space control'- a critical prerequisite for space-based BMD schemes. Its timeframe stretches from the theories that paved the way for Reagan's policy through to the Soviet leadership's decision to 'de-link' objections to SDI from wider arms control negotiations in 1987. It begins by relating how BMD evangelists like Lt Gen. Daniel O. Graham and science fiction author Jerry Pournelle resurrected depictions of space as the decisive military high ground. Entranced by a fusion of astrofuturism and missile defence ideology, they presented outer space as the key to realising long-held dreams of space commercialisation and strategic invulnerability. This chapter's second half details how images of a Soviet resurgence in space became an indispensable element of the Reagan administration's warnings about the SDI's malevolent mirror image, the 'Red Shield'. The Soviet space programme served a vital function within pro-SDI rhetoric: it proved that the USSR coveted outer space's promise and power, something Americans ignored at their peril.

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[16] Baucom, *The Origins of SDI* (1992), pp. 118-25, 144-6; Broad, *Teller's War* (1992*)*; pp. 105-6; Fitzgerald, *Way Out There in the Blue* (2000);Nigel Hey, *The Star Wars Enigma: Behind the Scenes of the Cold War Race for Missile Defense* (Washington DC: Potomac Books, 2007), pp. 73-4.

[17] Pratt, *Selling Strategic Defense* (1990), pp. 97.

[18] See Stares, *The Militarisation of Space* (1985), pp. 180-200, 213-4, 223-4; Larry Pressler, *Star Wars: The Strategic Defense Initiative Debates in Congress* (New York, NY: Praeger, 1986), p. 44-8, 180.

[19] Before being popularised by Reagan, the term 'Red Shield' was used in a 1986 *Reader's Digest* article: Ralph Kinney Bennet, 'Russia's Secret Red Shield', *Reader's Digest*, 47, September 1986, p.4; Linenthal, *Symbolic Defense* (1989), p. 51; Broad, *Teller's War* (1992), pp. 146-7, 187; Edward Reiss, *The Strategic Defence Initiative*(Cambridge: Cambridge University Press, 1992), p. 55; Gerald M. Steinberg, 'Preaching to the Converted: The Role of Scientists in the SDI Debate' in *Lost in Space : The Domestic Politics of the Strategic Defense Initiative* ed. by Gerald M. Steinberg, (Lexington, MA: Lexington Books, 1988), pp. 89-107 (p. 100).

Pax Sovietica: Space Control Arguments in Ballistic Missile Defence Advocacy

'If we allow the Soviets to dominate space and acquire the means to deny the Free World access to space except on Soviet terms, we are doomed to surrender our liberty.'- Lt. Gen. Daniel O. Graham, 1986.[20]

Two months after giving his 23 March 1983 'Star Wars' speech, Ronald Reagan met briefly with members of a missile defence lobbying group: the High Frontier Panel. The delegation was comprised of three business leaders who belonged to Reagan's informal inner circle, the 'Kitchen Cabinet': Karl R. Bendetsen, William Wilson and Joseph Coors as well as the atomic physicist, Livermore National Laboratory Director Emeritus and 'Father of the Hydrogen Bomb' Dr. Edward Teller. The BMD evangelists passed the President a memo that warned:

> Control of space is a central Soviet objective. It occupies the highest organisational status directly under the Politburo... The nation which first controls space will have the power to deny or dictate terms of access. The Soviets will stop at nothing to be first.

Letting them succeed 'would conclusively alter the world balance of power.' America's only hope was to take 'extraordinary measures' comparable to the Manhattan Project, ICBM and Apollo programmes and deploy its own space-based missile defence system.[21] The old men in the Kremlin understood the new high ground's strategic importance; the West had a brief window of opportunity to frustrate their schemes and seize outer space's phenomenal advantages for itself.

Obsessed with high technology's promise, pro-BMD groups like the High Frontier Panel argued leadership in space exploration was a critical military objective. Their strategic worldview was astrodeterminist: space control did more than compound the effectiveness of conventional or strategic arms, it was the decisive factor.[22] It was the same mind-set that had motivated a host of ambitious space proposals in the late 1950s, ranging from demands that America's space effort be placed under military control to Brigadier General Homer A. Boushey's scheme for transforming the Moon into a missile base.[23] As in the Sputnik-Vostok era, the Soviet space presence was described as an existential threat to capitalism's survival. This section explores how missile defence activists used apocalyptic predictions of Soviet orbital blockades to justify space-based missile defence programmes. However, warnings about the Soviet space threat were difficult to

[20] Daniel O. Graham, *To Provide for the Common* Defense (Louisville, KY: Publishers Press Incorporated, 1986), p. 95 available in Folder: SDI Background, Box 682, Karl R. Bendetsen Papers, Hoover Institution, Stanford University, Palo Alto, California (Hereafter: 'Bendetsen Papers').
[21] Karl R. Bendetsen to Clare Boothe Luce, 23 May 1984, Attachment A:'Memorandum for the President', Folder: Special Project, Box 676, Bendetsen Papers.
[22] Everett C. Dolman uses 'astrodeterminist' to describe utopian views of space technology's potential though I believe Kilgore's 'astrofuturist' suits this tendency better. Dolman, *Astropolitik* (2002), p. 169.
[23] William Burrows, 'Beyond the Blue Horizon: Lunar Missile Base Concepts in the Early Cold War' in *Harnessing the Heavens: Defense through Space* ed. by Paul G. Gillespie and Grant T. Weller (Chicago, IL: Imprint, 2008), pp. 25-33 (p. 27).

reconcile with pro-BMD discourse's argument that high technology was a uniquely American area of advantage. This fixation on space control contributed to the overall incoherence of the missile defence vision where fantasies of technologically-assisted invincibility coexisted uneasily alongside gloomy predictions of imminent communist triumph.

Ballistic missile defence research dated back to the 1940s, but it was only after the first Soviet ICBM tests in the late 1950s that the interminable and repetitive debate over whether America needed a BMD system (and if so, what sort?) truly began.[24] Successive administrations toyed with the idea of 'terminal phase' missile defence, systems that would intercept a limited or accidental missile attack in the final moments before it reached its target. Testing on land-based terminal defence systems was carried out with the Nike/Zeus system during of the early 1960s and the SENTINEL and SAFEGUARD programmes under the Nixon and Johnson administrations. However, as SDIO historian Donald Baucom relates, the SALT 1 accords and ABM treaty of 1972 'effectively killed' SAFEGUARD and the system was finally shut down by Congress in 1975 two weeks after it became operational.[25]

Individual programmes like SAFEGUARD might be cancelled but the missile defence dream of deliverance from nuclear terror proved more difficult to dispel. H. Bruce Franklin links these 'weapons disguised as their antithesis' to the recurrent cultural trope of the 'superweapon'- a technology that enables America to triumph over foreign barbarism. Similarly, Edward Tabor Linenthal argues that Reagan's March 1983 'Star Wars' speech was so effective because it eloquently synthesised the central themes of twenty years of American pro-BMD discourse: 'fear of atomic vulnerability, faith in American technology, fascination with progress in exotic technology (like the laser), and the perceived inspirational value of the patriotic spirit'.[26] BMD popularisers were particularly fixated on the futuristic aura of laser, particle or directed energy beams. The dream, or nightmare, of the beam weapon had reverberated across science fiction since H. G. Wells' heat ray-wielding Martian imperialists. By the early 1960s, laser research was a booming and generously funded area of physics and the realisation of 'Death Ray' fantasies seemed imminent.[27] Missile defence was portrayed as a proactive alternative to the despair and fatalism of MAD. It offered a *deus ex machina* resolution to the nuclear drama where the god and the machine were indivisible.

[24] For the prehistory of SDI and its connections to earlier BMD proposals see: Pratt, *Selling Strategic Defense* (1990), pp. 9-47; Reiss, *The Strategic Defence Initiative* (1992), pp. 21-36; Nigel Hey, *The Star Wars Enigma* (2007), pp. 10-36; Baucom, *The Origins of SDI* (1992), pp. 2-113.
[25] Baucom, *The Origins of* SDI (1992), pp. 71, 91-6.
[26] H. Bruce Franklin, *The Superweapon and the American Imagination*, (Oxford: Oxford University Press, 1986), p. 198; Linenthal, *Symbolic Defence* (1989), p. 5.
[27] Franklin, *War Stars* (1988), pp. 202-3; Joan Lisa Bromberg, 'Device Physics Vis-à-Vis Fundamental Physics in Cold War America: The Case of Quantum Optics.', *Isis*, 97, 2, (2006), pp. 237–259 (p. 240) ;Rebecca Slayton, 'From Death Rays to Light Sabers: Making Laser Weapons Surgically Precise.', *Technology and Culture*, 52, 1, (2011), pp. 45-74 (55-6).

Barry Goldwater's thwarted but totemic 1964 presidential campaign presaged crucial elements of pro-SDI rhetoric by combining fears of the Soviet space programme with the strategic potential of beam weaponry. Goldwater had been influenced by the post-Sputnik expectations that space exploration would revolutionise military strategy and he argued it was imperative to contest 'obvious Soviet moves to pre-empt the so-called 'military field of the future.''[28] In a 1964 *Popular Mechanics* article, the Republican candidate argued America should abandon the Moon Race, place the manned space programme under military control and develop laser weapons which could 'with lethal certainty, vaporize enemy nuclear space weapons before they could harm our territory.'[29] Goldwater's warnings about Soviet progress were simultaneously vague yet disturbingly vivid: 'I am told that Nikita Khrushchev keeps on his desk a piece of metal scarred by a laser beam… perhaps the Russians are doing more than speculate. We are not.'[30] Goldwater's story of Khrushchev's sinister paperweight sets the tone for the next quarter century's warnings about Soviet BMD research. It is forever the eleventh hour, the technology being described is always decisive and the listener is roused into action with the classic Cold War dichotomy between Western inaction and communist determination. Goldwater's military space programme may not have impressed the electorate - one poll found only 20% or respondents in favour of his bellicose proposals- but his argument that the Cold War could be won through space control and beam weaponry had tapped into something powerful.[31]

Historians argue that 'militarist' science fiction writers like Jerry Pournelle, Larry Niven, Robert Heinlein and Ben Bova provided the SDI vision with crucial imaginative inspiration and cultural reinforcement.[32] Before his literary career had taken off, Pournelle had worked as an aviation psychologist, Boeing systems engineer and political science professor.[33] In the late 1960s, he collaborated with Hoover Institution Senior Fellow Stefan Possony and aerospace engineer Francis X. Kane (uncredited) on a book that bridges the gap between Goldwater and Reagan's BMD visions. *The Strategy of Technology* recalls the uncompromising Cold Warrior rhetoric of Goldwater's *Why Not Victory* whilst presaging the Reagan administration's framing of missile defence as the true peace movement. It begins by castigating environmentalists for spreading 'the illusion that technology is the modern incarnation of the devil'. The true source of global evil was the USSR, variously described as 'the Nazis of our Age' and 'Oriental despots', whose communist

[28] Barry Goldwater, '10 Ways to Catch Up in Space Race', Los *Angeles Times*, 15 January 1963, p. A4.
[29] Robert C. Toth, 'Military Should Direct All Manned Space Research, Goldwater Says', *Los Angeles Times*, 21 July 1964 p. 1.
[30] McDougall, *The Heavens and the Earth*, (1997), p. 392.
[31] Robert Dallek, 'Johnson and Project Apollo' in *Spaceflight and the Myth of Presidential Leadership* ed. by Launius and McCurdy (1997), pp. 68-91 (p. 78-9).
[32] Franklin, *War Stars* (1988), pp. 199-203; Reiss, *The Strategic Defence Initiative*(1992), pp. 81-2; Chris Hables Grey, '"There Will Be War!": Future War Fantasies and Militaristic Science Fiction in the 1980s', *Science Fiction Studies,* 21, 3, (1994), pp. 315-336; FitzGerald, *Way Out There in the Blue* (2000), p. 132; Hey, *The Star Wars Enigma* (2007), pp. 73-5.
[33] Grey, 'There Will Be War!', *Science Fiction Studies,* 21, 3 (1994), pp. 315-336 (pp. 323-4).

creed demanded the bloody 'human sacrifice' of violent revolution. In the face of this monstrous foe, technology, 'America's manifest destiny', offered salvation rather than damnation.[34] The titular 'strategy of technology' was one of 'Assured Survival' wherein America must seize the initiative and deploy a comprehensive BMD network including space-based beam weapons.[35] This flawless cybernetic system dedicated to resolving the ultimate threat to civilisation appealed to the Cold War technocrat as well as the science fiction visionary within Pournelle.

In *The Strategy of Technology*'s conception of the Cold War as a technological duel to the death, space control and missile defence were complementary goals. Consequently, the Soviet space programme was a significant obstacle on the pathway to national salvation. Like Goldwater, Possony and Pournelle believed that space exploration was 'possibly the most important military medium of the future' and they bemoaned that America's programme was under the direction of a civilian agency. By contrast, space control was a central Soviet strategic objective: 'As we stand on the threshold of the space age, we face an unprecedented situation: a clear military superiority in space potentially can ensure denial of creating a counter-capability.'[36] Despite being published in 1970, *The Strategy of Technology* often reads like a document from the early 1960s. Ignoring the billions of dollars spent on American military space programmes, it lamented: 'We have taken no military initiatives in space. Soviet astronauts have flown over the White House, while we have yet to place a man in orbit over any part of the USSR.'[37] The orbiting cosmonaut as a stand in for Soviet space weapons was a Vostok-era cliché informed by Nikita Khrushchev's boasts that Gagarin and Titov could have been replaced with 'other payloads'.[38]

As anachronistic as Possony and Pournelle's warnings appeared in the afterglow of *Apollo 11*, they were responses to lingering contemporary concerns about space technology's military potential. As well as ASAT tests, the late 1960s saw a series of Soviet launches that appeared to be tests of a potential Fractional Orbital Bombardment System (FOBS). The FOBS was an ICBM modified in such a way as to allow it to make a partial orbit of the Earth, allowing the USSR to strike the United States from the direction an attack would be least expected from, the south. American policymakers had rejected developing such a system in the late 1950s but awareness of Soviet interest in the area played an important role in convincing Kennedy to invest in ASAT technology. The FOBS issue came to wider public attention in November 1967 when Defence Secretary Robert

[34] Pournelle and Possony, *The Strategy of Technology* (1970), pp. xxii-2.
[35] Ibid., pp. 129-31.
[36] Ibid., p. 105.
[37] Ibid., pp. 28-9.
[38] Stares, *The Militarisation of Space*, (1985), p. 75.

J. McNamara announced that although the Soviets had developed a capability, their system constituted neither a violation of the OST nor an urgent threat to the US.[39]

Possony and Pournelle disagreed. They argued that 'Fractional Orbital Bombardment or Fully Orbital Bombardment Systems (FOBS) have required another hurried examination of our strategic defence concepts. Every USSR deployment causes a fundamental re-evaluation of our force structure.'[40] *The Strategy of Technology* claimed that whilst America focused on 'massive and expensive NASA spectaculars' with the Apollo programme, the Soviets were solidifying their 'lead in many military phases of space'.[41] Forceful as their warnings were, they were ill timed. *Apollo 11* did not entirely erase underlying anxieties about the Soviet space threat, but it did make attempts to raise the alarm considerably harder. As far as many Americans were concerned, the Moon landings proved the technology race had already been won. Overall concern about space warfare receded with the onset of detente, though one of the reasons that Soviet FOBS tests tailed off entirely by 1971 was that a variant of the system had by then entered active service.[42]

The political landscape in the late 1970s was much more conducive to *The Strategy of Technology*'s arguments. Missile defence was an increasingly attractive proposition to conservatives who had lost faith in a Cold War strategy based on mutually assured destruction and detente. The conservative case against detente had been crystallised in the writings of the Committee on the Present Danger (CPD) which argued America was losing vital ground to an ascendant USSR. The CPD's 1977 report 'What is the Soviet Union Up To?' reiterated anticommunist received wisdom with its depiction of the USSR as a duplicitous Marxist theocracy fanatically bent on world domination. The CPD's claim that the Soviets were using detente as a respite to achieve a first strike capability resonated with conservatives worried by the USSR's strategic weapons build-up.[43] Like the 'Missile Gap' of the early 1960s the illusory nature of this 'window of vulnerability' did not stop it from having profound political ramifications.[44] Historians have stressed the overlapping membership of the High Frontier Panel, the CPD and the 'Team B' group that CIA Director George H. W. Bush convened in 1976 to challenge received intelligence

[39] Stares, *The Militarisation of Space*, (1985), pp. 99-100; Kalic, *US Presidents and the Militarization of Space, 1946-1967* (2012), pp. 83-87, 116-7; For a contemporary classified appraisal of the FOBS threat see 'National Intelligence Estimate: Soviet Capabilities for Strategic Attack' (NIE 11-8-67), 26 October 1967, pp. 13-15 <https://www.cia.gov/library/readingroom/docs/DOC_0000268004.pdf> [accessed 28 February 2018].
[40] Possony and Pournelle, *The Strategy of Technology* (1970), p. 135.
[41] Ibid., p. 96.
[42] Johnson, *Soviet Military Strategy in Space* (1987), pp. 131,135-6; 'R-360/SL-X? FOBS' Federation of Atomic Scientists website, 29 July 2000 <https://fas.org/nuke/guide/russia/icbm/r-36o.htm> [accessed 28 February 2018].
[43] The Committee on the Present Danger, 'What is the Soviet Union up to?' in *Alerting America: The Papers of the Committee on the Present Danger* ed. by Charles Tyroler II and Max M. Kampelman (Washington DC: Pergamon Brassey's, 1984), pp. 10-15.
[44] Pavel Podvig, 'The Window of Vulnerability That Wasn't: Soviet Military Buildup in the 1970s: A Research Note.', *International Security*, 33, 1, (2008), pp. 118–138 (120-1).

community wisdom; Graham, for instance, was a member of all three.[45] An underappreciated element of SDI's appeal was that it offered a unilateral solution to the nuclear stalemate that circumvented the negotiating table and the duplicitous Soviets. The BMD dream sought to elide the difficult reality of diplomatic compromise with an appealing vision of infallible technology.

The resumption of Soviet ASAT tests within a climate of growing scepticism about US-Soviet detente reawakened fears of communist death rays. Reports of Soviet interest in space-based BMD weapons had surfaced in the press in late 1975, but it would be another year before the threat of Soviet missile defence found an authoritative voice. Almost immediately after retiring as head of Air Force Intelligence in January 1977, Major General George J. Keegan captured press attention with his claims that the US had vastly underestimated the Soviet military threat, and by March his claims of a fast emerging beam weaponry 'gap' were being widely circulated.[46] Meanwhile, another campaign to rouse America from its slumber was being waged within the military-industrial complex. Maxwell W. Hunter III, a Lockheed Corporation aerospace engineer, was convinced that space-based lasers held the key to missile defence. After all, what Soviet weapon was faster than light? Hunter's widely circulated pamphlet *Strategic Dynamics and Space-Laser Weaponry*, nicknamed the 'Halloween Paper' as it was issued on 31 October 1977, is frequently hailed as a founding text of the SDI vision. The Halloween Paper found its way to the junior Republican Senator for Wyoming, Malcolm Wallop through his aide Dr Angelo Codevilla. Wallop became an enthusiastic champion of Hunter's missile defence gospel within the Republican establishment.[47] Keegan and Hunter were responding to the frustrated feelings of helplessness that pervaded conservative rhetoric in the late 1970s. Proposals that would have seemed fantastical during the space slump appeared more credible when set against a background of post-detente fears of imminent Soviet strategic superiority.

Keegan and Hunter's astrodeterminist military strategy informed their vigorous objection to the idea that space should be maintained as a sanctuary from warfare. They believed this argument was worse than wrongheaded pacifism, it was a communist ruse designed to thwart America's only hope of survival. Hunter denounced the sanctuary view as a 'cruel, genocidal hoax' whilst Keegan, in the foreword to a 1981 book on space warfare, likened it to the appeasement of Nazi Germany:

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[45] Pratt, *Selling Strategic Defense* (1990), p. 46; Reiss, *The Strategic Defence Initiative* (1992), p. 4; Broad, *Teller's War* (1992), pp. 105-6; FitzGerald, *Way Out There in the Blue* (2000), pp. 82-3, 131.

[46] Around the World: Race for 'Death Ray' Laser Reported', *The Washington Post,* 29 December 1975 p. A12; David Binder, 'Air Force's Ex-Intelligence Chief Fears Soviet has Military Edge', *New York Times*, 3 January 1977, p. 3; George C. Wilson, 'Just Retired General Cites Soviet Threat', *The Washington Post*, 12 March 1977, p. A5 George J. Keegan, 'New Assessment Put on Soviet Threat', *Aviation Week and Space Technology*, 28 March 1977, pp. 38-9; 'Russ Reportedly Harness Missile-Killer Energy Beams', *Los Angeles Times,* 3 May 1977, p. 6; 'Soviet Breakthrough is Reported in Research on an Antimissile Beam', *New York Times*, 3 May 1977, p. 3.

[47] Baucom, *The Origins of SDI* (1992), pp. 118-25; Linenthal, *Symbolic Defense* (1989), pp. 8; Hey, *The Star Wars Enigma* (2007), pp. 73-4; Bruce-Biggs, *The Shield of Faith* (1988), p. 408.

> In fact, space is now the key to free world survival- or extinction. Unfortunately, only the Forces of Darkness are seeking to capture the high ground. The vision of utopian peace had blinded America's diplomats, scientists and political leaders. And so the tragic events of the 1930s are to unfold upon us once again.[48]

Pro-BMD rhetoric is littered with appeasement analogies; Graham's 1986 manifesto *To Provide for the Common Defense* likened criticism of SDI to the 'self-delusion' of Britain's pre-war leaders who had hoped for 'Peace in our Time'.[49] Like the fascists before them, the communists were exploiting Western idealism. The sanctuary view of space was a hoax designed to hobble America whilst the Soviets established their orbital blockade.

Keegan and Hunter's emphasis on space technology reflected the increasingly blurred boundaries between the pro-space and pro-BMD movements. Throughout the late 1970s, *L-5 News* excitedly discussed space-based BMD proposals alongside its space colony speculation and reports on the Salyut programme.[50] Eventually, the issue of missile defence would tear the L-5 society apart as its members agonised over whether to pragmatically support the SDI cause, or to pursue a more idealistic course.[51] In 1985, Eric Drexler, a disciple of Gerard K. O'Neill and future nanotechnology pioneer, responded to the rancorous debate that was dominating the letter pages of the *L-5 News* with an editorial arguing the society was pursuing a 'shift of emphasis, not of strategy'.[52] That psychedelic psychiatry pioneer Timothy Leary and neoconservative congressman Newt Gingrich (R., GA) were both L-5 Society members proved that the pro-space movement was an extremely broad church.[53] What united pro-space activists was their fetishistic belief in technology's ability to solve societal problems and their unshakeable conviction that America's destiny lay in space. Space-based BMD schemes appealed to both of these passions whilst also offering, in Drexler's words, a 'strategy' to restore space exploration to its rightful prominence in political culture. O'Neill may have vigorously resisted the BMD movement's appropriation of astrofuturist rhetoric but many of his disciples enthusiastically embraced the new relevance that the Strategic Defence Initiative brought.

In the last weekend of January 1981, Jerry Pournelle convened the first meeting of the Citizens Advisory Council on National Space Policy, bringing together a galaxy of astrofuturist luminaries at

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[48] Baucom, *The Origins of* SDI, (1992), p.122; George J. Keegan, 'Foreword' in David Baker, *The Shape of Wars to Come* (Cambridge: Patrick Stephens Ltd, 1981), p. 6.
[49] Graham, *To Provide for the Common Defense*, (1986), pp. 25-7.
[50] 'Space: The Next Battleground?' *L-5 News*, 1, No. 10, June 1976, p. 2; John Holt, 'Space Research and the Military', *L-5 News*, 2, 2, February 1977, pp. 3-4; James Oberg, 'Facts and Fallacies of Space Warfare', *L-5 News*, 3, 10, October 1978 pp. 9-11; L. Keith Henson, 'Space Forts or "Where Are You Obi Wan Kenobi?"', *L-5 News*, 4, June 1979 pp. 1-3.
[51] Michaud, *Reaching for the High Frontier* (1986), pp. 214-45; McCray *Visioneers*, (2012), pp. 141-3.
[52] Eric Drexler, 'Have We Changed Our Goals?', *L5 News,* 8,10, October 1983, pp. 1-2.
[53] 'Movement into Space: Interview with Dr Timothy Leary and Captain Robert Freitag', *L-5 News*, 1, 14, July 1976 pp. 6-11; Gregory Anderson, 'A few words with Newt Gingrich', *thespacereview.com*, 15 May 2006, available online via <http://www.thespacereview.com/article/623/1> [accessed 28 February 2018].

the California home of science fiction author Larry Niven to define a vigorous space policy for the newly inaugurated Reagan administration. Alongside Pournelle's friends and former collaborators like Niven, Dr Francis X. Kane, Possony, Robert Heinlein and Poul Anderson were the presidents of the L-5 Society and American Astronautical Society, former astronauts, nuclear physicists from the Lawrence Livermore laboratory, space commercialisation activists and futurists.[54] The report that emerged was a disjointed medley of previous ambitious space programme proposals, justifying its moon bases, space stations and expanded crewed space programmes with O'Neillian warnings about suffocation of the 'Limits to Growth' thesis and grandiose language about America's 'world mission' as 'the showplace of freedom'.[55] *The Crucial Frontier* should not be written off as yet another overly exuberant space oddity; Michaud describes the 'strongly nationalistic' report's emphasis on space's military potential as 'increasingly characteristic' of the pro-space movement's politics.[56] Rather than being motivated by pure opportunism, arguments that military and civilian space activities were mutually reinforcing emerged organically from the council's astrofuturist worldview. In a note prepared during the council's second meeting in September 1981, Niven asserted 'it is also a fact that anything worth doing in space can be turned into a weapon... the more thoroughly we can establish ourselves in space, the safer we are'.[57]

The report of the Citizens Advisory Council's Committee on Space War: 'The Soviet Strategic Threat from Space' warned that the Soviets would use every weapon in their arsenal to prevent America from realising the space frontier's potential. The USSR's strategic build-up was 'real and ominous' because 'strategic weapons making use of the space environment have serious implications for the survival of the United States'.[58] Every facet of the Soviets' programme indicated a shrewd understanding of technological warfare. Their ASAT technology was being perfected to 'blind' US command and control networks on the eve of a war. Their nuclear-powered RORSATS were not just monitoring America's ships; they indicated that Soviet space-based nuclear reactors were capable of generating the vast amounts of power that an orbital laser would require. Such a device could pick off American missiles 'and then leisurely burn down all enemy bombers for an encore'. As ever, decisions taken in the next decade would prove to be pivotal: 'Failure to rapidly gain at least parity with the advancing Soviet space warfare capabilities appears likely to doom the United States by the mid-90s; if this occurs, beam weapons systems

[54] 'Chairman's Summary Report', Spring 1981, p. 7 Folder: OS Outer Space (000001-024999), Box 1 'OS Outer Space Begin- 182999', WHORM Subject File, Ronald Reagan Presidential Library, Simi Valley, CA (Hereafter Reagan Library).
[55] Citizen's Advisory Council on National Space Policy, *Space: The Crucial Frontier*, (Tucson, AZ: L-5 Society, 1981), available online via nss.org, <http://www.nss.org/settlement/L5news/L5news/CrucialFrontier1981.pdf> [accessed 28 February 2018].
[56] Michaud, *Reaching for the High Frontier*, (1986), p.169.
[57] 'A Quick Word on Defense (Niven)', Untitled Folder, Box 128, Stefan E. Possony Papers, Hoover Institution, Stanford University, Palo Alto, California (hereafter: 'Possony Papers').
[58] Citizens Advisory Council on National Space Policy, 'The Soviet Strategic Threat From Space', p. 25, Folder: 'NASA General (2 of 7), Box 82, Boggs, Danny J., Files, Reagan Library.

deployed on Soviet space battlestations circling the Earth seem to be the lethal instruments.'[59] The council substantiated the theory of *The Strategy of Technology* with Keegan's 'beam gap' warnings to claim that a laser arms race had already begun. The prospect of a Soviet orbital laser battlestation, a weapon of terror and blackmail on a horrifying scale, was the price of failure to achieve space control.

As the USSR's scientists tinkered with their death rays, its diplomats were directing an insidious effort to deny capitalism the space frontier's riches. The Free Enterprise Committee's policy paper: 'How to Save Civilisation and Make a Little Money' set the goal of making 'space self-sustaining, which means economically profitable.' Firstly, it recommended that Reagan should clearly state that 'The Soviet Union has, and has repeatedly demonstrated, a direct interest in preventing free enterprise from entering space.' Then, America should withdraw from international legal agreements relating to space exploration. The OST's restrictions on the use of space by non-governmental entities had 'chilled the investment environment for private corporations interested in financing space activities'.[60] Furthermore, subsequent agreements like the Convention on International Liability for Damages Caused by Space Objects and the 1979 'Moon Treaty' were all 'more political statements by the Third World and the USSR than a workable set of rules for the initial development of space resources.'[61] The yet-to-be-ratified Moon Treaty had incensed libertarian space enthusiasts by describing lunar resources as the 'common property' of all humanity. Art Dula, a space commercialisation activist who attended the Citizens Advisory Council's first meeting, attacked it in *L-5 News* as part of a 'careful and deliberate program' by the USSR and their envious Third World pawns 'to limit the entry of free enterprise into space.'[62] As in denunciations of the 'sanctuary' school of thought, there was a yearning for unilateral action and a suspicion of diplomatic compromise. Legal regimes that limited America's freedom of action in space were communist conspiracies to further the Soviet stranglehold over LEO.

The Citizens Advisory Council's message was favourably received within conservative and military circles. In September 1981, the space fanatic Newt Gingrich warned his fellow congressmen that 'there is no major war we can win against the Soviet Union'; America must focus instead on high technology 'and go into space in a massive way. It is the aviation of the 20th century.'[63] Though he would doubtlessly have countered that aviation was the aviation of the twentieth century, Edgar Ulsamer, *Air Force Magazine's* Policy and Technology Editor, concurred that 'in the struggle to

[59] Ibid., pp. 26-8.
[60] Citizens Advisory Council on National Space Policy, 'How to Save Civilisation and Make a Little Money: Draft Report of the Free Enterprise Committee', Spring 1981, p. 1, Folder:' Outer Space (000001-124999), Box 1, 'OS Outer Space', WHORM: Subject File, Reagan Library.
[61] Ibid., p. 2.
[62] Art Dula, 'Free Enterprise and the Proposed Moon Treaty Part II', *L-5 News*, 1, 11, November 1979, p.6.
[63] Newt Gingrich, 'Strategic Doctrine: Abstract of an Address Delivered by Hon. Newt Gingrich, Congressional Record- September 11, 1981', Unnamed Folder, Box 128, Possony Papers.

maintain a technological edge over the Soviet Union, taking and holding the high ground of space is essential'. Quoting high level military sources, Ulsamer sketched the forbidding extent of the Soviets' space effort and their 'awesome' lead in military R&D spending before concluding by describing particle beam research as an 'essential priority' in order to compete with the USSR's 'own massive effort'.[64] Ulasamer and Gingrich helped normalise space control by reintroducing the idea to audiences outside of the pro-space movement. In May 1981, Senators had voted ninety one to three to amend a defence authorisation bill by adding a $50 million commitment for laser technology research and development, with the *Los Angeles Times* noting lasers 'could be used to counter Soviet weapons in outer space'.[65] No longer treated as a fringe belief within the space cult or a kitsch throwback to the Sputnik Crisis, the space-as-high-ground idea was treated with increasing seriousness.

On 12 April 1981, twenty years to the day since Yuri Gagarin's *Vostok 1* mission, the Space Shuttle *Columbia* successfully completed its first crewed flight. Reagan hailed the *Columbia* as a demonstration of American grandeur, 'Today our friends and adversaries are reminded that we are a free people capable of great deeds.'[66] However, the Space Shuttle's triumphant debut also reminded ordinary Americans about the existence of what Trevor Paglen terms the 'other night sky', the steadily increasing militarisation of space that was largely occluded from public view.[67] A *New York Times* report on citizens' reactions to the *STS-1* mission ('We're No. 1!') quoted Jeffrey Spiegler of Cleveland Ohio's description of the shuttle as a counter to Soviet ambitions: 'I think it's in our best interest to get up there and keep an eye on what they're doing and not fall behind.'[68] Investigative journalist Jack Anderson's *Washington Post* columns repeatedly covered the militarisation of space. In August, Anderson revealed the Pentagon's prioritisation of which Soviet space assets to target in the event of a space war, warning, 'The world is moving into the bewildering age of space warfare faster than most Americans realize'. EORSATS, 'sophisticated spies in the sky' that tracked American fleets and 'airborne warning and control systems', were 'Priority 1' targets; the Salyuts were a 'Priority 2' and would have to be eliminated within 48 hours of space war being declared alongside 'Priority 3' targets like meteorological and surveillance

[64] Edgar Ulsamer, 'Advanced Technology in Space', *Air Force Magazine*, June 1981, pp. 97-101.
[65] 'Senate OKs Laser Weapons Program, *Los Angeles Times*, 14 May 1981, p. OC4.
[66] Ronald Reagan, 'Statement on the Landing of the Space Shuttle Columbia Following Its Inaugural Flight' 14 April, 1981, available online via *The American Presidency Project*, <http://www.presidency.ucsb.edu/ws/?pid=43688> [accessed 28 February 2018].
[67] Trevor Paglen, 'AFP-731 or The Other Night Sky: An Allegory' in *Down to Earth: Satellite Technologies, Industries, and Cultures* ed. by Lisa Parks and James Scwoch, (London: Rutgers University Press, 2012), pp. 238-253 (239,244).
[68] Joseph B. Treaster, 'Nation Reacts With Cheers and "We're No. 1 Again"', *New York Times*, 15 April 1981, p. A24.

satellites.[69] Target lists made space warfare sound worryingly real, something that could break out at any moment rather than in a hazy science fiction future.

The High Frontier's worldview was torn between the 'We're No. 1' optimism of the Shuttle's long-anticipated maiden flight and the Citizen's Advisory Council's ominous warnings about the Soviet space threat. The role that Lt. Gen. Daniel O. Graham and his comrades played in convincing the Reagan administration to embrace missile defence has been analysed extensively elsewhere. Nevertheless, proper context necessitates a brief summary. An article on space-based BMD that Graham wrote for the spring 1981 edition of *Strategic Review* attracted the attention of businessman and Reagan confidante Karl R. Bendetsen. Together, Bendetsen and Graham assembled a group of well-connected, likeminded conservatives that included businessmen Jacquelin H. Hume and Joseph Coors and Dr. Edward Teller of the Livermore National Laboratory, who resolved to sell missile defence to the new president. Over the next year, Graham supervised the drafting of the High Frontier Panel's report whilst other panellists lobbied administration figures like Chief of Staff Edwin Meese and Science Advisor George Keyworth. By the time the High Frontier Panel eventually met with Reagan in late January 1982, Graham had alienated himself from the other panellists in clashes over whether to employ existing 'off the shelf' technology or Edward Teller's nuclear-powered X-Ray Laser. Graham's unilateral decision to go public with the Panel's findings widened the rupture. In February, Graham published the panel's report as *High Frontier: A New National Strategy* and broke away to form his own group: The High Frontier Foundation.[70]

Graham's conversion was similar to Keegan's; both were former military intelligence officers who had become convinced that America was sleepwalking towards disaster. Graham's 1979 broadside, *Shall America be Defended?* was a howl of frustration at the prevailing strategic orthodoxy. Although it sporadically referenced missile defence's potential, the book concluded on a bleak note by imploring America to 'look the present danger in the eye and not flinch' as a limited nuclear war would be preferable to the 'greater casualties' that would result from communist slavery.[71] Baucom describes how Graham was converted to the missile defence cause by Angelo Codevilla whilst they collaborated on *Shall America be Defended?*[72] As was often the case with those born again into the BMD faith, Graham came to believe space technology offered a way to overcome a seemingly hopeless situation on Earth. By January 1981, when Newt Gingrich requested Graham 'prepare some 'bold stroke' options' for defence policy, he had

[69] Jack Anderson, 'Space Wars', *The Washington Post*, 16 August, 1981, p. B7, see also Jack Anderson, 'The Race for 'Star Wars Weapons', *The Washington Post*, 25 May 1981, p. C11; 'Slicing the Pie in the Sky', *The Washington Post*, 8 August, 1982, p. C7.
[70] Baucom, *The Origins of SDI*, (1992), pp. 141-70; Graham's career and interest in BMD is discussed pp. 141-144; Broad, *Teller's War* (1992*)*; pp. 105-6; FitzGerald, *Way Out There in the Blue* (2000), pp. 114-146.
[71] Daniel O. Graham, *Shall America Be Defended* pp. 122-5, 247.
[72] Baucom, *The Origins of SDI*, (1992), pp. 131-2.

comprehensively internalised the astrodeterminist worldview of Maxwell Hunter and the Citizens Advisory Council.[73] The published version of the High Frontier Panel's report described space-based BMD as a way to 'escape the brooding menace of the "balance of terror doctrines"'.[74]

Like the Citizens Advisory Council, Graham believed space-based missile defence would guarantee both security and prosperity. An entire chapter of *The High Frontier: A New National Strategy* was devoted to the scheme's 'non-military dimension'. Borrowing liberally from space activists like O'Neill, Graham described the revolutionary implications of space-based solar power stations and the alchemical wonders of low-gravity manufacturing facilities to argue that 'Space industry is synergistic with national security'.[75] The Soviet space programme exemplified this principle; its long duration flights were 'the precursor to *their* space industry, in parallel with their continuing commitments to substantial military space operations.'[76] Graham would later claim that the Soviets feared SDI because it threatened their growing stranglehold over LEO. The 'dreaded by-product' of an American space-based BMD system would be 'capitalism in space: where they have sought to make near-Earth space a Red Sea.'[77] In the life-or-death struggle between the capitalist and communist economic systems, the bounty of space industrialisation would prove to be decisive. Graham's inability to resist bringing up the Soviet threat when discussing the 'non-military dimension' is revealing. Behind the superficial optimism of Graham's vision was an underlying fear that America would vacillate, as it had done under the corrupt and unimaginative leadership of the 1970s, and fail. Failure meant the orbital blockade: 'a new era of Pax Sovietica in which Soviet space power dictates Free World behaviour.'[78]

'Pax Sovietica' was a deliberate nod to 'Pax Britannica': the 19th century global hegemony of the British Empire. Maritime analogies were central to Graham's vision of space as the decisive military terrain. Outer space was not just a frontier; it was also a curious blend of the high ground and the high seas. Erik K. Pratt, Frances Fitzgerald and Andrew Butrica all contend that Graham was profoundly influenced by the seapower theories of 19th century naval historian Alfred Thayer Mahan.[79] Mahan had argued that Britain's power resulted from its judicious control of vital sea-lanes and choke points. Graham explicitly invoked Mahan in a High Frontier Panel discussion paper from November 1981 that argued, 'If Alfred Thayer Mahan were alive today, he would say

[73] Daniel O. Graham to Edward Teller, 11 June 1981, Folder: 'High Frontier Correspondence', Box 194, Teller Papers.
[74] Graham, *High Frontier,* (1984), p. 25.
[75] Graham, *The High Frontier* (1986), pp. 91-125 (p. 118).
[76] Ibid., pp. 114.
[77] Daniel O. Graham, *To Provide for the Common* Defense (Publishers Press Incorporated, 1986), p. 69 available in Folder: SDI Background, Box 682, Bendetsen Papers.
[78] Karl Bendetsen to Joseph Coors, Jaquelin Hume, Edward Teller, 'Attachment A: High Frontier Final Report Brief' p. 3, 18 November 1981, High Frontier Correspondence, Box 194, Teller Papers.
[79] Pratt, *Selling Strategic Defense* (1990), p. 96; Fitzgerald, *Way Out There in the Blue* (2000), pp. 77, 126; Butrica, ''The Right Stuff': The Reagan Revolution and the U.S. Space Program' in *Remembering the Space Age,* ed. by Steven J. Dick (Washington DC: NASA, 2008), p. 121-134 (pp. 126-7).

of space what he once wrote about the oceans.'[80] To present space exploration as a 'natural' development, Astrofuturist writers like Arthur C. Clarke had intentionally characterised humanity's entry into the cosmos as the latest stage in its evolution.[81] Graham's historical analogies performed a similar function. A summary of the High Frontier Report prepared for Reagan listed a procession of illustrious thalassocracies to prove the 'unavoidable historical imperative to move vigorously into that arena.'[82] By positioning space as the next ocean, rather than internationalised, demilitarised terrain like the Antarctic, its militarisation became an inevitable process rather than a failure of international diplomacy.[83] Graham declaimed that 'either the United States or the USSR will eventually establish strategic superiority in space'. Given that 'Soviet activities indicate a determination to win that race for military dominion', it was imperative to act quickly.[84]

The High Frontier Panel hoped to capitalise on its enviable connections to the intelligence establishment to paint an accurate picture of America's competition in space. Graham and Teller had occupied positions at the pinnacle of the national security state and they both retained Top Secret security clearances. In June 1981, Bendetsen sent a memo to Meese's deputy requesting a temporary clearance at Top Secret level for 'essential' briefings on Teller's X-ray laser project and 'Soviet offensive space systems and satellites'.[85] Bendetsen's request came at a time of heightened Intelligence Community interest in Soviet space activities. That month, CIA Director William J. Casey and his deputy, Admiral Bobby R. Inman had discussed 'the desirability of an assessment of what the Soviets may be doing in space.' Casey requested a briefing from the Pentagon and Inman's thoughts on 'what we could usefully do beyond this.'[86] In November 1981,

[80]'Project High Frontier Discussion Paper', 16 November 1981, Folder: 'High Frontier Meeting Material 9/20/1981-12/31/1981', Box 681, Bendetsen Papers.
[81] Kilgore, *Astrofuturism*, (2003), p. 115.
[82] Karl Bendetsen to Joseph Coors, Jaquelin Hume, Edward Teller, 'Attachment A: High Frontier Final Report Brief', p. 3, 18 November 1981, High Frontier Correspondence, Box 194, Teller Papers.
[83] The Antarctic analogy was a common one throughout the space age, for a contemporary example see Phillip M Smith: 'Prospects for International Cooperation on The Moon: The Antarctic Analogy' in *Men in Space: The Impact on Science, Technology and International Cooperation* ed. by Eugene Rabinowitch, and Richard S. Lewis, (Aylesbury, Medical and Technical Publishing Company, 1970), pp. 85-98; for a historical analysis of this idea: James Spiller, *Frontiers for the American Century: Outer Space, Antarctica and Cold War Nationalism* (Basingstoke: Palgrave Macmillan, 2015), pp. 65-112.
[84] Daniel O. Graham, 'Toward A New US Strategy: Bold Strokes Rather Than Increments', *Strategic Review*, Spring 1981 pp. 9-16 (pp. 12-13).
[85] Karl R. Bendetsen to Ed Thomas, 'Project High Frontier', 9 October 1981, Correspondence 3/12/81-12/29/82, Box 678, Bendetsen Papers.
[86] William J. Casey to Deputy Director of Central intelligence, 'Soviet Space Program', 15 June 1981, online via the CIA Electronic Reading Room <https://www.cia.gov/library/readingroom/docs/CIA-RDP88B00443R001003880077-1.pdf> [accessed 28 February 2018].

a DIA briefing for CIA personnel on the 'Soviet space threat' was arranged to respond to the 'considerable high level interest within the Department of Defence and Congress''.[87]

Bendetsen's request was successful; an effusive letter of thanks to the Pentagon reveals that Bendetsen, Coors and Hume were granted a one-time Top Secret level clearance for a briefing on 'Soviet space technologies and activities' by the DIA's Dr Jack Verona and Colonel T. H. Krebs in the autumn of 1981.[88] Bendetsen and Teller's Papers are silent on the briefing's specific content but contemporary classified appraisals affirm it would have reinforced the panellists' concerns. The CIA's NIE-11-1-80 'Soviet Military Capabilities and Intentions in Space', which the DIA had contributed to, depicted the Soviet programme's emphasis shifting from 'civil space accomplishments for prestige purposes' to 'the use of space systems for military support'. Of the USSR's space systems, 70% served 'only a military mission' with a further 15% described as dedicated to 'both military and civil purposes'. Perhaps most worrying of all was evidence of Soviet space-based laser and particle beam weapon projects.[89] The High Frontier Panel may have been precluded from quoting classified information, but these appraisals would have undoubtedly strengthened their resolve to sound the alarm about the growing Soviet space threat.

Even before the Reagan administration publicly embraced missile defence, it had already accepted that space was a crucial military high ground. In December 1982, Reagan's National Security Council issued NSSD-13-82 'National Space Strategy'. In a memo circulating the document to the heads of relevant agencies, NSC Advisor William P. Clark had informed that Reagan 'requests that agencies provide their highest priority to this effort.' The NSC study preceded under two central premises. The first warned that 'The Soviet Union has initiated a major campaign to capture the 'high ground of space''. The second was more optimistic, noting that 'regardless of Soviet activities, the space medium offers significant potential for the enhancement of civil, commercial and national security capabilities.'[90] This second premise restated the longstanding principles of American space policy: that space was an exciting and important new medium that should be exploited to its full potential. The first, though, reflected a renewed concern about the security of America's space leadership. Reagan may not have directed congress to fund Daniel O. Graham's 'space cruisers' or the Citizen's Advisory Council's lunar base, but his administration shared their concerns about the Soviet drive to conquer space.

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[87] Lawrence K. Gershwin, 'Memorandum: Briefing: Soviet Space Threat' 13 November 1981, online via the CIA Electronic Reading Room <https://www.cia.gov/library/readingroom/docs/CIA-RDP83B00140R000100020002-1.pdf> [accessed 28 February 2018].

[88] Bendetsen to Lt. Gen. James Williams, 23 October 1981, Folder: 'Meetings', Box 680, Bendetsen Papers.

[89] Directorate of Central Intelligence, 'National Intelligence Estimate: Soviet Military Capabilities and Intentions in Space' (NIE-11-1-80), August 1980, p. 1, available online via <http://nsarchive.gwu.edu/NSAEBB/NSAEBB501/docs/EBB-33.pdf> [accessed 28 February 2018].

[90] William P. Clark, 'Memorandum: National Space Strategy' 15 December, 1982 and 'NSSD-13-82: National Space Strategy', Folder: 'NSSD 13-82 [National Space Strategy] (1 of 20), Box 9279, 'NSD 13-82', Executive Secretariat, NSC Records, Reagan Library.

The High Frontier Panel did not originate the concept of space-based missile defence; instead, it synthesised pre-existing themes from missile defence and space control advocacy into a package that appealed to the Reagan administration's desire to aggressively confront communism. In a November 1981 note outlining the High Frontier Panel's 'Mission', Karl Bendetsen described American satellites as 'undefended' and repeated his group's mantra: 'Whoever dominates space can dominate the Earth. This the Soviets have in mind. They are working to attain this position. We are doing nothing.'[91] This mission statement encapsulated the two principal contentions of early 1980s space control discourse. Firstly, that space control guaranteed survival. Secondly, that America was doing 'nothing' whilst the Soviets reaped the rewards of having a truly space age strategy. This stark dichotomy between American inaction and Soviet foresight recalled earlier space race rhetoric and anticommunist perceptions of the USSR as a monomaniacal power fixated on carrying out Lenin's plan for world conquest. Soviet interest in space control was central to the High Frontier Panel's case for space-based BMD. It not only justified the need for a corresponding American grand strategy but also allowed the panellists to harness the feelings of powerlessness and frustration that had emerged during the hiatus.

Superficially, space-based missile defence offered an optimistic vision of deliverance from the nuclear threat that rested on the flattering image of high technology as America's 'priceless advantage'.[92] Groups like The High Frontier aspired to emulate John F. Kennedy's rousing exhortations to journey to the Moon, depicting the end of nuclear war as one of the benefits of embarking on a new spacefaring golden age. However this technological optimism was shot through with a deep-seated anxiety that America would be blocked out of space and thus, the future. Space technology was supposed to be the ace up America's sleeve but, confusingly, the Soviet Union was portrayed as perpetually on the verge of seizing control of space and ushering in a miserable era of 'Pax Sovietica'. Expansive rhetoric about space as a new ocean quickly gave way to warnings about losing control of the high ground of space. It seemed that America's only hope of avoiding the prospect of a Soviet orbital blockade was to establish its own.

'The Red Shield': The Soviet Space Threat in Reagan Administration Rhetoric

'Facts on how high the Russians can shoot down satellites need to come out. Can they knock out HBO and cable TV? (That will send shivers down the backs of America!)'. –Tom Korologos, Reagan administration adviser, September 1985.[93]

[91] Karl R. Bendetsen to The High Frontier Panel, 'Summary of our Mission', 2 November 1981, Folder: 'Meetings', Box 680, Bendetsen Papers.
[92] Graham, *High Frontier,* (1984), p. 25.
[93] Tom C. Korologos to Robert C. McFarlane, 'Summitry', 13 September 1985, 'Summit 1986-US Advisory Commission on Public Diplomacy,' Box 55 'Washington Summit 1986-USSR Shevardnadze Visit September 1986 Briefing Book', Series III: US-USSR Summits', Matlock, Jack F. Jr. Files, White House Staff Member and Office Files, Reagan Library.

The star attraction of the 1983 Paris Le Bourget Air Show was undoubtedly the *Enterprise*, the Space Shuttle test orbiter renamed in honour of *Star Trek*'s iconic starship.[94] To maximise the propaganda return of flying the *Enterprise* and its transport aircraft to Europe, NASA and the State Department had also arranged for visits to Bonn, Rome and London where spectacular flybys would be followed by speeches from NASA administrator James Beggs and his deputy Hans Mark. Mark's lengthy trip report is a strange blend of banal touristic observations about the hotels, restaurants and sightseeing that he and his wife found time to enjoy and dispatches from the frontline of a war of words over space militarisation. During an interview with West German TV, Mark took umbrage with a question about whether the shuttle would be used to deploy space weaponry. Denying this, Mark pointed out that the Soviets had been conducting ASAT tests 'for a decade now' and that 'the entire Russian space programme is much more closely tied to the military operations than NASA.' Lambasting the Soviet programme for its 'thick blanket of military security', Mark asked the hapless journalist whether he had ever been invited to a Soviet space launch before promptly inviting him and his crew to the Shuttle's next launch.[95] Mark's riposte exemplified the Reagan administration's tendency to transfer criticism of American space activities onto the Soviet programme. As criticism of SDI mounted during the mid-1980s, charges that the USSR was militarising space became a crucial component of warnings about Soviets' 'Red Shield' BMD research.

SDI had initially been proposed as a vision of hope befitting a flattering self-image of America as a nation of proactive, peace-loving, technologically adept dreamers. Ronald Reagan in particular was the key expositor of this redemptive vision of SDI. Both Linenthal and Bjork's analyses of pro-BMD rhetoric depict Reagan seizing on SDI as a way to recapture a mythic American "innocence" that had been lost with the nuclear attacks on Hiroshima and Nagasaki.[96] From its announcement, Reagan held fast to his optimistic conception of SDI, however, however, as Edward Reiss relates, in response to sustained international and domestic criticism, 'from about 1985, [Reagan's] administration increasingly sold SDI in negative or reactive terms, as a response to Soviet activities'.[97] Soviet BMD research was a central element of the defensive 'media blitz' that the administration launched in the autumn of 1986 after SDI was criticised for frustrating an arms control agreement at the US-Soviet Reykjavik Summit that October.[98] Historians of SDI compare warnings about the Red Shield to the spurious, 'Bomber Gaps' and 'Missile Gaps' that were used

[94] On the decision to change the test orbiter's name from *Constitution* to *Enterprise*, see Heppenheimer, *Development of the Space Shuttle* (2002), pp. 100-1.
[95] Mark, *The Space Station: A Personal Journey* (1987), pp. 155-61; Hans Mark, 'European Trip Report (Germany, France, England)',May 20 to June 9, 1983' 22 June 1983, Folder: 'OS Outer Space OS 001 Outer Space (154000-156521)', Box 7: 'OS Outer Space 0001 129000-186699', WHORM Subject File, Reagan Library
[96] Linenthal, *Symbolic Defense* (1989) pp. 45; Bjork, *The Strategic Defense Initiative* (1989) pp. 65-6.
[97] Reiss, *The Strategic Defense Initiative* (1992), p. 168.
[98] FitzGerald, *Way Out There in the Blue* (2000), p. 350.

to justify earlier defence build-ups.[99] Following the all-pervading Cold War logic of deterrence and parity, a Soviet BMD system was a powerful argument for an American equivalent. Using declassified NSC memos and public diplomacy documents published by the Pentagon, State Department and ACDA, this section examines how the Reagan administration used threatening portrayals of the Soviet space programme to substantiate its Red Shield warnings.

But did the Red Shield exist, and, more pertinently, were Soviet space activities dedicated to its construction? Although this remains an extremely difficult area to research, the available evidence does point to a serious Soviet interest in BMD technology. From the early 1960s onwards, the USSR had deployed a token terminal-phase system, 'Galosh', in Moscow's suburbs and the Soviet military later began investigating a range of BMD technologies, including beam weaponry, at its Sary-Shagan installation located near the Kapustin Yar military cosmodrome in southern Russia.[100] Beyond this, historians are on shakier ground. A mysterious military satellite project named *Polyus*, also known as *Skif-D*, has been described as an ASAT programme that was hastily upgraded following the SDI's announcement to a 'real, honest-to-God orbiting battle station' equipped with prototype anti-missile laser weapons.[101] *Polyus'* first and only launch aboard the new Energia heavy-lift launch vehicle in 1987 ended in failure with the satellite failing to reach orbit, possibly being deliberately aborted on General Secretary Mikhail Gorbachev's orders.[102] *Polyus* remains one of Cold War space rivalry's greatest mysteries; in a 2010 *Air and Space Magazine* article, Asif Siddiqi remarked 'even today, there's a lot of sensitivity about the whole programme'.[103] Like the United States, the USSR's interest in missile defence led it to actively explore technologies with BMD potential. However, this research effort did not exactly correspond to Red Shield rhetoric's cohesive master-plan to outflank the West with space-based BMD lasers.

SDI was divisive from the moment it was announced and a common critique alleged it would further destabilise the delicate nuclear standoff by unleashing a new space arms race. Reagan's

[99] Pratt, *Selling Strategic Defense* (1990), pp. 64-66, 85; Craig Eisendrath, Melvin A. Goodman, and Gerald E. Marsh, *The Phantom Defense: America's Pursuit of the Star Wars Illusion*. (Westport, CT: Praeger, 2001), pp. 31-2.

[100] See Nuclear Threat Initiative, 'Sary-Shagan Facility' 1 October 2009, nti.org available online via <http://www.nti.org/learn/facilities/682/> [accessed 28 February 2018] for Galosh, see Reiss, *The Strategic Defense Initiative* (1992), pp. 26,32; Mira Duric, *The Strategic Defense Initiative: US Policy and the Soviet Union* (Aldershot: Ashford, 2003), pp. 16, 167-8.

[101] See Hey, *The Star Wars Enigma* (2007), pp. 143-8, Hey's account used material from a 1997 *Janes'* article based on post-Cold War revelations in the Russian press, See Stephen J. Zaloga 'Red Star Wars' *Janes Intelligence Review*, May 1, 1997; Bart Hendrickx and Bert Vis, *Energia Buran: The Soviet Space Shuttle* (Chichester: Springer Praxis, 2009), pp. 272-6.

[102] Hey, *The Star Wars Enigma* (2007), pp. 144, 202-5.

[103] Dwayne A. Day and Robert G. Kennedy 'Soviet Star Wars: The Launch That Saved the World from Orbital Battle Stations' *Air and Space Magazine* January 2010 accessed via: <http://www.airspacemag.com/space/soviet-star-wars-8758185/?no-ist=&page=4> [accessed 28 February 2018].

political opponents derided SDI as a 'Buck Rogers' or 'Star Wars' fantasy.[104] During the 1984 election, television adverts for Democratic candidate Walter Mondale warned voters 'Ronald Reagan is determined to put killer weapons in space, the Soviets will have to match us, and the arms race will rage out of control, layer upon layer, orbiting, aiming, waiting.'[105] Mondale lost the election, but opposition from sceptical scientists ended up eroding the administration's argument that there was a technological solution to the awful dilemma of the nuclear age. Finally, the Soviet Union and its allies attacked 'Star Wars' as an insane scheme by American militarist imperialists that would compel the USSR to undertake a huge strategic build-up in response. Reeling from domestic and international criticism, by 1986 the administration had rhetorically repositioned SDI as a necessary counterweight to Soviet BMD research. The administration's efforts to draw attention to the Soviet military space programme served two purposes: it exposed the hypocrisy of the USSR's complaints about the militarisation of space and reinforced the idea that the Soviets were engaging in their own 'technological end run' strategy to deploy a space-based BMD laser.

Reagan's 1983 'Star Wars' speech had called on the scientific community to help realise his BMD dream, but scientists, particularly those working at universities, would become SDI's most vocal critics. This partially reflected an established tradition of scientific anti-militarist activism that had produced groups like the Union of Concerned Scientists and publications like the *Bulletin of the Atomic Scientists*. Participants from earlier ABM debates like Nobel Prize-winning physicist Hans Bethe mounted withering critiques of the feasibility and advisability of a space-based BMD system. There was also concern that SDI would have a distortive impact on academic freedom; by June 1985, academics at the Universities of Cornell and Illinois were circulating petitions calling on scientists to boycott SDIO funded projects.[106] Scientists quickly became 'an integral component' of the SDI debate, deployed by both sides to bolster their case's 'scientific legitimacy' and impugn that of their detractors.[107] R. L. Holloway argues that scientific 'naysayers' were particularly dangerous because they undermined the foundation of technological optimism that the SDI's

[104] Ted Kennedy saddled the SDI with the 'Star Wars' moniker the day after Reagan's speech, for attempts to contest and reclaim the association with Lucas' films see Linenthal, *Symbolic Defense* (1989), pp. 14-16.
[105] Mondale Campaign, 'Orbiting Advertisement' 1984, available via, livingroomcandidate.org <http://www.livingroomcandidate.org/commercials/1984/orbiting#4102> [accessed 28 February 2018].
[106] Rebecca Bjork, *The Strategic Defense Initiative: Symbolic Containment of the Nuclear Threat* (Albany: State University of New York Press, 1992), pp. 125-7; Linenthal, *Symbolic Defense* (1989), pp. 31-2; R. L. Holloway, 'The Strategic Defense Initiative and the Technological Sublime' in R. L. Holloway, M. J. Medhurst and H. W. Brands, *Presidential Rhetoric; Critical Reflections on the Cold War Linking Rhetoric and History* (College Station, TX: Texas A&M University Press, 1998), pp. 209-232 (pp. 209-10); for the boycott see Rebecca Slayton, 'Discursive Choices: Boycotting Star Wars between Science and Politics' *Social Studies of Science,* 37, 1 (2007), pp. 27-66 (p.35-7).
[107] See Gerald M. Steinberg, 'Preaching to the Converted: The Role of Scientists in the SDI Debate' in *Lost in Space* ed. by Steinberg (1988), pp. 89-107 (p. 105-6); Wolfe, *Competing with the Soviets* (2013), pp. 130-2; Slayton, 'Discursive Choices', *Social Studies of Science,* 37, 1, (2007), pp. 27-66 (p. 31).

precarious promises rested on.[108] In a May 1984 letter to Newt Gingrich, Daniel O. Graham raged at the 'pseudo-scientific' opposition for 'hanging presumed cost and technological objections on their Christmas Tree of ideological opposition'. Although he remained convinced of SDI's moral righteousness and technical rigour, Graham's irritation that pro-SDI scientists were not 'sought out by the press' indicates the damage that the scientific opposition was doing.[109]

Despite the USSR's execrable record of scientific freedom, Soviet attacks on SDI also appealed to the scientific profession's intellectual prestige. In April 1983, a 'Soviet Scientists Appeal to all Scientists of the World' that ran as an advertisement in major American newspapers attacked SDI as 'a most dangerous illusion' which would 'cause an even more threatening spiral of the arms race'. Its list of over two hundred signatories was bulked up with grandees from the military-industrial complex like the space programme's Vladimir N. Chelomei, Nikolai D. Kuznetsov, and Vasilii P. Mishin, who were more accurately engineers and managers rather than research scientists.[110] This approach was continued in *Weapons in Space: The Dilemma of Security*, a 1986 book edited by physicist Evgenii P. Velikhov and Roald Z. Sagdeev, the face of Soviet space science as the director of the Academy of Science's Space Institute (IKI). The book restated the official Soviet line that 'the realisation of the SDI project would be a major obstacle to a world without nuclear weapons' and its technical critique was interspersed with moral invective.[111] The SDI sought to either 'cripple the USSR economically by forcing it into a new arms race in space' or to achieve 'victory in a nuclear war ... [through] reliance on the massive use of offensive space-based weapons'.[112] Moscow's propagandists understood that the inevitable Soviet criticism of a major American military R&D effort would sound better coming from an academician rather than an apparatchik.

The Soviets sought to upend SDI's optimism by turning it into a byword for space militarisation. A 1985 pamphlet, *Star Wars: Delusions and Dangers* attracted the *New York Times*' attention for being a 'direct analogue of *Soviet Military Power*', the Pentagon's glossy public relations series on the Soviet threat. Its cover subverted familiar SDI iconography by placing a 'Blue Marble' image of the whole Earth in the crosshairs of an unseen space weapon and its illustration of missiles being obliterated by lasers portrayed SDI not shielding the US population but covering an American first

[108] Holloway, 'The Strategic Defense Initiative and the Technological Sublime' in Holloway, Medhurst and Brands, *Presidential Rhetoric; Critical Reflections on the Cold War Linking Rhetoric and History* (1998), pp. 225-6.
[109] Daniel O. Graham to Newt Gingrich, 17 May 1984, Folder: 'SDI- Strategic Defense Initiative (June 1984), Box 10, 'RAC Box 13, 14', George Keyworth Files, Reagan Library.
[110] 'Advertisement: Soviet Scientists Appeal to All Scientists of the World', *New York Times*, 22 April 1983, p. A10.
[111] *Weapons and Space: The Dilemma of Security* ed. by Evgenii Velikhov and Roald Sagdeev, (Moscow: Mir Publishers, 1986), pp. 15-6.
[112] Ibid., pp. 145-6.

strike.[113] Whilst Soviet criticism of SDI was often blunt and emotive, it was no match for pro-BMD rhetoric at its most insipid. Tom Engelhardt has detailed the importance of children in missile defence propaganda, most notably in the Pro-SDI Coalition's much derided 'Peace Shield' television advert where a young girl cheerily enthuses about 'this Star Wars stuff' over a series of children's drawings depicting red missiles bouncing harmlessly off a rainbow.[114] Soviet propaganda tapped into the unease that these patronising sales pitches prompted amongst Americans who were aware that missile defence was an extremely complicated subject. By recasting space-based laser battlestations as harbingers of space warfare rather than orbital guardians, Soviet rhetoric latched onto one of SDI's critical vulnerabilities.

The ferocity of the Soviet propaganda offensive unnerved the Reagan administration. In an October 1985 memo to the President, Secretary of State George Shultz stated the Soviets were aiming to 'put us on the defensive with their anti-SDI campaign'. Reagan needed to make the case for 'our positive, pragmatic approach to world problems' in contrast to the 'simplistic but seductive Soviet effort to define the issue as "star peace" versus "star wars".'[115] The administration's response was to argue that it was the Soviet Union and not SDI that posed the real threat to the peace in space. To construct this threatening image, the administration drew on classified appraisals of the Soviet military space programme and rhetoric it had used to justify its decision to continue researching ASAT technology.

Throughout the early 1980s, the intelligence community consistently stressed that the Soviet programme was militaristic, aggressive and expanding. John Prados has persuasively detailed how fears of the Red Shield were fuelled by the politicised analysis of military intelligence during William Casey's tenure as CIA director. Casey's CIA encouraged alarmist predictions about the imminent deployment of a Soviet laser BMD system that were then repeated in public diplomacy documents like the Pentagon's *Soviet Military Power* series.[116] Even before Reagan's SDI's Speech, the CIA had been warning about a growing Soviet stranglehold over space. An October 1982 intelligence estimate argued the Soviet programme was undergoing a 'rapid expansion' that

[113] Wayne Biddle, 'A Salvo From the Other Side' *New York Times*, 12 August 1985, p. A10; Both the published version of the *High Frontier* report and a 1984 DoD report, *Strategic Defence Initiative: Progress and Promise* (Washington, DC: US Government Printers, 1984),used the iconic Apollo Programme photographs 'Earthrise' and 'The Blue Marble' on their covers.

[114] Tom Engelhardt, *The End of Victory Culture: Cold War America and the Disillusioning of a Generation,* Revised Edition, (Amherst, MA: University of Amherst Press, 2007), pp. 272-3; 'Doonesbury' Cartoonist Gary Trudeau memorably parodied the 'Peace Shield' advert with a coda where the young narrator exclaims 'Oops, one got through. Bye.', over a child's drawing of mushroom cloud, see Wayne Myers, 'The Star Wars Software Debate', *The Bulletin of the Atomic Scientists,* February, 1986 pp. 31- 36 (p.32).

[115] George P. Shultz to The President, 'Your October 23-4 Trip to the United Nations General Assembly: Scope Paper', 7 October, 1985, Folder: 'Shultz- Shevardnadze mtg. in New York 1 of 3 September 25 1985', Box 45, 'Series II USSR Subject File' Matlock, Jack F. Jr. Files, Reagan Library.

[116] John Prados, 'The Strategic Defense Initiative: Between Strategy, Diplomacy and United States Intelligence Estimates' in *Crisis of Detente in Europe: from Helsinki to Gorbachev, 1975-1985* ed. by Leopoldo Nuti, (London: Routledge, 2009), pp. 86-97 (pp. 90-95).

proved that the USSR's leadership saw space not 'as an isolated area but rather as an integral part of overall military, economic, and political policy.'[117] This estimate formed the basis of a video briefing that was shown to the President. The eight-minute version that has been declassified is a whistle-stop tour of Soviet space history from Tsiolkovsky to the Intercosmos programme. Slickly produced, the film's animations and archival footage of Soviet spacecraft in action are accompanied by soundscapes of Russian radio chatter and *Sputnik 1*'s insistent beep. A stentorian voiceover repeatedly stresses the programme's 'Jekyll and Hyde' nature: the dichotomy between the 'purely scientific' image of Soviet propaganda and the overwhelmingly military reality that existed in a 'sort of shadowland' of secrecy.[118] Reagan's diary entry for 14 October 1982 records the impression the CIA's 'movie' made: 'They are much further ahead than most people realize and their main effort has been military.'[119]

The intelligence briefings that were a routine part of the space policy formation process compounded this threatening image of the Soviet programme. In the summer of 1983, the administration was finalising the rollout of its space policy agenda that would focus on greater commercial participation and a US space station project to compete with Salyut. Deputy NSC Advisor Vice Admiral John Poindexter requested that Reagan be briefed on the CIA's latest intelligence estimate on Soviet space programmes, NIE-11-1-83. Poindexter described Soviet space activities as 'a major factor in the President's perception of a need for a more vigorous US Space programme'.[120] NIE-11-1-83 was another portrayal of the Soviet Military programme rapidly expanding with little regard to the sluggish Soviet economy. It predicted a 'high probability that a prototype high-energy laser weapon will be tested in low orbit by the early 1990s.'[121] The briefing solidified Reagan's perception of a troubling Soviet space resurgence: his diary entry for 8 August notes that 'there is no question but that they are working (twice as hard as us) to come up with a military superiority in space.'[122]

Later that month, Simon Ramo, a veteran rocket engineer nicknamed 'the father of the ICBM', delivered a memo on Soviet space lasers to NSC advisor Bill Clark and Science Advisor George

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[117] CIA, 'Outlook for Rapid Expansion of Soviet Space Programs Through 1986' October 1982, Available online via: <http://nsarchive.gwu.edu/NSAEBB/NSAEBB501/docs/EBB-35.pdf> [accessed 28 February 2018].
[118] CIA, 'Video Briefing: The Soviet Space Program' October 1982, The CIA Official YouTube Channel <https://www.youtube.com/watch?v=KzMYNONhfs4> [accessed 28 February 2018].
[119] Ronald Reagan, *The Reagan Diaries: Volume 1: January 1981-October 1985*, (New York, NY: Harper Collins, 2007), p. 162.
[120] John Poindexter, 'Schedule Proposal', 19 July 1983, Folder:' Records NSSD 13-82 [National Space Strategy] (12 of 20)', Box 9279 'National Security Directives (NSSD),Records NSSD 13-82', Executive Secretariat, NSC Files, Reagan Library; For the wider policy formulation backdrop to the US space station decision see Howard E. McCurdy, *The Space Station Decision: Incremental Politics and Technological Choice* (Baltimore, MD: Johns Hopkins University Press, 1990).
[121] Directorate of Central Intelligence, 'National Intelligence Estimate: The Soviet Space Program' (NIE-11-1-83), 18 July 1983, pp.3-4, 6 <https://www.cia.gov/library/readingroom/docs/DOC_0000284021.pdf> [accessed 28 February 2018].
[122] Reagan, *The Reagan Diaries: Volume 1*, (2007), p. 256.

Keyworth. Ramo warned that the USSR was on the verge of developing a powerful space-based laser capable of neutralising American satellites and bombers. Besides the frightening military implications, such a 'technological coup' would be 'disastrous for the US psychologically... that might trigger a quantum jump' in Soviet global influence and compel a 'frenzied, all-out crash effort to seek to catch up.'[123] The founder of TRW Inc., Ramo was a pillar of the aerospace industry with a longstanding interest in Soviet space technology, having chaired NASA's Space Intelligence Panel during the 1960s.[124] A military technologist of Ramo's stature would have been taken seriously and his voice joined a growing chorus of warnings about a Soviet drive to capture the technological initiative. That the Reagan administration's Red Shield warnings were a calculated public relations strategy designed to increase support for the SDI does not detract from the sincerity of the administration's concern about the Soviet military space program. The Reagan administration sincerely believed the Soviets were striving to attain space control; they hoped to use what they believed was an urgent threat to justify the President's pet project.

The administration's interventions in the early 1980s debate over ASAT weapons reflected its concerns about the Soviet space threat. The renewal of Soviet ASAT testing and the growing ubiquity of space control rhetoric had unnerved legislators on both sides of the aisle. On 6 May 1981, Senator Larry Pressler (R., SD) introduced a resolution calling for a renewal of ASAT negotiations. This first attempt was unsuccessful but Pressler and his allies persisted. They spent the next three years repeatedly calling for a halt to US ASAT tests and a resumption of negotiations.[125] Space-based BMD enthusiasts bitterly opposed calls to halt US ASAT testing. In 1983, Ken Kramer (R., CO), one of SDI's most fervent congressional supporters attacked Soviet proposals for an agreement on space weapons with appeals to space as the military high ground. Kramer implored his fellow congressmen not 'to be naive in believing that the Soviets do not think of space as the ultimate area to gain strategic superiority'.[126] It was no coincidence that Kramer's Colorado Springs congressional district was a major hub of military aerospace activity and had been chosen as the location for the new United States Space Command headquarters.[127] Despite Kramer's efforts and the Reagan administration's wishes, legislators eventually reached a

[123] Simon Ramo, 'Space Based Laser Demonstration', 26 August 1983, 'Folder: OS Outer Space (207000-219999)' Box 2 'OS: Outer Space OS 1830000-239999', WHORM Subject File, Reagan Library.
[124] David, *Spies and Shuttles* (2015), p.45.
[125] Larry Pressler, *Star Wars: The Strategic Defense Initiative Debates in Congress* (New York NY: Praeger, 1986), pp. 10-16.
[126] Ibid., pp.44-5; Kramer is often remembered for his unsuccessful pro-SDI 'People Protection Act' bill that immediately followed Reagan's Star Wars speech, see Reiss, The Strategic Defense Initiative, (1992), p.80.
[127] Anne Markusen, Peter Hall, Scott Campbell, Sabina Deitrick 'Space Mountain: Generals and Boosters Build Colorado Springs' in *The Rise of the Gunbelt: The Military Remapping of Industrial America* ed. by Anne Markusen, Peter Hall and Sabina Dietrick, (New York, NY: Oxford University Press, 1991), pp. 194-210 (p. 208).

compromise in October 1984: US ASAT tests would be limited rather than stopped outright and Reagan would be obliged to seek new ASAT talks.[128]

The administration's argument throughout this debate was that a Soviet capability necessitated an American response. An August 1981 classified memo on public posture regarding ASAT arms control directed officials to space militarisation's real culprits: 'US military activities in space have, in large part, been needed because Soviet activities have made space an area for potential military conflict.'[129] This strategy was evident in a speech that the NSC prepared for Robert C. McFarlane, at that time assisting Alexander Haig at the State Department, to give at an American Astronautical Society conference in October 1981. The communists were hypocrites whose ASAT programme 'directly threatens US interests in space. Yet the Soviets accuse us of militarising space.'[130] The administration also stressed the difficulty of verifying an ASAT agreement. A July 1983 Q&A document on 'Outer Space Arms Control' circulated by the ACDA within the administration claimed Soviet secrecy would make it 'relatively easy to maintain a covert supply [of ASAT weapons] for use in a crisis.'[131] A similarly intentioned DoD memo contrasted America's peaceful, defensive intentions with the Soviets whose 'quest for military supremacy has expanded into space'. With its ASAT tests, the USSR had 'clearly signalled its recognition of space as an arena in which to conduct war.'[132] Warnings about the Soviet space threat were an important continuity between the ASAT and SDI debates. In both cases, the Reagan administration justified American programmes criticised as destabilising or aggressive by stressing the USSR's determination to militarise space.

As criticism of SDI intensified during the summer of 1984, this bellicose image of the Soviet programme was ready and waiting to be incorporated into the administration's PR response. An April 1984 CBS/NYT poll had found 67% of respondents approving of the idea of developing a BMD system.[133] Less reassuring for the administration was a Harris poll conducted that July that pointed to growing public apprehension about space warfare; 82% of respondents were in favour

[128] Pressler, *Star Wars* (1986), p. 47.
[129] 'Strategy for Near-Term Public Posture on ASAT and Arms Control in Outer Space', 31 August 1981, pp. 16, 21-2, Folder: 'Soviet Union: Science/Space Etc (1/2)', Box 34, Series II: USSR Subject File, Matlock, Jack F. Jr. Files, WH Staff Member and Office Files, Reagan Library.
[130] Michael A. Berta to Robert C. McFarlane, 'Talk to American Astronautical Society on Space Policy' 19 October 1981, attachment: 'National Space Policy in Evolution' p. 4, Folder: OS Outer Space (035000-051999), Box 1.
[131] Richard M. Milton, 'CD: Outer Space Arms Control', 6 July 1983, Folder: 'ASAT (Anti-Satellite), (12/13/1982-08/10/19883)', Box 5, 'Box 90209,901212', Kraemer, Sven F. Files, White House Staff and Office Files, Reagan Library.
[132] Kent G. Stansberry, 'ASAT Working Group Meeting, 13 September, 1983', 12 September, 1983 Attachment: 'Public Affairs Guidance: Background on US Policy and Programs on the Military Uses of Outer Space', Folder: 'ASAT (Anti-Satellite),09/12/1983-10/02/1983', Box 5, 'Box 90209,901212', Kraemer, Sven F. Files, White House Staff and Office Files, Reagan Library.
[133] Thomas W. Graham and Bernard M. Kramer, 'The Polls: ABM and Star Wars: Attitudes Toward Nuclear Defense, 1945-1985', *The Public Opinion Quarterly*, 50, 1 (1986), pp. 125-134 (p.131).

of superpower negotiations to 'outlaw the use of weapons in outer space'.[134] The administration feared the USSR would exploit such an agreement by blocking the deployment of the space-based components of a future SDI system. Ultimately, though, problems of deployment would be irrelevant if SDI research was not funded adequately. In May 1984, Robert McFarlane, now National Security Advisor after succeeding Clark in October 1983, provided Reagan with a list of talking points for a meeting with Senators Warner (R., VA) and Tower (R., TX). McFarlane worried that a House cut of $400 million to the SDIO budget in the FY1985 DoD authorisation bill would 'cripple' the programme and proposed Reagan describe the Soviets as 'working very hard' to develop a BMD capability which could be used to blackmail the United States; SDI was 'an essential hedge against the Soviet strategic defence programme.'[135] McFarlane's warnings presaged the administration's new tactic of arguing that, as in the 1960s, the superpowers were pitted against each other in a race to seize the technological initiative.

As a research and development programme SDI was not tied down to one system or concept and decisions about its deployment were banished from the immediate future. While this malleability afforded a degree of flexibility in response to criticism, it also complicated attempts to, in the words of the NSC's Bob Linhard, 'get all the various players singing from the same policy music'. Therefore, in the autumn of 1984, an NSC-chaired interagency working group prepared an 'SDI Bible' to codify a new public diplomacy strategy in which the SDI would be justified as a 'hedge against Soviet defensive technology'. The Red Shield was supposedly 'much larger than the US effort' and comprised 'a wide range of advanced technologies' including a space-based laser, once again predicted for the mid-1990s.[136] The SDI Bible's commandments were further refined in NSDD-172 'Presenting the Strategic Defence Initiative' of May 1985 which claimed, 'Over the last two decades the Soviet Union has invested as much overall in its strategic defences as it has in its massive strategic offensive build-up.'[137] The Soviets resisted SDI through 'their propaganda theme of 'preventing the militarisation of space'' because it threatened their 'competitive advantage' in offensive and defensive capabilities.[138] By depicting a space-based laser as the centrepiece of the Soviets' missile defence effort and identifying Soviet Star Peace propaganda as a critical threat to SDI, the administration argued that the USSR's space and BMD programmes were inseparable.

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[134]'Decision Making Information Survey Databank Arms Control: SDI Folder', 19 December 1986, Folder: 'Public Attitudes Towards Arms Control and the Strategic Defense Initiative Prepared for the White House, 20 January 1987 [3 of 3]', Box 35: 'Decision Making Information December 1986', Chew, David Files, White House Staff and Office Files, Reagan Library.

[135] Robert C. McFarlane to The President, 'Strategic Defense Initiative (SDI)' (Undated, May 1984), Folder: 'Strategic Defense Initiative 10/01/1983-05/15/1984', Box 106, 'Strategic Defense Initiative' Subject File, Executive Secretariat, NSC Files, Reagan Library.

[136] Bob Linhard to Robert C. McFarlane, 'SDI "Bible", 1 December 1984, attachment: "The President's Strategic Defense Initiative"' pp. 9, 11;Folder: 'Box 106 'Strategic Defense Initiative 12/01/1984 (1/4)', Box 106 'Strategic Defense Initiative', NSC Subject File, Executive Secretariat, NSC Files, Reagan Library.

[137] NSC, NSDD-172 'Presenting the Strategic Defense Initiative', 30 May 1985, p. 3 available online via <https://fas.org/irp/offdocs/nsdd/nsdd-172.pdf>,[accessed 28 February 2018].

[138] Ibid., p. 7.

The administration's push to associate the Soviet space programme with space-based laser weapons made sense as a response to Star Peace propaganda, but it unintentionally undermined a simultaneous effort to argue that SDI was not synonymous with space-based systems. NSDD-172 had asserted that it was too early to tell whether an American BMD system would include space-based components. In February 1985, the White House decided against having Reagan address a High Frontier Panel banquet on the second anniversary of the Star Wars Speech. As much as the administration appreciated Graham's cheerleading, it feared 'drawing too tight an association between the President's unique vision and the High Frontier's goals.'[139] Attempts to distance Reagan's vague, hopeful vision from Graham's specific and potentially alienating one foundered because the administration's response to Soviet Star Peace propaganda continually depicted space as the decisive Cold War battleground and the optimal location for a BMD laser system.

One can trace the Soviet space threat's growing prominence within administration rhetoric through the Pentagon's flagship public diplomacy series *Soviet Military Power*. Published in September 1981, the first edition of *Soviet Military Power* was a meticulous taxonomy of the Soviet military threat packed with glossy illustrations of submarines, warplanes and missiles. Prados argues that *Soviet Military Power* not only reflected the 'marked change' in the intelligence community's appraisal of Soviet BMD research, it also helped fuel these alarmist depictions of the Soviet beam weapon threat.[140] The 1981 edition repeated NIE-11-1-80's estimate that approximately 85% of Soviet launches were military or dual civil/military in nature and warned about future beam weapons and a rocket booster '6-7 times more powerful than the shuttle'. However, its relatively brief discussion of Soviet space and BMD programmes framed these as elements of a Soviet 'quest for technological superiority'.[141] By contrast, the 1983 edition devoted an entire chapter to the Soviet space programme, and the 1985, 1986 and 1987 editions discussed Soviet space activities alongside strategic programmes.[142] The 1986 edition's illustrated description of the Galosh and Sary-Shagan installations was followed by a lengthy outline of the USSR's ASAT weapons, its crewed spaceflight programme and its military and applications satellites. Its prediction that a Soviet space shuttle was expected 'in late 1986 or 1987' was accompanied by an evocative illustration of the sleek, white spacecraft being readied for launch

[139] NSDD-172, pp. 10-11; Bob Linhard and Steve Steiner to Robert C. McNamara, 'Request for President to Address High Frontier Banquet, March 23rd', 15 January 1985, Folder: '51 AC/SDI [01/29/1985-02/07/1985]', Box 91066, Steiner, Steven S. Files, White House Staff and Office Files, Reagan Library.
[140] Prados, 'The Strategic Defense Initiative' in *Crisis of Detente in Europe* ed. by Nuti, (2009), pp. 86-97 (pp. 91-2).
[141] Department of Defense, *Soviet Military Power: 1981*, (Washington, DC: US Government Printing Office, 1981), pp. 74-6, 79-80.
[142] Department of Defense, *Soviet Military Power: 1983*, (Washington, DC: US Government Printing Office, 1983), pp. 65-70.

against an orange sunrise.[143] SDI shifted the Soviet space programme from a challenge to technological leadership to a strategic threat by portraying Soviet space and BMD research as components of the same grand strategy.

Specialised publications reinforced *Soviet Military Power*'s threatening picture. In the autumn of 1984, the DIA circulated a booklet amongst government agencies titled *Soviet Military Space Doctrine* that contended the USSR's 'dynamic, expanding and prodigious military space programme' was the natural product of a longstanding communist tradition of aggressive space control theorising.[144] The idea that the superpowers held irreconcilable views of space's place in military strategy was well established. At a 1984 conference on military space technology, Maj. Gen. Thomas C. Brandt of the JCS had ignored almost twenty years of American space control rhetoric to argue that the US saw outer space as a 'sanctuary unsullied by military interaction' in contrast to the Soviets who saw it as a 'geopolitical high ground'.[145] *Soviet Military Space Doctrine* presented the same dichotomy. Caveats about 'actual Soviet military space capabilities' as being beyond its scope and the difficulty distinguishing 'between offensive and defensive functions' in military spacecraft were quickly followed by stern warnings that 'the military nature of much of the USSR's capabilities is overwhelmingly offensive in character, since that is the essence of their military doctrine.'[146] Although *Soviet Military Space Doctrine* framed itself as a response to the USSR's vigorous military space programme, the context of the Soviet anti-SDI propaganda offensive was inescapable. The Soviets' hypocritical alarm at space militarisation proved 'it is obvious that the Soviet leadership is aware of the military significance of outer space', as well as the power of the 'technological breakthrough'.[147]

Publications like *Soviet Military Power* were supposed to be brandished in response to criticism of SDI. An appendix to the SDIO's 1985 report to Congress reproduced the 1985 edition of *Soviet Military Power*'s section on 'Soviet Defence and Space Programmes' in its entirety. As well as directly relevant warnings about Soviet plans to test and eventually deploy a space-based laser, the 1985 edition of Soviet Military Power had included a more general commentary on the military nature of the USSR's crewed programme. It argued, 'photographic and other missions

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[143] Department of Defense, *Soviet Military Power: 1986*, (Washington, DC: US Government Printing Office, 1986), pp. 44-55.

[144] Defense Intelligence Agency, 'DDB-1400-16-84: Soviet Military Space Doctrine', August 1981, p. 1, Record Number: 15032 'Strategic Defense Initiative 10/01/1983-05/15/1084', NASA History Office. The pamphlet drew on a range of sources but its most striking quotations came from Marshall Vasili D. Sokolovsky's *Soviet Military Strategy* which was revised throughout the 1960s, the 1962 edition is available online via: https://www.rand.org/content/dam/rand/pubs/reports/2005/R416.pdf [accessed 22/05/17] Vasilii Danilovich Sokolovsky, *Soviet Military Strategy,* trans. by Herbert S. Dinerstein, Leon Goure and Thomas W Wolfe (Santa Monica, CA: RAND Corporation, 1963); for analysis of Sokolovsky's conception of space doctrine see Nicholas L. Johnson, *Soviet Military Strategy in Space* (London: Jane's Publishing Company, 1987), pp. 12, 139-40, 191-5.

[145] Brandt, 'The Military Uses of Space' in *America Plans for Space* (1986), pp. 81-92 (p. 85).

[146] Defense Intelligence Agency, 'DDB-1400-16-84: Soviet Military Space Doctrine' pp.3-4.

[147] Ibid., p. 31.

aboard *Salyut 7* indicate the Soviets are aware of the potential value of manned space stations in an actual wartime situation.'[148] The SDIO's 1987 report to Congress similarly highlighted the Soviets' 'continuing military expansion into space' as proof that the USSR 'clearly recognizes the high ground of space as a major component of [their] drive for military superiority'.[149] Private sector SDI supporters enthusiastically echoed these warnings. A 1986 pamphlet, *The Intelligent Layperson's Guide to Star Wars* published by the conservative think-tank The National Strategy Information Centre argued that Star Peace propaganda was a devious ruse employed to protect the Soviets' 'monopoly on anti-satellite and missile defence capabilities'.[150] The USSR's real intentions were evident in its decades of space warfare theorising and its 'vigorous military space programme' that had 'placed special emphasis on all areas of strategic defence'.[151] By presenting the USSR's space and BMD ambitions as intertwined, the SDIO and its champions echoed Pournelle and Possony's argument in *The Strategy of Technology*: America must recognise, as the communists had, that the key to Cold War victory lay in advanced technology.

The autumn of 1985 saw a concerted push by the administration to draw attention to the Soviet BMD threat in anticipation of the Geneva Summit, the first meeting between Reagan and new Soviet leader Mikhail Gorbachev. In October, classified briefings on Soviet BMD research were arranged for both the House and Senate which were to be 'followed by the release of a joint, State/Defence unclassified publication on Soviet strategic defences.'[152] That publication, *Soviet Strategic Defence Programs,* was a *Soviet Military Power*-style pamphlet which argued that, although a space-based BMD laser 'could not be developed until the mid-1990s or even later', the USSR could deploy a laser weapon for ASAT purposes in the 'near term'.[153] Promoting the document during his weekly radio address on 12 October, Reagan warned that 'unlike our own, Soviet activities go well beyond research'. He quoted the report's estimate that 'as many as 10,000 Soviet scientists and engineers' were striving to 'put an advanced technology defensive

[148] Strategic Defense Initiative Organisation, 'Report to the Congress on the Strategic Defense Initiative 1985' 1985, pp. c15-c16, Folder: '[Strategic Defense Initiative] U.S. Policy Statements on SDI (1 of 5])', Box 26, Subject Files, Series 1, Green, Max Files 1985-1988, White House Staff and Office Files, Reagan Library
[149] SDIO, 'Report to the Congress on the Strategic Defense Initiative', April 1987, pp. II-2-113, Folder: 'SDI (5 of 8)', Box 25, 'Green Subject File Soviet Trade – SDI III', Green, Max Files 1985-1988, White House Staff Member and Office Files, Reagan Library.
[150] The National Strategy Information Center, *The Intelligent Layperson's Guide to 'Star Wars'* (New York, NY: The National Strategy Information Center, 1986), p. 37, Folder: 'SDI V (2 of 6)' Box 26 'Green Subject File SDI III to SDI-US Policy Statements', Series 1 Subject Files, Green, Max Files 1985-1988, White House Staff Member and Office Files, Reagan Library.
[151] Ibid., p. 18.
[152] 'Status of Soviet Strategic Defenses, Proposed Talking Points for Mr McFarlane', 7 October 1985, Folder: 'NSPG 0118 10/07/1985 [Soviet Strategic Defense]', Box 91307, National Security Planning Group (NSPG),Records, Executive Secretariat files, NSC Files, Reagan Library.
[153] Department of Defense and Department of State, 'Soviet Strategic Defense Programs', October 1985, p. 16 available online via <https://www.cia.gov/library/readingroom/docs/CIA-RDP88G00186R000901150017-2.pdf> [accessed 28 February 2018].

system in space by the end of the century.'[154] The USSR's BMD programme was, of course, almost entirely invisible to Western eyes and thus extremely difficult to estimate accurately. Reagan's attempt to make this threat tangible recalled the post-Sputnik depictions of the Soviet system churning out engineers and physicists in its effort to bury the West. Red Shield warnings depicted missile defence as a new space race, a vital technological contest that the Soviets were once again straining to win through sheer force of numbers.

Between the Geneva Summit in November 1985 and the Reykjavik Summit the following October, the Reagan administration came under pressure to trade the SDI away in return for Soviet concessions in arms control negotiations.[155] A White House 'Talking Points' document drawn up in July 1986 emphasised that 'The SDI is not a bargaining chip'. It was a 'prudent response to existing Soviet missile defences', a category that now included the Soviet ASAT weapon.[156] The following month the ACDA published a pamphlet specifically addressing *The Soviet Propaganda Campaign against the US Strategic Defence Initiative*. The pamphlet was a detailed indictment of anti-SDI Soviet propaganda that juxtaposed the USSR's ASAT tests with its shrill denunciations of the Space Shuttle, noting how 'the Soviet space programme has long been predominantly military in nature... There is no Soviet equivalent to NASA, America's civilian space agency.'[157] The administration saw the Soviet ASAT weapon as the perfect evidence to deploy in response to the 'bargaining chip' argument. Soviet 'killer satellites' proved both the hollowness of the USSR's pious rhetoric about Star Peace and the SDI's necessity in an uncertain future.

The administration also attempted to rally SDI supporters outside of government. On 7 November 1985, Reagan and SDIO Director Lt. Gen. James A. Abrahamson met with a group of 35 prominent SDI supporters who ranged from stalwarts like Daniel O. Graham and physicist Robert Jastrow to the Hollywood actors Tom Selleck and Susan Anton. The supporters were urged to continue fighting the good fight by speaking out against the Soviets plans to deploy a space-based BMD laser by the end of the century. The White House particularly appreciated their help because 'the Soviet propaganda line that the US has gone into a 'new' military area with SDI has had some effect.'[158] Selleck and Anton do not appear to have used their star power to help sell Star Wars

[154] 'Presidential Radio Talk: SDI: Saturday October 12, 1985', 10 October 1985, pp. 2-3, Folder: '51-AC/SDI/Soviets (1),(10/05/1985-10/31/1985)', RAC Box 12, Steiner, Steven S. Files, White House Staff and Office Files, Reagan Library.
[155] Fitzgerald, *Way Out There in the Blue* (2000), pp. 301-13.
[156] 'White House Talking Points: The Strategic Defense Initiative (SDI)', 16 July 1986, Folder: 'Strategic Defense Initiative – I (1 of 8)', Box 25, Series I: Subject File, Green, Max, Files, White House Staff and Office Files, Reagan Library.
[157] Arms Control and Disarmament Agency, *The Soviet Propaganda Campaign against the US Strategic Defence Initiative* (ACDA Publication 122), August 1982, p. 9, Folder: 'SDI III (2 of 2)', Box 26, Series I: Subject File, Green, Max, Files, White House Staff and Office Files, Reagan Library.
[158] Steven E. Steiner to Robert C. McFarlane, 'Presidential Meeting with SDI Supporters', 6 November 1985, p. 2; Meeting with Private Sector Supporters of SDI 08/05/86, RAC Box 12, Coordination Office Records, NSC Files, Reagan Library.

but former NASA physicist Jastrow had been warning about the Soviet space threat since 1982.[159] In a February 1987 *National Review* article, Jastrow argued that unless America rapidly pressed ahead 'with our own space-based defence', by the late 1990s the Soviets would be able to 'disrupt US communications and reconnaissance satellites at will. By the end of the century they may be able to keep the United States out of space altogether. They'll close the door and say, 'You can't come in.''[160] Jastrow's characterisation of SDI as America's last hope of avoiding a Soviet orbital blockade demonstrates how indebted to earlier space control theories pro-SDI rhetoric had become.

At the Reykjavik Summit, Reagan's refusal to abandon SDI left him unable to agree to Mikhail Gorbachev's proposals for a sweeping arms control agreement aimed at eliminating nuclear weapons entirely by the end of the century. Some historians allege that Soviet opposition to SDI at the summit solidified popular support for the policy: surely something that provoked such a visceral reaction from the Kremlin must be worthwhile?[161] Nevertheless, with the Democrats now in control of both House and Senate, the administration feared SDI would be blamed for the failure to reach agreement.[162] So, in spite of warming US-Soviet relations, the Red Shield was once again pressed into service. In the winter of 1986/1987 NASA and the CIA were directed to collaborate on a major study outlining 'where the US has fallen behind the Soviet space programme and where we still hold a competitive edge.'[163] Whilst the report was being readied, CIA Deputy Director Robert Gates went on the offensive, accusing the Soviets of spending up to fifteen times what the US had on strategic defence and benefitting from 'a very dark cloud' that had settled over the American space programme.[164] As the following chapter will elucidate, the destruction of the Space Shuttle *Challenger* in January 1986 and the launch of the Soviets' latest Space station, *Mir* (Russian for peace, world or community) the following month prompted widespread media lamentation about American space leadership.[165] By invoking NASA's woes, Gates was subtly connecting the Soviets' highly visible successes in space to their mostly invisible BMD programme.

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[159] Robert Jastrow, 'The New Soviet Arms Buildup in Space', *New York Times,* 3 October 1982, p. SM30; Zbigniew Brzezinski, Max Kampelman and Robert Jastrow, 'Defenses in Space is Not Star Wars', *New York Times,* 27 January 1985, pp. SM28, 46,51; 'Space Expert Says Critics of Missile Defense are Off Target', *Washington Times*, 28 June 1984, p. 4C.

[160] Robert Jastrow, 'America Had Five Years Left', *National Review*, 13 February 1987, p. 42.

[161] Fitzgerald, *Way Out There in the Blue* (2000), p. 350; Mira Duric, *The Strategic Defence Initiative* (2003) pp.79-81.

[162] Jonathan Hunt and David Reynolds, 'Geneva, Reykjavik, Washington and Moscow, 1985-8' in *Transcending the Cold War: Summits, Statecraft, and the Dissolution of Bipolarity in Europe, 1970–1990* ed. by Kristina Spohr and David Reynolds, (Oxford: Oxford University Press, 2016) pp. 151-179 (pp. 170-1).

[163] Alfred H. Kingon to Fred Ryan, 'Meeting with the President and Dr James Fletcher on America's competitiveness in Space', 26 November 1987, Folder: 'OS Outer Space (440000-448999)', Box 4 'OS Outer Space (388000-539999), WHORM Subject File, Reagan Library.

[164] Warren Strobel, 'Kremlin has spent $150 billion on its 'Star Wars,' CIA estimates', *Washington Times*, 26 November 1986, pp. 1A, 10A.

[165] John Noble Wilford, 'Age of Space: A Soviet Step', *New York Times*, 14 March 1986, pp. A1, 16.

On 28 February 1987, Gorbachev proposed the superpowers eliminate all intermediate-range nuclear weapons in Europe without demanding that the US limit SDI research to laboratory-only experiments in return. This momentous proposal 'de-linked' SDI from other arms control issues, paving the way for the Intermediate-Range Nuclear Forces Treaty to be signed at the Washington Summit that December.[166] However, the Soviet decision had a negligible impact on the Reagan administration's public diplomacy efforts and the war of words over space militarisation continued unabated. A March 1987 NSC memo outlined plans to use the latest edition of *Soviet Military Power* to 'get renewed focus on Soviet programmes'. Transcripts of a press conference with secretary of Defence Caspar Weinberger would be distributed through State Department and DOD networks and classified briefings would be arranged for selected congressmen. All the while, the administration would 'continue to make full use' of the 1985 publication *Soviet Strategic Defense Programmes*.[167] Beyond the continuing Soviet Star Peace propaganda and sincere concerns about aggressive Soviet intentions in space, the administration persisted with its Red Shield rhetoric because it had little choice. By this point, SDI was being justified almost entirely in negative terms and the connection between Soviet space and BMD research was a deeply engrained element of this strategy.

In December 1987 the DoD published a pamphlet titled *The Soviet Space Challenge* that encapsulated the central themes of the preceding six years' rhetoric about the communist space threat. The document's warnings about Soviet beam weaponry research and *Soviet Military Power* style illustrations of modular Salyut stations were prefaced with a threatening quotation from a Soviet Military Manual, the *Dictionary of Basic Military Terms*: 'Mastering space is an important prerequisite for achieving victory in war.'[168] Caspar Weinberger's foreword described the book as being published with the hope 'that, if presented with the facts, the American people will reject Soviet propaganda about US militarisation of space'. Weinberger stressed, 'It is essential that the message be clearly conveyed. We must not cede space control to the Soviet Union or to any other power that could use it to coerce our nation or restrict our liberties.'[169] The pamphlet concluded by warning that democracy's survival depended upon continued American access to space in language that Daniel Graham would have appreciated: abandoning space security 'would relinquish the ultimate high ground to our adversaries'.[170] *The Soviet Space Challenge* proffered new evidence, the number of docking ports on *Mir* for instance, to illustrate a crushingly familiar scenario of Soviet laser-assisted blackmail from space. Even after Gorbachev's

[166] Mira Duric, *The Strategic Defence Initiative (2003),* p. 99.
[167] Steve Steiner to Bill Cockell, Bob Linhard, Lint Brooks, Sven Kramer, Don Mahley, Will Tobey, Mike Donley, Fritz Ermarth, Ty Cobb, Bob Dean, Robert Bemis, Alison Fortier, Dan Howard, 'Getting out the word on Soviet Strategic Defense Programmes', 12 March 1982, Folder: '51- AC/SDI/Soviets (II),(03/01/1987-03/31/1987)', RAC Box 12, Steiner, Steven S. Files, Reagan Library.
[168] Department of Defence, *The Soviet Space Challenge* (Washington, DC: US Government Printing Office, November 1987), available in Record Number: '15032 USSR Space Effort 1984-1987' pp. ii, 9, 16-17.
[169] Ibid., pp. ii-iii.
[170] Ibid., p. 20.

de-link decision, the Reagan administration remained stubbornly committed to its strategy of using Soviet space activities as a rhetorical stand-in for the all-but-invisible Red Shield.

How effective was this strategy? Did attacks on the Soviet space program boost support for SDI? Whilst this question is difficult to answer definitively, available evidence indicates that this strategy was not only ineffective, but actually counterproductive. Opinion polls suggest that though Americans responded positively to the general idea of defending the nation from nuclear attack, they remained concerned about space militarisation. A July 1985 poll conducted by Boston research firm Marttila and Kiley found 58% of respondents favouring 'A system that was perfect and could successfully defend against all incoming nuclear weapons.' However, a January 1985 *Los Angeles Times* survey had found 43% strongly in favour and 16% somewhat in favour of seeking 'an agreement to outlaw the use of all military weapons in outer space'; a Harris poll from two months later found 56% of respondents opposed to the idea of developing 'a laser beam and particle-beam outer space defence system'.[171] Polling data provides the slipperiest of handholds; after all, 'Should the government protect you and your family from a nuclear firestorm?' and 'Should we seize the High Frontier?' are two very different questions. Still, as Soviet propagandists had realised, the link between SDI and space militarisation was one of the policy's critical vulnerabilities. Warnings about the Soviet space threat fuelled fears of an outer space arms race, undercutting the administration's disingenuous claims that the SDI had nothing to do with space militarisation. Such arguments became untenable as the SDI was increasingly justified as a way of containing communism's spaceward expansion.

Perhaps the best evidence for this strategy's failure is the increasingly desperate tone of the administration's warnings. The fact that Weinberger was still urging the public to wake up to the Soviet space threat in 1987 demonstrates that previous warnings appear to have gone unheeded. The following chapter explores in more detail how Red Shield rhetoric was contested and challenged. The late 1980s did see a surge in concern about the Soviet space programme's threat to American space leadership. However, with Mikhail Gorbachev's chaotic attempt to resuscitate the Soviet system through reform gathering pace, this concern was more likely to centre on a Soviet charm offensive to capture the commercial launch market than an orbital blitzkrieg to deploy laser weaponry. Even as concerns about slipping space leadership intensified, the changing face of the Soviet Union made it more difficult for SDI's supporters to sustain their signature brand of militaristic astrofuturism.

As US-Soviet arms control discussions continued and Gorbachev's reform effort spun out of control, the SDI vision dwindled from Reagan's ambitious peace shield to a much more limited terminal defence system. Space-based concepts remained influential, though not as a response to

[171] Thomas W. Graham and Bernard M. Kramer, 'The Polls: ABM and Star Wars: Attitudes Toward Nuclear Defense, 1945-1985.', *The Public Opinion Quarterly*, 50, 1, (1986), pp. 125–134 (pp. 131-2).

supposed Soviet research. In the summer of 1988, Livermore Laboratory scientists had impressed both Reagan and his soon-to-be successor, George H. W. Bush, with their 'Brilliant Pebbles' scheme of comparatively tiny, non-nuclear satellite interceptors 'packed with fancy electronics and innovative optics'. As William J. Broad notes, 'Over the months and years that followed, Brilliant Pebbles became one of the fastest-growing arms programs in the nation's history.'[172] The Bush administration remained committed to missile defence in a world that was rapidly changing. Red Shield justifications were increasingly implausible as Glasnost demystified both the USSR's space programme and its laser research. In July 1989, Evgenii Velikhov guided a small American delegation of physicists, congressmen and journalists round the Sary Shagan research facility. A *New York Times* report by one Velikhov's guests characterised the 'shabby' buildings, 'rusted steel' and '20-year-old transistorised computers' as a 'Potemkin village' that had 'loomed large in the lore of the Pentagon'.[173] In 1990, the year that Brilliant Pebbles was designated as SDIO's principal BMD concept, the Warsaw Pact was dissolved. Consequently, Brilliant Pebbles was sold to the public as insurance against an accidental launch or the danger of a nuclear armed 'mad man' in the Third World rather than a torrential downpour of Soviet ICBMS.[174]

The SDI's roots were deep. Whether these stretched back to the missile defence theorising of the early 1950s or a centuries-long American yearning for the 'perfect defence' is debatable.[175] More directly, Ronald Reagan's space-based BMD vision was a product of the resurrection of space control discourse during the late 1970s. It was an astrofuturist dream that thrived on futuristic images of laser technology, orbital battlestations and arguments that space was the ultimate high ground. This ubiquitous connection between the SDI and space technology facilitated Soviet Star Peace propaganda and was consequently reinforced by the Reagan administration's retort that the Soviets were the real space militarists. Attempts to present the SDI as a broader research effort rather than a specific space-based system were doomed to failure. The administration's public diplomacy angrily rebuffed attempts to caricature the SDI as a purely space-oriented solution only to immediately describe it as a hedge against the Soviet Union's drive to conquer LEO and deploy their own laser weapon. Reagan earnestly believed that SDI was a vision of hope: a scientific quest that would save the world from nuclear warfare. Ultimately though, the growing prominence of Red Shield rhetoric proved that SDI was also a vision of fear, not just nuclear fear, but the fear of a suffocating future of diminished possibilities and totalitarian blackmail under a Soviet orbital blockade.

[172] Broad, *Teller's War* (1992), pp. 246-7.
[173] Bill Keller, 'American Team Gets Close Look at Soviet Secret', *New York Times*, 9 July 1989, pp. 1, 17.
[174] Fitzgerald, *Way Out There in the Blue* (1997), pp.482-4.
[175] The compelling idea of SDI as the manifestation of an enduring defensive obsession is explored less-than-successfully through a disjointed series of historical vignettes in James Chace and Caleb Carr's *America Invulnerable: The Quest for Absolute Security from 1812 to Star Wars* (New York, NY: Simon & Schuster, 1989).

Chapter Five | Together to Mars! – Cooperative Visions at the Dusk of the Cold War

'For myself, I cannot see a justification for sending people to Mars other than the improvement of the relations between the United States and Soviet Union, and the public demonstration of such an improvement.' - Carl Sagan, 5 June 1987.[1]

Strolling through the Kremlin's grounds during the 1988 Moscow Summit, General Secretary Mikhail Gorbachev directed Ronald Reagan's attention to the 'Tsar Bombard'. This gargantuan thirty-eight-tonne cannon was already obsolete as a weapon when it was cast in 1586 by Muscovite master gunsmith Andrei Chokov. Instead, it had served an ideological function as an awe-inspiring symbol of Russian grandeur and military preparedness, gawped at by generations of envoys and would-be conquerors alike.[2] As Reagan scrutinised the imposing artillery piece, Gorbachev brought up a contemporary example of Russian ingenuity, his nation's space programme, and proposed a cooperative US-Soviet crewed mission to Mars. Later, at dinner, Gorbachev returned to the theme, introducing IKI director Academician Roald Sagdeev to Reagan as a scientific advocate of the idea. Sagdeev later recalled how Reagan's expression rapidly clouded with annoyance as Gorbachev obliviously enthused that an American comrade of Sagdeev's, an eminent scientist named Carl Sagan, had also been pushing for a cooperative Mars mission. Sagan was an outspoken critic of Reagan's beloved SDI and Sagdeev believed that the prospect of a joint mission evaporated with Gorbachev's blunder.[3] The reason why astronauts and cosmonauts never set off to the Red Planet together was a little more complicated, but Sagdeev's anecdote illuminates several crucial elements of 1980s proposals for a cooperative US-Soviet mission to Mars: firstly, the idea's origins within anti-SDI discourse; secondly, the transnational relationships between its scientist advocates; and, finally, the stark contrast between enthusiasm and wariness in how the Soviet and American governments received the idea.

Mars had long exerted a powerful influence on the minds of space popularisers, forever looming as 'the next logical step' on humanity's ascent to the stars. In 1975, Werner von Braun, whose collaborations with Walt Disney had stoked Mars fervour in the 1950s, proposed capitalising on

[1] Note 5/7/87, Folder 6: 'Mars missions notes chronological', Box 935, Carl Sagan Papers, The Seth MacFarlane collection of the Carl Sagan and Ann Druyan archive, Library of Congress, Washington DC (hereafter 'Sagan Papers').
[2] Sergei Bogatyrev, 'Bronze Tsars: Ivan the Terrible and Fedor Ivanovich in the Decor of Early Modern Guns' in *Personality and Place in Russian Culture: Essays in Memory of Lindsey Hughes* ed. by Simon Dixon, (London, UCL School of Slavonic and East European Studies, 2010), pp.48-72 (pp. 63-7).
[3] Roald Sagdeev, *The Making of a Soviet Scientist: My Adventures in Nuclear Fusion and Space from Stalin to Star Wars* (New York: John Wiley & Sons, 1994), pp. 310-11; Roald Sagdeev, 'Highlights of the Russian Planetary Programme' in *Carl Sagan's Universe* ed. by Yervant Terzian and Elizabeth Bilson, (Cambridge: Cambridge University Press, 1997), pp. 28-34 (p. 32).

the ASTP with an 'international super-adventure' to the fourth planet.[4] The word 'adventure' fails to adequately capture the reverence with which 1980s space enthusiasts treated a mission to Mars. Kendrick Oliver relates how the early space age brimmed with expectations that astronauts would return from space bearing profound insights as well as scientific data.[5] 'Mars Together' proposals resurrected this yearning with claims that a cooperative mission to Mars would restore a sense of profundity to space exploration. Speaking at the Jet Propulsion Laboratory's (JPL) Von Karman Auditorium in 1989, Sagan claimed, 'such a program could focus the global imagination, not just during the mission, but for decades before and after. This is a proud goal- for the nation and for the species, and an aperture to a future worthy of our children.'[6] Robert Crossley's encyclopaedic literary history *Imagining Mars* argues that 'Mars is not only a locale, a symbol, a mythos, it is also a tabula rasa. It is a place with a past but without a history.'[7] By offering the superpowers a fresh start, the journey to Mars was less an adventure than a pilgrimage. Travelling to Mars together would absolve them of the sins of the Cold War; like the road to Santiago de Compostela, Mecca or Canterbury- the lessons of the journey were as important as the destination.

During the final days of the Cold War, a loosely connected movement of American and Soviet scientists, space enthusiasts and politicians came together to promote the Mars Together vision. Between Reagan's 1983 SDI speech and the 1989 announcement of George H. W. Bush's Space Exploration Initiative (SEI), books, conferences, television specials, write-in campaigns, Congressional resolutions, articles and editorials in favour of a joint mission to Mars were produced. However, this burst of political activity was suddenly overshadowed by the Eastern Bloc's rapid and largely unexpected disintegration and the ensuing collapse of the Soviet Union itself.[8] By the time of the failed coup against Gorbachev by Stalinist hardliners in August 1991, the

[4] Kilgore, *Astrofuturism* (2003), p. 65; McCurdy, *Space and the American Imagination* (2011), pp. 123-9; Thor Hogan, *Mars Wars: The Rise and Fall of the Space Exploration Initiative,* NASA SP-2007-4410 (Washington, DC: NASA History Division, 2007), pp. 16-19; Von Braun, 'We get set for Astronaut-Cosmonaut space linkup', *Popular Science*, January, 1975, pp. 38-41 (p. 41).

[5] Oliver, *To Touch the Face of God* (2013), p. 91.

[6] This thesis' use of 'Mars Together' is not to be confused with the later 'Mars Together' collaboration between American and Russian scientists that culminated in Russian experiments being flown aboard NASA's *Mars Odyssey* spacecraft in 2001. See Eisenhower, *Partners in Space* (2004), pp. 95-97; Carl Sagan, 'Planets and Politics: Reflections on the Presidential Moon-Mars Initiative' – booklet based on address at NASA's Jet Propulsion Laboratory, Von Karman Auditorium, Pasadena, California, 27 July 1989, p. 21, Folder 1: 'Advisory Committee on the Future... 1990-1991 (2 of 3)', Box 365, Sagan Papers.

[7] Robert Crossley, *Imagining Mars: A Literary History* (Middletown, CT: Wesleyan University Press, 2011), p. 28.

[8] The following memoirs present American policymakers scrambling to react to the USSR's collapse: George H. W. Bush and Brent Scowcroft, *A World Transformed* (New York NY: Vintage, 1998); Jack F. Matlock Jr., *Autopsy of An Empire: The American Ambassador's Account of the Collapse of the Soviet Union* (New York, NY: Random House, 1995), James Baker, *The Politics of Diplomacy: Revolution, War and Peace 1989-1992 (*New York, NY: G. P. Putnam's, 1995). The CIA did diagnose many of the Soviet state's ailments as terminal, and in 1988 predicted an imminent crisis in the USSR's relations with its Warsaw Pact neighbours, see NIE 11/12-9-88: *Soviet Policy Toward Eastern Europe Under Gorbachev,* May 1988, pp. 1-3, available online via https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-

USSR appeared incapable of maintaining the peace, let alone joining America in such a complicated and costly endeavour. The far-reaching events of 1989-1991 buried not only the Mars Together idea but also the memory of the brief moment when it had commanded widespread attention.

Linenthal's *Symbolic Defence* perceptively described cooperative Mars proposals as attempts to subvert the Reagan administration's SDI vision by harking back to Apollo-Soyuz's rhetoric of space diplomacy.[9] Elsewhere, however, Mars Together has received only sporadic and tangential mentions in histories of both space exploration and the Cold War.[10] This chapter uses the Mars Together idea as a gateway to American perceptions of the Soviet space programme during the USSR's final days. Its protagonists are the 'unarmed forces', transnational scientists and citizens' diplomacy groups, that Matthew Evangelista and Kai-Henrik Barth argue played an important role in ending the Cold War.[11] William Burrows' *This New Ocean* argued that 1986 saw the 'first space age' of state-led technocratic mega-projects end with the catastrophic 'ruptures' of the *Challenger* and the Chernobyl nuclear power plant disasters. *Challenger* had a profound effect on American perceptions of space exploration, but this chapter disputes Burrows ironic depiction of the Soviet programme's collapse as 'a Chernobyl in slow motion'. Not only does this depiction create the false impression that Chernobyl impacted popular perceptions of spaceflight as it did those of civilian nuclear power, it also detracts from how rapid and shocking the Soviet programme's collapse appeared to Western observers.[12]

This chapter's first half explores the rise of cooperative Mars proposals as visionary alternatives to SDI's fantasy of space warfare. The Mars Together movement's loose coalition of scientists, legislators and space enthusiasts made common cause with the Soviet space community to challenge the prevailing depiction of Apollo-Soyuz as a propagandistic sham. This transnational coordination peaked with a 1987 'Space Bridge' discussion where Soviet and American scientists discussed the logistics of a joint mission in real time via satellite technology. This chapter's second half examines Mars Together's image of the Soviet programme in more detail, arguing that space

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monographs/at-cold-wars-end-us-intelligence-on-the-soviet-union-and-eastern-europe-1989-1991/16526pdffiles/NIE1112-9-88.pdf [accessed 25/7/2017].

[9] Linenthal, *Symbolic Defense* (1989) pp. 85-6, 89.

[10] Thor Hogan's history of the SEI includes a brief reference to Sagan's desires for greater US-Soviet space cooperation: Hogan, *Mars Wars* (2007), pp. 109-110; McCurdy's *Space and the American Imagination* (2011), pp. 171-2 describes the 1980s obsession with Mars that led to the formation of a 'Mars Underground' but fails to mention the influence of cooperative proposals; additionally, Karash's *The Superpower Odyssey* discussion of sub-governmental proposals for Mars missions is a rarity in a field focused on high-level diplomacy or programmes like the BION biological science satellites that actually reached fruition: Karash, *The Superpower Odyssey* (1999), p.159-160.

[11] Kai-Henrik Barth 'Catalysts of Change: Scientists as Transnational Arms Control Advocates in the 1980s', *Osiris*, 2, 21, (2006), pp. 182-206 (p.205); Evangelista, *Unarmed Forces* (2002).

[12] Burrows, *This New Ocean*, (1998), pp. 551, 570-573; for a more nuanced historical analysis of what Chernobyl reveals about Soviet political culture see P. R. Josephson, 'Atomic-Powered Communism: Nuclear Culture in the Postwar USSR', *Slavic Review*, 55, 2, (1996), pp. 297-324.

cooperation activists encouraged a venerable image of the Soviets pursuing a rational, progressive programme that was incrementally advancing towards crewed interplanetary flights. The post-*Challenger* period of anguished soul-searching over America's slipping space 'leadership' nourished Mars Together's vision of ending the Cold War through a 'space age' megaproject. It was only after Space Shuttle flights resumed in late 1988 that the strains of the Soviet programme began to show, exacerbated by the harsh light of Glasnost. The dispiriting failure of the USSR's Phobos programme to probe Mars' diminutive moon dispelled the Soviet programme's aura of competence and dealt a decisive blow to Mars Together plans. As Glasnost steadily revealed the chaos that the Shadow Programme had long concealed, Perestroika eroded the ideological incentives for a mission to Mars. Why spend billions of dollars travelling to Mars if the Soviet government already appeared increasingly desperate for accommodation?

'Something Big. Something Daring': The Rise of the Mars Together Idea

'What else have we got in common with the Soviet Union without space travel? The Olympics, maybe. Anyway, not enough, right?' - Letter from thirteen-year-old Lauren Ardman to President Reagan protesting budget cuts to NASA planetary programmes, 25 April 1981.[13]

In a February 1986 *Parade* magazine article titled 'Let's Go to Mars- Together', Carl Sagan, the David Duncan Professor of Astronomy and Space Scientists at Cornell University, outlined the scientific, organisational and political rationale for a joint US-Soviet space programme culminating in a crewed mission to the Red Planet. Sagan had even considered how to avoid the awkward question of whether an astronaut or a cosmonaut would set foot on the planet first: 'If this issue worries us, we can arrange for the ankles of the American and Soviet commanders to be tied together as they alight in the gentle Martian gravity.'[14] This image of space brotherhood exemplified 'Mars Together' proposals which argued that by travelling together to another world, the superpowers could save this one. Linenthal's *Symbolic Defence* quotes space cooperation's greatest legislative champion, Senator Spark M. Matsunaga's (D, HI) argument that 'Star Wars is a vision of our future in space. Only an alternative vision of the future can decisively counter it.'[15] Matsunaga's 1986 book *The Mars Project*, a nod to Werner von Braun's earlier Mars manifesto *Das Mars Projekt*, praised space cooperation as 'a course aimed at transcending the Cold War.'[16] Like SDI, Mars Together was an astrofuturist vision that used space technology to escape Cold War realities. Whereas SDI rhetoric presented Soviet scientists and cosmonauts as shadowy and

[13] Lauren Ardman Letter, 25 April 1981, Folder: OA 1810 (OA 935694), (4 of 11), Box 16, 'OS Outer Space OS 001 455000-534999', WHORM Subject File, Reagan Library.
[14] Carl Sagan, 'USA and USSR: Let's go to Mars- Together' *Parade*, 2 February 1986, reprinted in Carl Sagan, Planetary Society Background Paper No. 1: Planets and Politics: Reflections on the Presidential Moon-Mars Initiative' 1989, pp. 23-31, Folder 2: 'Advisory Committee on the Future 1990-1991', Box 365, Sagan Papers.
[15] Linenthal, *Symbolic Defense* (1989), p. 85.
[16] Spark Matsunaga, *The Mars Project* (New York, NY: Hill and Wang, 1986), p.170; Willy Ley and Wernher von Braun, *The Exploration of Mars* (London: Sidgewick and Jackson, 1956).

threatening figures hard at work on offensive laser technology, Mars Together activists enlisted them as partners to prove that space technology could break down Cold War barriers.

Spark Matsunaga, the junior Senator for Hawaii, played a crucial role in turning anti-SDI sentiments into a Mars-centred cooperative proposal. A decorated veteran of the legendary 100th Infantry Battalion and the son of a Shinto priest who had yearned to philosophically reconcile East and West, Matsunaga was a respected liberal senator and a pillar of the Japanese-American community.[17] He found the discussion of space weaponry that presaged Reagan's SDI announcement profoundly depressing. Space warfare seemed antithetical to the practical 'Space Age' internationalism of the astronomers he had met during a 1980 visit to the Mauna Kea Observatory. For Matsunaga, ASAT competition portended 'a spiral of space weapons competition... as dangerous as a breeder reaction running out of control.'[18] His first attempt to halt the space arms race was a July 1982 *Washington Post* comment piece that proposed a joint space station project as a worthy follow up to Apollo-Soyuz: 'Something big. Something daring, bearing hope for the future... We need to give the Staffords and Leonovs of this world a chance.'[19] Matsunaga's positive view of 1970s space cooperation was reinforced by discussions with ASTP crewmember Deke Slayton who had disputed 'the myth that Apollo-Soyuz was a technological giveaway' and convinced the Senator that 'the *process* of Apollo-Soyuz was democratising' by pushing 'the Soviets' closed system toward greater openness at the points where we came into contact with it.'[20] Matsunaga had imbibed Apollo-Soyuz's central rationale: collaboration could be used to socialise the recalcitrant Soviets into better, more open, behaviour.

Matsunaga's vision expanded in scope and ambition following Reagan's SDI announcement. The Senator had previously introduced unsuccessful resolutions calling for greater space cooperation in December 1982 and March 1983. Although he sympathised with the pro-BMD lobby's criticisms of MAD doctrine Matsunaga remained convinced that 'Space weapons, however well intentioned, don't treat the madness'.[21] Seeking a vision that would match SDI's emotive appeal, Matsunaga immersed himself in space history and was struck by the emphasis that early Soviet cosmonautics theorists like Tsiolkovsky and Fridrikh Tsander had placed on eventual Mars colonisation. 'Mars was there at the beginning of both space programmes. The Russians clung to it. We turned away from it.' This disastrous mistake had caused America to lose 'a Space Age frame of reference for our extraterrestrial activities.'[22] Matsunaga outlined his vision for a set of 'building blocks to Mars' in an April 1984 opinion piece: cooperative programmes progressing from robotic interplanetary

[17] Peter B. Flint, 'Spark M. Matsunaga Dies at 73', *New York Times*, 16 April, 1990; for Kingoro Matsunaga's philosophy and its influence on his son see Matsunaga, *The Mars Project* (1986), pp. 68-70.
[18] Matsunaga, *The Mars Project* (1986), pp. 5-8.
[19] Spark Matsunaga, 'Find Peace with Russia in Space' *The Washington Post,* 4 July 1982, p. B4.
[20] Matsunaga, *The Mars Project* (1986), pp. 23-4.
[21] Ibid., pp. 9, 28-31.
[22] Ibid., pp. 53-4, 56-7.

probes to Shuttle-Salyut rendezvous and Moon base projects would eventually culminate in a joint mission to Mars. A cooperative crewed voyage to Mars would be 'history's most stirring undertaking' and would 'cost us far less than a full-blown Star Wars scenario.' America could still pursue a purely R&D-oriented SDI effort, but Matsunaga remained confident that when the time came to decide on deployment, Mars would win out. 'Compared to that inspiring prospect, a 'high-ground' space-weapons programme looks like an anthill.'[23]

The SDI announcement imbued Matsunaga's calls for space cooperation with new urgency. In February 1984, Matsunaga introduced a third space cooperation resolution alongside Claiborne Pell (D, RI) and Maryland and Illinois Republicans Charles Mathias and Charles H. Percy. This resolution was immediately more successful its predecessors, attracting fourteen co-sponsors by April and a hearing of the Senate's Foreign Relations Committee was scheduled that June to help further broaden that support.[24] SDI's greatest asset was the President, a persuasive idealist praised as the 'great communicator' for his ability to turn political abstractions into relatable, homespun aphorisms.[25] To prove that space cooperation rather than Star Wars was the visionary scheme that could end the Cold War, Matsunaga needed a similarly gifted salesman.

Carl Sagan had helped plan NASA's *Mariner*, *Viking* and *Voyager* interplanetary programmes, but it was in his guise as a prodigiously gifted science communicator that he best served the Mars Together movement. Sagan had become a household name through engaging appearances on Johnny Carson's *Tonight Show* and his enormously influential PBS documentary series, *Cosmos: A Personal Voyage*.[26] Sagan used his celebrity to popularise causes close to his heart. In 1980, alongside Louis D. Friedman and Bruce Murray of the JPL, he founded the Planetary Society, an educational and advocacy group dedicated to proving there was a popular mandate for planetary exploration programmes. Although Friedman stressed that the group was more than 'just the Carl Sagan fan club', Sagan's popularity played a crucial role in the Planetary Society's rapid expansion to approximately 130,000 members by 1984.[27] Sagan could provide Matsunaga with a conduit to both thousands of *Cosmos* fans and the motivated vanguard of planetary scientists eager to put Mars back on the political agenda.

The rise of the Planetary Society exemplified a growing obsession with Mars amongst scientifically-minded members of the pro-space movement. Crossley describes how although the

[23] Spark M. Matsunaga, 'Needed: Cooperation, Not War, in Space', *Newsday*, 9 April 1984, proof copy enclosed in letter from Harvey Meyerson to Carl Sagan, 1 April 1984,Folder 4: 'US Senators Matsunaga, Spark 1983-1989', Box 846, Sagan Papers.
[24]Matsunaga, *The Mars Project* (1986), pp. 56-60.
[25] For Reagan's rhetoric and its effectiveness see Morgan, *Reagan* (2016) pp. 151-2; Fitzgerald, *Way Out There in the Blue* (2000) pp. 15-6; Holloway, 'The Strategic Defense Initiative and the Technological Sublime' in Holloway, Medhurst and Brands, *Presidential Rhetoric* (1998), pp. 209-232; Bjork, *The Strategic Defense Initiative* (1992) 65-84.
[26] William Poundstone, *Carl Sagan: A Life in the Cosmos* (New York, NY: Henry Holt & Company, 1999)
[27] Michaud, *Reaching for the High Frontier* (1986), pp. 207-9.

bleak images of 'dead Mars' returned by NASA's Mariner and Viking programmes in the 1960s and 1970s finally dispelled ancient illusions about Martians and canals, they had also gradually revealed the striking geographical diversity of the 'real Mars', its epic canyons and colossal extinct volcanoes, 'engendering a new romance with the planet.'[28] By the early 1980s, a dedicated 'Mars Underground' was coalescing around the 'Case for Mars' conferences at the University of Colorado Boulder which had begun with a 1981 gathering hosted by a group of graduate students calling themselves the Mars Study Project. The group's third conference in 1987 played host to 500 participants and included a keynote address from Sagan on the Mars Together idea that attracted an audience of 1000. The Mars cultists these events attracted were motivated by a combination of scientific curiosity and astrofuturist aspirations to 'terraform' the dead world into a verdant habitable paradise.[29] Mars Together rhetoric echoed their depiction of the Red Planet as a scientific wonderland that was both familiar and alien. Sagan's *Parade* article described Mars as somewhere that was 'sometimes as warm as a New England October' yet contained 'sandstorms that sometimes reach half the speed of sound.'[30] The Mars Together vision and the Mars Underground's schemes were mutually reinforcing: one provided a compelling political rationale whilst the other detailed the adventures Americans and Soviets could embark on once they reached their destination.

There was a strange symmetry between Sagan's elegiac descriptions of Mars and his warnings about what a world after nuclear war could look like. As well as being a cheerleader for planetary exploration, Sagan was also a vociferous critic of the nuclear arms race. In the early 1980s, he had attracted controversy by popularising the 'Nuclear Winter' concept, which contended that atomic warfare might irrevocably devastate the Earth's delicate climactic balance.[31] The freezing, inhospitable hellscape that Sagan asserted would follow a strategic nuclear exchange was not unlike the bleak vista which would greet the Soviet and American spacefarers disembarking from their Martian lander module. Journeying to an already dead world might be what it would take to prevent the superpowers from visiting the same fate upon Earth.

Profoundly suspicious of the military-industrial complex, Sagan had been opposed to SDI from the moment of its announcement, even going so far as to dictate a petition against it whilst lying in

[28] Crossley, *Imagining Mars* (2011), pp. 214-16.
[29] Andrew Chaikin, *A Passion for Mars: Intrepid Explorers of the Red Planet* (New York, NY: Abrams, 2008), pp. 133-144; For Terraforming as a goal see James Oberg, *Mission to Mars* (1982), pp. 192-7.
[30] Carl Sagan 'USA and USSR: Let's go to Mars- Together' *Parade*, 2 February 1986 reprinted in Carl Sagan, Planetary Society Background Paper No. 1: Planets and Politics: Reflections on the Presidential Moon-Mars Initiative' 1989, p. 25, Folder 2: 'Advisory Committee on the Future 1990-1991', Box 365, Sagan Papers.
[31] Paul Ehrlich, Carl Sagan, Donald Kennedy and Walter Orr Roberts, *The Cold and the Dark: The World after Nuclear War* (New York, NY: Norton, 1985); for analysis of Sagan's Nuclear Winter thesis see Poundstone, *Carl Sagan* (1999), pp. 292-3, 315-6; Lisa Vox, *Existential Threats: American Apocalyptic Beliefs in the Technological Era* (Philadelphia, PA: University of Pittsburgh Press, 2017), pp. 113-4, 117-8.

intensive care following appendicitis surgery.[32] Sagan's anti-SDI activism earned him the High Frontier Foundation's undying enmity; the *High Frontier Newsletter* identified him as one of SDI's key opponents.[33] The May 1984 issue reprinted a *Washington Times* article that underlined its attack on Sagan's 'nimble sophistry' with a cartoon portraying the scientist as a clueless medieval alchemist poring over grimoires in a fruitless quest for the philosopher's stone.[34] Sagan was an SDI sceptic with a background in planning interplanetary exploration programmes who possessed enviable name recognition as a leading science populariser. As someone who could convincingly relate both the scientific case for Mars and the moral case against space weaponry, he was the ideal champion for Matsunaga's Mars Together proposal.

Sagan's initial response to entreaties from Matsunaga's staff was scepticism. He questioned the wisdom of proposing such an ambitious project in an election year and expressed his 'intuition' that US-Soviet relations 'must improve at least somewhat before [joint space missions] become feasible.' Nevertheless, he offered his support and agreed to pass Matsunaga's proposal onto Louis Friedman, Executive Director of the Planetary Society.[35] Friedman responded enthusiastically; international cooperation was 'a good platform for us (away, also, from the usual budget ones).'[36] Cooperation also promised the enticing prospect of pooling resources with the USSR's vigorous planetary programme. A July 1981 *New York Times* article juxtaposed planned Soviet, Japanese and European missions to intercept Halley's Comet in 1985/1986 with NASA's planetary sciences budget which was under threat of total elimination. The article quoted Sagan's warning of the 'ominous and very real prospect that American leadership in planetary exploration will come to an abrupt end.'[37] Mars Together offered an excellent opportunity to halt the arms race in outer space, resuscitate NASA's planetary programme and present the Planetary Society's work as setting the agenda rather than as a constant rearguard action against cuts to NASA programmes.

From the beginning, Mars Together activism was part of a broader international effort to halt SDI. Sagan was already comfortable working alongside Soviet scientists in both scientific and activist contexts. During the 1960s, he had collaborated on a book on SETI with Academician I. S.

[32] Poundstone, pp. 300-1.
[33] 'Know the Opposition', *High Frontier Newsletter,* March 1985, 3, 3, pp. 5-6, Folder 4: 'Anti Nuclear Activism, Organisations High Frontier 1 of 3', Box 833, Sagan Papers.
[34] Phil Nicolaides, 'Defense: Carl Sagan's Nimble Sophistry', *High Frontier Newsletter,* May 1984, 1, 11, p. 6, Folder 5: 'Anti Nuclear Activism, Organisations High Frontier 2 of3' 1983-1984, Box 833, Sagan Papers.
[35] Carl Sagan to Harvey Meyerson, 10 February 1984, Folder 4: 'US Senators Matsunaga, Spark 1983-1989', Box 846, Sagan Papers.
[36] Memo from Louis Friedman to Carl Sagan, 'Matsunaga Bill', 7 March 1984, Folder 4: 'US Senators Matsunaga, Spark 1983-1989', Box 84, Sagan Papers.
[37] John Noble Wilford, 'Rousing US Science to Meet Halley's Red Dawn', *New York Times*, 19 July 1981, p. E22.

Shklovskii of Moscow State University.[38] This association culminated in Sagan co-organising a US-Soviet SETI conference at the Armenian SSR's Byurakan Observatory in September 1971.[39] Matthew Evangelista's account of the revival of transnational fora during the Second Cold War describes how, in the absence of a civil society independent of the state, the 'main actors on the Soviet side' were often scientists.[40] Sagan made common cause with Soviet scientists attacking the Reagan defence build-up and participated in a 1983 televised 'Space Bridge' discussion on Nuclear Winter alongside the Academy of Sciences' Evgenii Velikhov.[41] Matsunaga tapped into this background in a June 1984 letter imploring Sagan to lend his 'special genius for communication' to the Mars Together effort. The senator described how meeting Sagan's friend Roald Sagdeev at a dinner following a May 1984 meeting between American and Soviet arms control officials had further convinced him of a cooperative programme's 'enormous potential'.[42] Like Alexis Tatistcheff, Apollo-Soyuz's émigré translator, Matsunaga had been impressed with the businesslike conviviality of space cooperation. *The Mars Project* contrasts the 'ideological rhetoric and posturing' of the arms control meeting with Sagdeev's dinnertime conversation with members of an Office of Technology Assessment panel that was evaluating space cooperation, likened to 'shrewd businessmen testing the market for each other's products.'[43]

The Senate's Foreign Relations Committee hearing on Matsunaga's space cooperation resolution took place on 14 September 1984 after being cancelled and rescheduled following the hunger strike of Soviet dissident and Nobel Prize-winning physicist Andrei Sakharov.[44] Matsunaga condemned the USSR's remorseless persecution of its dissidents but, as he explained in a *Washington Post* piece, he believed an attitude of inflexible hostility had made US foreign policy 'hostage to the KGB', who thrived in an atmosphere of international isolation. Matsunaga characterised engagement as a policy of strength rather than appeasement by proposing a Mars mission as the sort of 'aggressive cooperation' that could spread the humanitarian,

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[38] Poundstone, *Carl Sagan,* (1999), pp. 77-9; for the NASA budget see Michaud, *Reaching for the High Frontier* (1986), pp. 203-4.

[39] The weeklong conference used an earlier form of the SETI acronym 'CETI' (Communication with Extra-Terrestrial Intelligence),and attracted a diverse collection of notable attendees including early SETI theorists like Skhlovsky Frank Drake, Freeman Dyson and Nikolai S. Kardashev; DNA pioneer Francis Crick, AI theorist Marvin Minsky, laser inventor Charles H. Townes and Nobel Prize-winning physicist Vitalii L. Ginzburg, see: 'List of Participants, CETI Conference, Byurakan, 5-11 September, 1971', Folder 11: 'Communication with Extraterrestrial Intelligence Symposium', Box 646, Sagan Papers.

[40] Evangelista, 'Transnational Organisations and the Cold War' in. *The Cambridge History of the Cold War*, 3, ed. by Leffler and Westad (2010), pp. 409, 412.

[41] 'Space Bridge: The World After Nuclear War' originally aired on CNN September 1983, available online via <https://www.youtube.com/watch?v=cVU0dpoDOb8> [accessed 28 February 2018].

[42] Spark Matsunaga to Carl Sagan, 13 June 1984, Folder 4: 'US Senators Matsunaga, Spark 1983-1989', Box 846, Sagan Papers.

[43] Matsunaga, *The Mars Project* (1985), pp. 62-3; Sagdeev had befriended Sagan during a1976 visit to the US to discuss coordinating American and Soviet Venus probes, see Sagdeev, 'Highlights of the Russian Planetary Program' in *Carl Sagan's Universe* ed. by Terzian and Bilson (1997), p. 31; the OTA report is available in Office of Technology Assessment, *Future US-Soviet Space Cooperation*, 13 September 1984, Folder 8: 'OTA Report', Box 937, Sagan Papers.

[44] Matsunaga, *The Mars Project* (1986), pp. 60, 67.

internationalist values that had initially moved Sakharov to seek 'intellectual freedom'. At the hearing Matsunaga challenged SDI on its own terrain by framing the choice between Star Wars and Mars Together as between rival visions of the future rather than government programmes. Whereas SDI was a 'faddish video game, a vision best suited for application in amusement arcades', a joint mission to Mars was 'a new American vision of the future that is truly worthy of our ideals and our heritage'.[45] The task of Matsunaga's witnesses was to sell this alternative vision to the senators and public.

Throughout the hearing Matsunaga's allies presented Mars Together as an inspirational way to overcome Cold War rivalry. Sagan's appearance as star witness drew on two elements of his public persona: the anti-nuclear activist coolly demolishing SDI's vague vision of future security and someone who could, in Matsunaga's words, 'describe our future in space with down to earth authority and a sense of soaring wonder.'[46] Sagan argued that a major cooperative programme 'could give a dramatic feeling of hope' that the superpowers 'might be engaged in something for the benefit of the human species, instead of jointly engineering the present trap that the species finds itself in.'[47] Further testimony from science fiction author Arthur C. Clarke's introduced a recurring motif in Mars Together advocacy, using the approaching 500th anniversary of Columbus' transatlantic voyage as a signal for the superpowers 'to start talking seriously about mankind's next, and greatest, adventure.'[48] Mars Together activists deliberately sought to recapture the expansive rhetoric of the early space age that had characterised space exploration as an epoch-defining moment in order to present their vision as a chance to shape humanity's cosmic destiny.

At its most expansive, Mars Together advocacy argued that an interplanetary voyage would unite humanity and usher in a second renaissance. Arthur C. Clarke's hearing testimony noted that his *2001* sequel, *2010: Odyssey Two* had depicted a joint US-Soviet interplanetary mission 'to start people thinking seriously once again about such cooperation.'[49] Whilst not as critically or artistically successful as its predecessor, the novel's film adaptation, *2010: The Year We Make Contact* (1984), is still a striking depiction of space exploration's power to heal ideological divides.[50] It presents Heywood Floyd, the protagonist of *2001*'s first act, tagging along on a Soviet mission to Jupiter. Against a backdrop of escalating nuclear brinkmanship on Earth, the

[45] United States Senate, *Hearing before the Committee on Foreign Relations United States Senate, Ninety-Eighth Congress, Second Session on S.J. Res. 236* (Washington, DC: US Government Printing Office, 1984), pp. 7-10, Folder 4: 'SDI Space Cooperation as an alternative', Box 889, Sagan Papers.
[46] Matsunaga, *The Mars Project*, (1986), p. 127.
[47] United States Senate, *Hearing before the Committee on Foreign Relations United States Senate, Ninety-Eighth Congress, Second Session on S.J. Res. 236* (1984), pp. 13.
[48] Ibid., pp. 60-61.
[49] United States Senate, *Hearing before the Committee on Foreign Relations United States Senate, Ninety-Eighth Congress, Second Session on S.J. Res. 236* (1984), pp. 13.
[50] Vincent Canby, 'Movies: '2010' Pursues The Mystery of '2001'', *New York Times*, 7 December 1984, p. C15; Paul Attanasio, ''2010' The Long-Awaited Sequel Gets Lost in Space', *The Washington Post*, 7 December 1984, pp. D1, D8.

international crew of the aptly named spacecraft *Alexei Leonov* overcome their initial mistrust as they investigate the mysterious events of the first film. The film's nuclear crisis is eventually averted after one of the enigmatic alien monoliths cause Jupiter to transform from a gas giant into a star.[51] Thermonuclear war may have been prevented by the inscrutable, millennia-in-the-planning schemes of godlike extra-terrestrials, but Clarke was also making the case for space cooperation. Aboard the *Leonov*, space brotherhood prevails over earthly divisions and humanity only unifies when it is forced to look upwards, towards the new star, and away from Earthly political distractions.

A similarly utopian vision of space cooperation appears in the writings of Brian O'Leary, an astrophysicist who had briefly trained as an astronaut during the 1960s before writing a tell-all criticising NASA's myopic fighter-jock culture. By the 1980s, O'Leary had become immersed in new age ideas including parapsychology and speculation that images transmitted by NASA's *Viking 1* orbiter had revealed the existence of alien ruins in Mars' Cydonia region.[52] O'Leary had long been an enthusiastic disciple of Gerard K. O'Neill's space colony vision and his 1987 book *Mars: 1999* is deeply influenced by O'Neill's literary style. Chapters on the science and logistics of an international Mars mission are interspersed with fictional vignettes in which O'Leary and his real-life Soviet friend, cosmonaut Vitalii Sevastianov, lead a mission to the Red Planet to coincide with the millennium. O'Leary fervently believed that Mars Together would begin humanity's ascension to the status of multi-planetary species. He depicts the Mars mission opening up a golden age of space industry, acting as a spur towards a genuine world government and even providing the impetus for humanity to realise the potential of extra-sensory perception.[53] Setting aside O'Leary's more idiosyncratic ideas, his work still demonstrates the centrality of astrofuturism to the Mars Together vision. The voyage to Mars would be one of healing and reconciliation; an interplanetary pilgrimage offered the chance for humanity to learn more about themselves as well as Martian geology.

Senate Joint Resolution 236 was passed on 12 October 1984. Though it stopped short of committing the President to immediately seek an agreement on a Mars mission, it did instruct him to try and resurrect the lapsed 1977 US-Soviet Space Agreement, to attempt to obtain Soviet agreement on a simulated rescue mission and to inaugurate talks 'in such areas as space medicine and space biology, planetary science' in both crewed and non-crewed exploration. The resolution's preamble retained Matsunaga's depiction of cooperation as the moral alternative to

[51] *2010: The Year We Make Contact* dir. by Peter Hyams, (MGM, 1984).
[52] For O'Leary as an a-typical astronaut trainee see Hersch, *Inventing the American Astronaut* (2012), pp. 93-4; A despairing letter to O'Leary's friend Carl Sagan from a mutual acquaintance chronicles O'Leary's interest in pseudoscientific phenomena: David Morrison to Carl Sagan, 23 September 1992, Folder 10: 'Set D O'Leary Brian,1977-1996' Box, 82, Sagan Papers.
[53] Brian O'Leary, *Mars: 1999: An Exclusive Preview of the US-Soviet Manned Mission* (Harrisburg, PA: Stackpole Books, 1987), pp. 134-9.

space war; it argued that Apollo-Soyuz had proved the 'practicality of a joint space effort' and warned of the incalculable opportunities for societal growth that would be 'lost irretrievably were space to be made into yet another East-West battleground.'[54] Reagan left it until 30 October, the day before the deadline for his pocket veto, to sign the resolution and his statement was markedly defensive. It criticised the preamble's 'very speculative' language and noted his repeatedly expressed desire to engage the USSR in 'mutually beneficial and productive' cooperation. Finally, he stressed that his administration had already offered to carry out a joint simulated space rescue mission with the USSR.[55] Reagan's grudging validation of a resolution that had framed space cooperation as a moral imperative was a symbolic victory for the Mars Together movement.

Unbeknownst to Matsunaga and his allies, the White House had already been discussing space cooperation internally even as it publicly denounced the Soviet space threat. In a December 1983 pros and cons memo to NSC Advisor McFarlane, Jack Matlock had mentioned the propaganda potential of a cooperative mission but warned that rekindling space cooperation 'would have undesirable overtones of a 'return to detente' and carry the risk of technology transfer.[56] The following month, the Soviets rejected a confidential offer to discuss a simulated Shuttle-Salyut rescue mission because of US unwillingness to negotiate an ASAT weapons agreement.[57] This failure reinforced the administration's pessimism. In a May 1984 letter to the Senate Committee on Foreign Relations discussing S.J.Res.263, the State Department argued that bilateral space cooperation reflected 'the general state of US/Soviet relations' rather than their 'future direction'. Apollo-Soyuz had been a creature of its time and thus 'did nothing to restrain Soviet adventurism' or to prevent the Soviets from proceeding with their strategic build-up and ASAT weapons programmes.[58] The Reagan administration's ambivalence towards space cooperation resulted from a negative image of Apollo-Soyuz and a corresponding belief that space cooperation reflected the overall tenor of US-Soviet dialogue. By contrast, Mars Together's proponents idealistically contended that activities in space could act as a diplomatic catalyst and prefigure an improved superpower relationship.

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[54] S.J.Res.236 Joint Resolution Relating to Cooperative East-West Ventures in Space, 98th Congress, 2nd Session, 10 October 1984 attached to letter from Spark Matsunaga to Carl Sagan, 1 November 1984, Folder 4: 'US Senators Matsunaga, Spark 1983-1989', Box 846, Sagan Papers.

[55] Matsunaga, *The Mars Project*, (1986), pp. 132-3; Ronald Reagan, 'Statement on Signing a Bill Relating to Cooperative East-West Ventures in Space', 30 October 1984, available online via *The American Presidency Project* <http://www.presidency.ucsb.edu/ws/?pid=39334> [accessed 28 February 2018].

[56] Jack Matlock to Robert C. McFarlane, 'Space Cooperation with Soviets', 27 December 1983, Folder: 'Space Policy (11/21/1983-01/15/1984)', Box 99 'Files Folder Space Policy (07/01/1981-12/31/1981)', Executive Secretariat Subject Files, NSC Files, Reagan Library.

[57] Robert C. McFarlane to George P. Shultz, 'International Space Initiatives', 24 December 1984, Folder: 'Space Policy 10/10/1984-11/30/1984', Box 99 'Files Folder Space Policy (07/01/1981-12/31/1981)', Executive Secretariat Subject Files, NSC Files, Reagan Library.

[58] Robert M Kimmitt to Ronald K. Peterson, 'State Draft Report on S.J.Resolution 236', 7 May 1984, Folder: OS Outer Space (233000-239999), Box 2, 'OS Outer Space OS 1830000-239999', WHORM Subject File, Reagan Library.

Following the passage of S.J.Res.236 and Reagan's re-election, the White House began dutifully gauging Soviet interest in space cooperation. In April 1984, unaware of the administration's confidential outreach to the Soviets, Matsunaga had introduced a parallel resolution calling for a simulated space rescue mission, the 'least controversial aspect' of space cooperation, as a way to build support for S.J.Res.236.[59] An NSC memo to Secretary of State George Shultz discussing how to ameliorate 'DOD concerns about the initiative' had highlighted a simulated rescue as a 'mutually beneficial' starting point for cooperative discussions.[60] Contingency for rescuing stranded spacefarers had been an important, if highly speculative, rationale for space cooperation since the 1960s. The Reagan administration's preference for the limited cooperation of a simulated space rescue, essentially a one-off Shuttle-Salyut docking mission, rather than the expansive grandeur of Mars Together was predictable. Beyond the mission's superficial space chivalry, there was a chauvinistic undercurrent to a simulated rescue that resonated with the administration's Cold Warrior stance. The docking could be construed as desperate astronauts seeking sanctuary in the Soviet space station, but with the US spacecraft playing the active role, it was more likely to be interpreted as a fantasy of the Space Shuttle riding to a stricken Salyut's rescue.

The White House's efforts to honour S.J.Res.236 were frustrated by Soviet reluctance to delink space cooperation from the wider issue of space militarisation. In June 1985, a NASA spokesman blamed the Soviets for the lack of progress; they had rejected America's rescue mission idea because 'the time wasn't right to fly this kind of mission.'[61] A proposal that Shultz made the following month to the new Soviet foreign minister Eduard Shevardnadze also went unanswered. Science Advisor George Keyworth believed that the Soviets ignored US proposals because they sensed a 'hidden agenda' behind the proposal, the link to SDI had been an excuse.[62] SDI was more than an excuse; it was only after Gorbachev de-linked SDI from wider Soviet arms control in 1987 that the superpowers were finally able to sign a space cooperation agreement to replace the one that had lapsed in 1982.[63] In October 1985, Floridian Democratic congressman Bill Nelson led a congressional delegation to Moscow to gauge Soviet interest in space cooperation. The delegation's much-anticipated meeting with Foreign Minister Andrei Gromyko ended up devolving into mutual recrimination over space militarisation, human rights abuses and which

[59] Matsunaga, *The Mars Project* (1986), pp. 60, 66.
[60] Robert C. McFarlane to George P. Shultz, 29 July 1985, Folder: 'Soviet Union: Science/Space etc 2/2', Box 34, Series II USSR Subject File, Jack F Matlock Jr. Files, Reagan Library.
[61] John Holmes, 'Joint space flight seen off until 1990s', *The Washington Times*, 12 June 1985, p. 4A.
[62] 'Bilateral Issues: Space Cooperation', 16 September 1985, Folder: 'Reagan Shevardnadze meeting 9/27/85 (3 of 7)', Box 45, Series II USSR Subject File, Jack F Matlock Jr. Files, Reagan Library; G. A. Keyworth to John M. Poindexter, 'The President's November Meeting with Secretary General Gorbachev: Consideration of a Science and Technology Option', 18 October, 1985, p. 2, Folder: 'NSC System Files 8508364 – Science & Technology Options for Geneva Meeting / USSR – Gorbachev (System 1 Box 5 folder 8508360-8508366)', RAC Box 2, William R. Graham Files, Reagan Library.
[63] Portree, *Thirty Years Together* (1993), p. 30.

nation was more likely to order a nuclear first strike.[64] It is difficult to blame the Soviet for recoiling from these cooperative entreaties while the Reagan administration was propagating two incompatible visions of space exploration. Its SDI rhetoric characterised space as a Cold War battlefield where cosmonauts were the shock troops erecting a cosmic Iron Curtain but its cooperative proposals construed LEO as a location for superpower reconciliation where a Salyut's crew would be welcomed onto a Space Shuttle.

The Planetary Society hoped to build on S.J.Res.236 through events that brought the American and Soviet space communities together to present space cooperation as the logical alternative to space weaponisation. A June 1984 conference of American and Soviet planetary scientists that the Society had held in Graz, Austria had solidified US-Soviet cooperation's focal place in Planetary Society's policy. The following January, the Society co-sponsored a symposium on 'The Potential Effects of Space Weapons on the Civilian Uses of Space' in Washington DC that saw Roald Sagdeev propose cooperative Mars sample return and rover projects.[65] Sagdeev contrasted a worrying future of geostationary orbit crowded with military satellites, 'a situation... more familiar ... to the Straits of Hormuz', with the cooperation of Apollo-Soyuz which he argued had been 'done in good spirit' despite the political charges levelled against it.[66] That July, the Planetary Society celebrated Apollo-Soyuz's tenth anniversary with a conference on the crewed exploration of Mars at the National Air and Space Museum where the American and Soviet ASTP crews added their voices to the Mars Together chorus.[67] These events attracted much favourable coverage from Washington correspondents, which created the impression of building political momentum.[68] Offering emissaries from the Soviet space programme a platform reflected the genuine view that planetary scientists like Sagan, Friedman and Murray had of space cooperation as a transnational exchange of people and ideas. These events also compounded the political pressure on the Reagan administration by drawing further attention to the SDI's presence as an obstacle to cooperation.

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[64] Tom Paine, 'Memorandum of the October 16th Meeting in Moscow of the US Congressional Delegation with Andrei Gromyko' pp. 7-9, Folder 11: 'Soviet Union 1983-1990', Box 779, Sagan Papers.

[65] 'The Goal of Human Exploration of Mars: A planetary Society Review' Undated 1988, Folder 3: 'Mars Missions, Mars Declaration', Box 935, Sagan Papers, For detailed information on the Graz meeting see Louis D Friedman and Carl Sagan, 'US/USSR Cooperation in Exploring the Solar System: An Internal Report of the Planetary Society' 1985, Folder 2: 'Friedman, Louis D, and Carl Sagan US/USSR Cooperation in Exploring the Solar System', Box 928, Sagan Papers.

[66] Transcript: 'Space Weapons Symposium With Planetary Society', January 1985, p. 24, Folder 5: 'SDI Space Weapons Symposium 1985', Box 889, Sagan Papers.

[67] Thomas O. Toole, 'US-Soviet Mars Mission Urged', *The Washington Post*, 17 July 1984, A18.

[68] 'Astronomer Sagan pushes for US-Soviet Mars Landing by 2003', *The Dallas Morning Herald* 13 January 1985; Walter Pincus, 'Soviet Scholar Warns Against Space Arms' *The Washington Post*, 13 January 1985; 'Editorial: Star Peace?', *Trenton New Jersey Times*, 14 January 1985; Brad Knickerbocker, 'Military's Role in Space' *The Christian Science Monitor*, 15 January 1985, p. 1; Arlen J. Large, 'Once A Big Fizzle, Men to Mars Idea is Enjoying a Revival' *The Wall Street Journal*, 23 January 1985, p. 1; Thomas O'Toole, 'US-Soviet Mars Mission Urged', *The Washington Post*, 17 July 1985, p. 18; Robert C. Cowen, 'A Serious Look at a Trip to Mars' *The Christian Science Monitor*, 18 July 1985; Arlen J. Large, 'US and Soviets Mull Mission to Mars', *The Wall Street Journal*, 18 July 1985; 'Rapprochement in Space' *Los Angeles Times*, 18 July, 1985 – clippings available in Folder 11: 'Mars Missions Clippings', Box 935, Sagan Papers.

The Planetary Society's events brought welcome attention to Spark Matsunaga's latest legislative endeavour: a space cooperation resolution which proposed designating 1992 the 'International Space Year' (ISY). The choice of 1992, the 500th anniversary of Columbus' first voyage, appealed to a recurrent analogy that likened the space exploration to the age of discovery that had opened the New World to European colonisation.[69] The proposal also drew on rose-tinted recollections of the 1957/1958 International Geophysical Year (IGY), a global initiative to stimulate cooperation in the Earth sciences which had provided a scientific impetus to the superpowers' nascent space programmes, to present Mars Together as the true heir to the spirit of the Space Age. By broadening international participation, the ISY would dilute the USSR's propagandising tendencies and allow US-Soviet cooperation to be 'tested in a broader and less volatile atmosphere than in a head-to-head encounter.' Matsunaga roped the visiting ASTP cosmonauts into selling the ISY by inviting them to the Capitol to meet wavering senators and he later quoted Kubasov on the beauty of Earth from space during a floor statement. The ISY resolution passed on 21 November 1985.[70] The ISY proposal succeeded because it cannily honoured the idealism of the ASTP and the IGY whilst placing US-Soviet space cooperation within a multinational framework less likely to prompt negative comparisons with bilateral detente.

The Mars Together movement devoted considerable effort to challenging negative depictions of 1970s space cooperation. Carl Sagan's February 1986 *Parade* magazine article, excerpts of which were reprinted in *Pravda*, used the ASTP crews' 10th anniversary reunion at the Planetary Society's conference to set the scene for his cooperative sales pitch. Sagan referenced how the two crews' 'easy, self-mocking humour... camaraderie' and 'mutual affection' had prompted 'an ovation of such a timbre and intensity that you knew something deeply felt had been touched in the hard-bitten and tough minded audience'. He then launched into a lyrical appeal to Mars' scientific wonders and the benefits of channelling the energies of the military-industrial complex away from 'an arms race juggernaut' and into 'a humane and benign cause.'[71] Sagan could not avoid or ignore Apollo-Soyuz, so he chose instead to focus on the warmth between the mission's participants to contrast space cooperation's human connections with the destructive machinery of an outer space arms race.

Despite Sagan's efforts, the ASTP remained divisive. To citizens' diplomacy groups the mission remained an inspirational instance of international teamwork that pointed towards a hopeful

[69] Spiro Agnew had likened *Apollo 11* to the voyages that had 'swept aside' the 'chains of medievalism' see Address by the Vice President, Chicago Executive Club, Chicago, Il, 30 September 1969, in Folder: Speeches ---President & Vice President, Box 5, Sheldon Papers; the analogy became a mainstay in pro-space rhetoric see Robert G. Nichols 'Suppose Isabella Had Said 'No'?' *L-5 News* 3, 1, July 1978; Graham, *The High Frontier* (1983), p. 31.

[70] Matsunaga, *The Mars Project*, (1986), pp. 145-7, 153.

[71] Carl Sagan, 'USA and USSR: Let's go to Mars- Together', *Parade*, 2 February 1986, reprinted in Carl Sagan, Planetary Society Background Paper No. 1: Planets and Politics: Reflections on the Presidential Moon-Mars Initiative' 1989, pp. 23-31, Folder 2: 'Advisory Committee on the Future 1990-1991', Box 365, Sagan Papers.

future. The opening ceremony of the 1986 Goodwill Games, Ted Turner's quixotic effort to unite the superpowers through international sporting competition, included an underwhelming re-enactment of the 1975 mission where convertibles bearing Tom Stafford and Alexei Leonov rendezvoused at the centre of Moscow's Lenin Stadium. A 1986 exhibition funded by the futurist magazine *OMNI* and the pressure group CONNECT/US-USSR that displayed paintings of space cooperation by Soviet and American children in both Moscow and Washington presented a similar image of Apollo-Soyuz as a beacon of hope. The beloved children's television host Fred Rogers praised the paintings for providing 'the most natural way in the world to help make a bridge between nations'.[72] However, the ASTP also remained a byword for technology transfer, as in a *Washington Times* editorial that attacked 'TV impresario Carl Sagan' for defending a 'rip-off' that had 'saved the Soviets billions of rubles in nuclear missile development'.[73] In September 1986, Astronaut-turned-Senator John Glenn (D, OH) turned down a request to endorse a joint mission based on 'our experience at the time of the Apollo-Soyuz mission, in which the Soviets learned a great deal about our laboratories and technology, but we learned little about theirs.'[74] Glenn was an SDI sceptic and champion of the space programme; his wariness about cooperating with the Soviets demonstrated the uphill struggle that the Mars Together movement faced in building support for their ambitious programme.

In 1986, the Mars Together movement began plotting how best to capitalise on the political momentum that its congressional activities and conferences had generated. That summer, the Planetary Society's board discussed a national petition to the President setting a cooperative mission to Mars as a goal to reinvigorate America's space programme and transcend the arms race.[75] Warnings from Matsunaga's aide Harvey Meyerson that a single Kennedy-esque declaration of intent might prove vulnerable to cancellation went unheeded.[76] By September 1987, the Planetary Society's petition had become 'The Mars Declaration', complete with an eclectic list of potential signatories ranging from scientists like Freeman Dyson and Richard Feynman to purportedly pro-space celebrities including Michael Jackson, John Denver and Sigourney Weaver.[77] Three of the Declaration's twelve scientific, organisational and political rationales for sending human beings to Mars centred on US-Soviet cooperation, reiterating

[72] Stafford and Cassut, *We Have Capture* (2002), p. 218; Judith Hooper, 'The Artists of Detente', *OMNI*, 9, 2, November 1986, pp. 96-103.
[73] 'Editorial: Carl Sagan in Orbit', *The Washington Times,* 6 February 1986, clipping in Folder 12: 'Mars Missions Press Clippings', Box 935, Sagan Papers.
[74] John Glenn to Louis Friedman, 4 September 1986, Folder 1: 'Mars Missions Congressional Material 1984-1987', Box 933, Sagan Papers.
[75]See Louis Friedman to The Board and CMS, 'Memo: Petition', 7 August 1986; Carl Sagan to Louis Friedman, 22 August, 1986, Folder 8: 'Mars Missions Petition', Box 935, Sagan Papers.
[76] Harvey Meyerson to Bruce Murray and Louis Friedman, 21 July 1986, Folder 1: 'Mars Missions Congressional Material 1984-1987', Box 933, Sagan Papers.
[77] Timothy Lynch to Carl Sagan, 'Memo: Miscellaneous Names to Include for Mars Declaration', 1 September 1987, Folder 1: 'Mars Missions Mars Declaration General (2 of 3), 1987' Box 935, Sagan Papers.

familiar arguments about the 'realistic and possibly unique opportunity' that cooperation offered acting as a 'model and stimulant' for earthly cooperation and as a catalyst for disarmament.[78]

In an article draft for a June 1989 issue of *Parade*, Sagan claimed that the Declaration had attracted 'more than 130,000' signatories 'comprising a cross-section of Americans: Liberals and conservatives; Republicans and Democrat...'[79] The Declaration did end up attracting a host of famous signatories and both Jesse Jackson and Michael Dukakis endorsed the goal of a cooperative US-Soviet Mars programme during the 1988 Democratic primaries. However, it was not endorsed by independent candidate Ron Paul or the Republican Candidate and the election's eventual victor, Vice President George H. W. Bush.[80] A MG/AP poll conducted in June/July 1988 found 49% of respondents favouring a joint Mars programme in contrast to 15% in favour of a competitive programme and 30% against landing astronauts on the Red Planet at all. Supporters of a cooperative mission were more likely to be white, male, educated and self-described 'liberals' (though registered Republicans were 8% more likely to favour a joint mission than Democrats).[81] This profile bears a startling resemblance to the archetypal L5 Society member reconstructed by W. Patrick McCray, suggesting that the Mars Together movement struggled to reach those outside of its core constituency of liberal space enthusiasts.[82]

The Mars Together movement had more success reaching out to the Soviet space community. In the summer of 1986, the Planetary Society and The Search for Common Ground, a conflict resolution pressure group, began planning a television special that would highlight these links through a 'Space Bridge' discussion between Soviet and American scientists. Space Bridges used satellite technology to enable geographically disparate participants to converse in a form akin to modern videoconferencing and had facilitated discussions between Soviet and American arms control experts, parliamentarians and teenagers since 1982.[83] The television programme, *Together to Mars?,* aired on PBS 7 October 1987 and interspersed highlights of a discussion between Americans at the July 1987 3rd Case for Mars Conference at the University of Colorado

[78] 'Mars Declaration', 1988, Folder 3: 'Mars Missions Mars declaration General 1988-1992', Box 935, Sagan Papers.
[79] Carl Sagan, 'Mars Declaration' article proof copy, July 1989, Folder 3: 'Mars Missions Mars declaration General 1988 1992', Box 935, Sagan Papers.
[80] For celebrity endorsements see 'Mars Declaration', 1988, Folder 3: 'Mars Missions Mars declaration General 1988-1992', Box 935, Sagan Papers; For political endorsements see Space Cause, 'Voters Guide to the Presidential Candidates' 1988; 'Jesse Jackson '88 Issue Brief: Exploring Space to Benefit all Humanity'; Bush, had hailed the 1987 US-Soviet space agreement but was more accustomed to eliding specifics in favour of nebulous clichés about the space age's unifying effect see 'Press Release: Excerpts of remarks for Vice President George Bush at the George C. Marshall, Space Flight Center, Huntsville, Alabama,' 29 October 1987,Folder 2: 'Politics Presidential Campaigns 1988', Box 705, Sagan Papers.
[81] 'MG/AP Poll #21: The US Space Program June 22- July 2, 1988' Folder: Space, Box 10 'Science & Mathematics Award- Themes [Drug Issues – July 1988]', Series 1: Subject Files, Mari Maseng Files, White House Staff Member and Office Files, Reagan Library.
[82] McCray, *Visioneers* (2012), p. 93.
[83] 'Draft: US/USSR Exploration of the Planets', 7 July 1986, in Folder 4: 'Mars Missions PBS special Together to Mars (1 of 2)', Box 938, Sagan Papers; Helene Keyssar, 'Space Bridges: The U. S.-Soviet Space Bridge Resource Center.', *PS: Political Science and Politics*, 27, 2 (1994), pp. 247-53.

Boulder and Soviets at the Cosmos Pavilion of Moscow's VDNK exhibition park with interviews and animations explaining the logistics of a cooperative mission. The discussion united a host of planetary scientists, aerospace engineers and former spacefarers, and was moderated by Carl Sagan and his closest Soviet equivalent, Sergei Kapitsa, host of the popular science series *Evident, but Incredible*.[84] Aside from Soviet science fiction author Arkadii Strugatskii who argued that 'such a monstrously expensive project is premature' was 'premature' given Earth's 'present political, social and economic conditions', the programme presented a can-do chorus of American and Soviet space popularisers.[85] The Space Bridge format itself showed space technology already uniting scientists on different continents in spirited, productive discussion. This image of scientists ready to collaborate at a moment's notice once again refocused attention on the Reagan administration's inability to break the political deadlock.

Strugatskii's pessimism was at odds with the Soviet government's growing enthusiasm for space cooperation. Shultz's April 1987 visit to Moscow had produced an agreement to resurrect cooperative discussions in sixteen areas, though the *New York Times* noted, 'The new agreement provides for no dramatic joint ventures in space.'[86] This newfound Soviet amenability resulted from Gorbachev's de-linking of SDI from wider arms control issues and Roald Sagdeev's political apogee as scientific grand vizier to the new reformist General Secretary.[87] On the eve of the May 1988 Moscow Summit, the Planetary Society issued an excited press release hailing reports that Gorbachev would propose a cooperative programme of Mars exploration.[88] For the Mars Together movement, the tide finally seemed to be turning as Perestroika pointed the way to a new cooperative era in space. All that remained was for the US to follow the Soviets' lead and embrace this future.

Despite initially appearing to be polar opposites, SDI and Mars Together share important similarities. Both were responses to the resurgence of nuclear fear the Second Cold War provoked. Reagan proposed SDI as a quest to avert a nuclear holocaust and Mars Together

[84] 'Possibility of Joint United States/Soviet Missions to Mars Explored in 'Together to Mars?'', Together to Mars? Вместе на Марс? Press Pack, in Folder 5: 'Mars Missions PBS special Together to Mars (2 of 2)', Box 938, Sagan Papers.
[85] Bill Steigerwald, 'Television Reviews: 'Together To Mars?'' *Los Angeles Times*, 7 October 1987, available online via <http://articles.latimes.com/1987-10-07/entertainment/ca-8086_1_mars-mission> [accessed 28 February 2018]; John Corry, ''Together to Mars?' US and Soviet Scientists', *New York Times*, 7 October 1987, available online via <http://www.nytimes.com/1987/10/07/arts/together-to-mars-us-and-soviet-scientists.html> [accessed 27/7/17]; 'Spacebridge- Together to Mars 1987' Television special aired PBS, 7 October 1987 available online via <https://www.youtube.com/watch?v=3WHR0Ll778Q> [accessed 28 February 2018].
[86] Henry Kamm, 'US and Soviet Sign a Pact Over Exploration in Space', *New York Times,* 16 April 1987, p. A14.
[87]Sagdeev, *The Making of a Soviet Scientist* (1994), pp. 268-273; for American coverage of Sagdeev's growing political clout see Dick Thompson, 'The Wizard of IKI', *Time,* 5 October 1987, p. 19; Nicholas Daniloff, 'The Space Statesman', *Air and Space*, October/November, 1988, pp. 42-46.
[88] Draft News Release, 23 May 1988, Folder: Folder 1 Mars Missions Mars Declaration General (2 of 3), Box 935, Sagan Papers.

emerged from the belief that 'Star Wars' portended an outer space arms race. Both were astrofuturist visions championed by elements of the pro-space movement that depicted outer space as a terrain on which the future was written. Furthermore, both argued that the US had only a brief window of opportunity to seize the technological initiative to escape a strategic stalemate that would eventually doom the Earth to destruction. The crucial difference between these visions was that supporters of a joint mission to Mars hoped to recapture the ASTP's promise and thus treated the Soviet space programme as a potential partner rather than an existential threat. Sagan and Matsunaga's dream was prompted by nuclear fear, but it was ultimately more hopeful than the SDI's vision because it saw space technology as a vehicle for transnational exchange and dialogue. Mars Together may have misguidedly assumed that it would take a journey to Mars to end the Cold War, but it did recognise that the ideological standoff between the US and USSR could only be resolved through cooperation and accommodation.

'The Russians are going to Mars. So Should We.': Space Leadership, Cooperation and the End of the Cold War

'There's not a whole lot going on in the Soviet Union that's first rate- except for their space programme.'- James Oberg, September 1988.[89]

In October 1987, Roald Sagdeev's IKI organisation celebrated the 30th anniversary of *Sputnik 1's* launch with a three day symposium, 'The Space Futures Forum', that offered 900 guests an unprecedented look at the USSR's future space plans. Sagdeev invited several hundred American scientists, experts, journalists and spacefarers, including former NASA Administrator Tom Paine, a member of the Planetary Society's board of directors who had recently chaired a presidential commission on the future of the US space programme (the so-called 'Paine Commission'). Paine reflected that the symposium represented a 'complete turnaround from the glory years of NASA'. The Soviets were 'confident of their program, open about their plans, and enthusiastic about international cooperation, while the American officials were uncertain of the future, evasive about space goals and suspicious of dealing with foreigners'. Paine quashed the prospect of 'a Spenglerian 'technological decline of the West'', but warned that the Soviets were still well placed to carry out a 'purposeful program that will lead to Mars' beginning with robotic craft being dispatched to Mars' moon Phobos in 1988 and culminating in 2002 with a series of Lunokhod-type Martian rovers. Paine quoted cosmonaut Georgii Gretchko that as soon as crewed missions were scheduled; the USSR would share this news with the world because this would be a 'fine project for all of the nations of the world to do in cooperation.'[90] Media coverage of the Space Futures Forum echoed Paine's juxtaposition of purposeful Soviets forging a path to Mars whilst NASA was

[89] Jack Kelly, 'Soviets gain on stalled USA programme' *USA Today*, 9 September 1988, pp. 6-7.
[90] Thomas O. Paine, 'Observations on a trip to Moscow to attend the International Space Future Forum celebrating the 30th anniversary of Sputnik', 19 October 1987, in Record Number 1550: 'US/USSR Cooperation 1980-1987', NASA History Office.

mired in self-doubt by quoting American attendees who complained, 'The Russians have a programme and we don't.'[91]

During a brief period between the January 1986 *Challenger* disaster and the March 1989 failure of the *Phobos 2* interplanetary probe, warnings of Soviet ascendency and slipping US space 'leadership' pervaded American discourse on space exploration. Worries that the Soviets had seized the initiative just as NASA had stumbled were encapsulated in the subtitle of *National Geographic*'s October 1986 cover feature on the Soviet space resurgence: 'Are they ahead?'[92] This climate sustained Mars Together which needed the Soviet space programme to be a viable partner for a joint Mars project to be feasible. *Phobos 2'*s failure represented a fall at the first hurdle of the ambitious programme that Sagdeev had outlined at the Space Future's Forum and was a major setback for the Mars Together movement. Space cooperation activists had hailed Gorbachev's reforms as proof that it was time to discard Cold War stereotypes but Glasnost ended up exposing the stresses that were tearing the Soviet programme apart, dispelling the image of a Soviet space resurgence that their ambitious proposal relied on. By the time the USSR finally collapsed in 1991, Mars Together had rapidly receded from the public consciousness.

The *Challenger* Disaster of 28 January 1986 dealt a severe blow to American confidence. A fault in the *Challenger*'s right-hand solid booster had caused the spacecraft to break up just over a minute into its flight, killing the entire seven member crew of *STS-51-L*, including payload specialist Christa McAuliffe who had been selected as part of NASA's much-publicised 'Teacher in Space' initiative.[93] The disaster prompted not only a presidential commission into the accident itself, the Rogers Commission, but also wider reflection over NASA's institutional culture and purpose. The feeling that the Space Shuttle had turned out to be an ill-conceived disappointment was encapsulated in a flurry of space history articles that critiqued the compromises of the post-Apollo decision-making process.[94] The disaster finally dispelled NASA's exuberant promises that, if its users waited patiently, the shuttle would eventually blossom into a dependable, multipurpose spacecraft. The DoD, disappointed by the shuttle's performance, had already won the White House's agreement to develop a new expendable launch vehicle. The Pentagon's flight from the

[91] 'Soviets Stress Cooperative Ventures at Space Forum', *Aviation Week and Space Technology*, 12 October 1987, pp. 25-27; see also John Noble Wilford, 'As Mars Beckons, US is Wary and Indecisive', *New York Times*, 13 October 1987, pp. C1, 5.
[92] Thomas Canby, 'Soviets in Space', *National Geographic*, 170, 4 October 1986, pp.420-459.
[93] See Diane Vaughan, *The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA* (Chicago, IL: University of Chicago Press, enlarged edition, 2016); Allan J. McDonald & James R. Hansen, *Truth, Lies, and O-Rings: Inside the Space Shuttle Challenger Disaster* (Gainesville, FL: University Press of Florida, 2009); for a psychological study of the impact of McAuliffe's death see L. C. Terr, D A Bloch, B. A. Michel, H. Shi, 0 J. A. Reinhardt, S. Metayer, 'Children's symptoms in the wake of Challenger: a field study of distant-traumatic effects and an outline of related conditions.', *American Journal of Psychiatry*, 156, 10, (1999), pp. 1536-44.
[94] John Logsdon, 'The Decision to Develop the Space Shuttle' *Space Policy*, 2, 2, (1986), pp. 103-119, 'The Space Shuttle Program: A Policy Failure', *Science*, 232, 30 May 1986, pp. 1099-1105; Alex Roland, 'Priorities in Space for the USA', *Space Policy* 3, (1987), pp. 104-14.

Shuttle was codified in NSDD-254 of December 1986, which stated that the US would rely on a 'balanced mix of launchers'.[95] Whether or not *Challenger* spelled the definitive end of the 'first space age', it was still a watershed moment for the US space programme; tarnished by tragedy, NASA's flagship never quite recovered its lustre.

The post-*Challenger* climate of grief-stricken introspection exacerbated existing unease about the security of American space leadership. Some conservatives lashed out at the Cold War enemy and blamed the Soviets for the tragedy. *The Washington Times* ran a digest of the most egregious statements from Soviet propaganda outlets in the disaster's aftermath, asking 'Can't Mr Gorbachev grant us even a week to mourn in peace?'[96] Rumours of sabotage abounded; during a July 1986 meeting on space policy Reagan raised unsubstantiated reports that Soviet 'trawler' tracking ships had been seen speeding away from the *Challenger*'s coastal launch site, causing NASA Administrator Fletcher to reassure him that NASA would take steps to protect against the prospect of future sabotage.[97] More significantly, the tragedy induced a hiatus in crewed shuttle flights until September 1988 that, once again, amplified the effect of Soviet space successes. Alarmist statements by the editor of British publication *Jane's Space Flight Directory* that 'The Soviet lead in space is almost frightening... they are almost out of sight' were repeated in the American press.[98] Subsequent articles that characterised the *Mir* space station as a 'palace compared to the older Salyut space stations' and claimed that the USSR had taken 'commanding lead in space' would have delighted Moscow propagandists.[99] *Mir*, the Energia heavy-lift launch vehicle and the increasing openness of IKI's planetary science programme all created the impression that the Soviet programme was enjoying a new golden age just as NASA's fortunes had reached their nadir. As in the 1975-1981 hiatus, American inaction shaped perceptions of the Soviet programme as much as Soviet activities.

In February 1986, with the pain of *Challenger* still raw, the core block of the USSR's new *Mir* modular space station was launched in full view of foreign television cameras in accordance with the new Glasnost transparency campaign. The first cosmonaut crew entered the station the

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[95] Hays, 'NASA and the Department of Defense' in *Critical Issues in the History of Spaceflight* ed. by Dick and Launius, (2006), pp. 199-238 (pp. 228-229, 236-238); David, *Spies and Shuttles* (2015), pp. 212-3, 230-43

[96] 'We Mourn, Moscow Carps', *The Washington Times*, 31 January 1986, p. 9A.

[97] 'US Space Launch Capabilities: National Security Council Meeting, 29 July 1986' p. 5, Folder: NSC 000134, 29 July 1986 [US Space Launch Capabilities], RAC Box 12: 'For Research Room NSC, NSPG, MTG Minutes & Presidential Memcons', Reagan Library; Chief of Staff Donald T. Reagan would later bemoan that this conspiracy theory was 'Scuttle that will not go away', Memo from Donald T. Reagan, 7 August 1986, attached to Paul M. Weyrich to Donald T. Reagan, 6 August, 1986, Folder: 'OS 001 Space Flight (476000-479999)', Box 15: 'OS Outer Space OS 001 455000-534999', WHORM Subject File, Reagan Library.

[98] 'Jane's Analyst Says Soviets Have Lead in Space Program', *The Washington Post*, 17 June 1986, p. A13; Nicholas C. Chriss, 'Soviet success in space: How much in lead are they?', *The Houston Chronicle*, 20 July 1986, pp. 28.

[99] William J. Broad 'Soviet Detail Ambitious Space Plans', *New York Times*, 22 July 1986, pp. C1, 3; Paulette Thomas, 'Soviet Union Took Commanding Lead in Space Last Year', *Wall Street Journal*, 30 March 1987, p. 20

following month.[100] That a new space station had long been anticipated did little to dampen American reaction to *Mir*. *The Houston Chronicle* described the USSR 'hitting home runs with their space programme' even as it was 'striking out on Earth' with the much-publicised Chernobyl nuclear power plant disaster. The article quoted Texan space expert James Oberg's assessment that though the US might want to pursue similar space activities, 'I doubt they will stand still to let us catch up.'[101] *The Miami Herald* quoted Floridian congressman Bill Nelson's triadic appraisal of the situation: 'First, the Soviets are very serious about space; second, the Soviets are very successful in space, and third, the United States does not dominate space.'[102] *Mir* was not yet the labyrinthine jumble of modules it would later become, but it prefigured a permanent Soviet space station. In a March 1987 memo responding to Chief of Staff Howard Baker's concerns about *Mir*, Science Advisor William R. Graham likened a permanent station to *Sputnik 1* or *Apollo 11* as a way to 'generate significant international prestige... its political payoff would be very real and should be recognised as the competitive challenge that it is.'[103]

May 1987 saw the debut of the Energia heavy-lift launch vehicle, a towering pillar of a rocket capable of carrying one hundred tonnes of payload to LEO.[104] Like *Mir*, Energia was not exactly a surprise; the imminent debut of a Soviet Saturn V was a perennial prediction of Western experts during the early 1980s and the Paine Commission had received a classified briefing on Soviet shuttle and heavy-lift launch vehicle plans in May 1985.[105] The White House had been planning for the 'considerable attention' that a new Soviet heavy lift launch vehicle would attract since November 1986 when NASA and the CIA had begun collaborating on a joint estimate of Soviet capabilities.[106] Whilst the Energia launched successfully, its payload, the mysterious *Polyus/Skif-D* prototype BMD battle-station, failed to reach orbit. Even though Western observers remained unaware of Polyus' purpose (*Aviation Week* described the jet-black, pencil-shaped satellite as a 'cargo pod'), a new Soviet heavy lift launch vehicle was still a cause for concern.[107] In a memo to the NSC, Secretary of Defence Caspar Weinberger wrote that Energia had 'heightened' the 'growing concern that the Soviets are rapidly pulling ahead of the US in the space arena.'

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[100] Zimmerman, *Leaving Earth* (2003) pp. 234-6.
[101] Nicholas C. Chriss, 'Soviets hitting home runs with their space program', *The Houston Chronicle*, 11 May 1986, p. 2.
[102] R. A. Zaldivar 'Soviets Catching up in Space Race', *Miami Herald*, 28 April 1986, clipping in Record Number: 15032 'USSR Space Effort 1984-1987', NASA History Office.
[103] William R. Graham to Howard B. Baker, 'Soviet Space Stations', 6 March 1987, Folder: 'Chron March 1987 [4 of 5]', RAC Box 2, Graham, William R. Files, Reagan Library.
[104] Energia Corporation Official Website 'LV Energia' available online via <https://www.energia.ru/english/energia/launchers/vehicle_energia.html> [accessed 28 February 2018].
[105] Oberg, *Red Star in Orbit*, (1981), p. 230; Gerard K. O'Neil, Notes 15 May 1985, Folder 2: 'National Commission on Space 1985-1986 folder 1 of 2', Box 51, O'Neill Papers.
[106] Alfred H. Kingon to Fred Ryan, 'Meeting with the President and Dr James Fletcher on America's competitiveness in Space', 26 November 1986, Folder: 'OS Outer Space (440000-448999)', Box 4: 'OS Outer Space OS (388000-539999)', Reagan Library.
[107] Vix and Hendrickx, *Energia Buran* (2009), pp. 272-281; Craig Covault, 'Moscow Summit to Expand US/Soviet Space Ventures' *Aviation Week and Space Technology*, 30 May 1988 pp/ 16-18.

Weinberger did not 'subscribe to the theory that we are ten years behind the Soviets', but he still believed it was 'proper to assess our relative capabilities and determine what really needs to be done.'[108] As a Foreign Broadcast Information Service report pointed out, Energia's significance stemmed not from the launch vehicle itself, but the possibilities that it opened up: larger space stations, interplanetary voyages and a Soviet Space Shuttle.[109]

America was being out-cooperated as well as out-competed. A January 1988 CIA report on Soviet space science described the Soviet programme's 'increased visibility', openness and willingness to cooperate with other nations as crucial to the 'USSR's image as a major player in space sciences'.[110] This new openness was on full display in a glossy, lavishly illustrated English-language brochure advertising IKI to the West that overflowed with photos of Soviet scientists and their foreign colleagues in the lab and conference room. The brochure's most striking image was a world map that recalled the 'Red Web' diagrams of interwar anticommunism. Rather than ensnaring those entangled in the communist conspiracy, the lines emanating from Moscow reached out to nations who had collaborated with the Soviet Academy of Sciences.[111] The USSR was also courting foreign collaboration in the lucrative commercial space sector. A May 1988 *US News and World Report* article warned that the Soviets were making a push to seize the commercial launch market by undercutting the shuttle with their cheap expendable Proton launch vehicles that rolled off a subsidised 'assembly line'.[112] With the superpowers waking up to the space exploration's multi-polar future, Arnold Frutkin's assertion that space cooperation was a powerful diplomatic tool was truer than ever. The USSR appeared to be making a concerted effort to unseat the US as the cooperative partner of choice for aspiring spacefaring nations.

Between 1986 and 1988, Sagdeev's organisation spearheaded several daring international space ventures. In 1986, IKI's Vega programme involved a host of Eastern and Western European nations contributing scientific instruments for two Soviet robotic probes that would rendezvous with Halley's Comet following missions to Venus. ABC's *Nightline* provided live coverage of the moment that *Vega 1* returned the first images of the comet to IKI's control room, with Ted Koppel

[108] Caspar Weinberger to Frank Carlucci, 'US-USSR National Security Space Net Assessment', 21 July 1987, Folder: 'OS Outer Space (4471000-476999)', Box 4: OS Outer Space OS (388000-539999), WHORM Subject File, Reagan Library.
[109] 'USSR: New Booster Key to Space Transport System' in FBIS, *Science and Technology Perspectives,* 2, 11, 5 August 1987 pp. 7-10, CIA CREST, ES Document Number CIA-RDP90-00065R000140007-1; For the same interpretation in open American media sources see Felicity Baringer, 'Mightiest Rocket in Soviet Sent Up on Its First Test', *New York Times,* 17 May 1987, pp. 2, 29; R. Jeffrey Smith, 'Soviet Rocket Matches US '60s Model', *The Washington Post*, 20 May 1987, p. A27; 'Editorial: Soviet Space Initiative' *Aviation Week and Space Technology*, 25 May 1987, p. 11.
[110] Director of Intelligence, Central Intelligence Agency, 'Soviet Scientific Space Program: Gaining Prestige', SW88-18004X, January 1988, Secret, available online via GWU National Security Archive <http://nsarchive2.gwu.edu/NSAEBB/NSAEBB501/docs/EBB-44.pdf> [accessed 28 February 2018].
[111] Brochure 'Space Research Institute of the USSR Academy of Sciences' p. 56, Folder 11: 'Mars Missions Soviet Union 1986', Box 937, Sagan Papers; For the Red Web as an anticommunist trope see Nick Fischer, *Spider Web: The Birth of American Anticommunism* (Chicago, IL: University of Illinois Press, 2016), pp. 71-79.
[112] 'Red Star Rising', *US News and World Report*, 16 May 1988, pp. 48-54 (p. 50).

interviewing a jubilant Sagdeev and Sagan. Sagan was in Moscow as Sagdeev's personal guest; Cold War tensions had prevented NASA from collaborating on the project.[113] An October 1987 *Time* magazine cover feature on the Soviet space challenge contended that the Soviet programme's 'new dynamism is drawn from a spirit of Glasnost' and hailed Sagdeev as a forward-thinking internationalist who was taking heroic steps to open Soviet space science to the world. The article detailed Sagdeev's plans to follow up Vega with the Phobos programme that would send laser equipped probes to investigate Mars' moon, quoting Sagan's praise for the plan as 'not just world class. It is novel, diverse and appropriate. The whole idea is very clever.'[114] The USSR's willingness to cooperate with other nations was a sign of confidence that challenged the long-held depiction of the Soviet programme as insular and secretive.

One can get a vivid sense of the mounting unease over slipping US space leadership by comparing the report of Tom Paine's 1986 National Commission on Space with the 1987 report that NASA Administrator Fletcher commissioned Astronaut Sally K. Ride to write ('The Ride Report'). Both the Paine Commission and the Ride Report were responses to NASA's alleged post-Apollo lack of purpose and proposed ambitious and broadly constituted space programmes centred on the long-range goal of human exploration of Mars.[115] However, their tones differed starkly. The Paine Commission's report *Pioneering the Space Frontier* was written largely before the *Challenger* disaster and wore its astrofuturist heart on its sleeve.[116] Its appeals to America's frontier past and its conviction that humanity's manifest destiny was to move out into the solar system and exploit its riches bore the indelible impression of O'Neill's intoxicating blend of Konstantin Tsiolkovsky and Frederick Jackson Turner.[117] Just over a year later, the Ride Report warned that America was no longer preeminent in space and had lost leadership to the Soviets in several critical areas.

The Paine Commission was established by executive order in 1984 to examine future directions and goals for the American space programme and counted Gerard K. O'Neill and Neil Armstrong and shuttle astronaut Katherine D. Sullivan amongst its fifteen members. Sullivan had advised against soliciting testimony from members of the Soviet space community because this would 'detract from the authority and status of the Commission' by giving the impression its

[113] Sagdeev, *The Making of a Soviet Scientist* (1994), pp. 274-284.
[114] 'Surging Ahead', *Time*, 5 October 1987, pp. 8-10.
[115] National Commission on Space, *Pioneering the Space Frontier: Report of the National Commission on Space* (Washington DC: US Government Printing Office, 1986),available online via <https://www.nasa.gov/pdf/383341main_60%20-%2020090814.5.The%20Report%20of%20the%20National%20Commission%20on%20Space.pdf> [accessed 28 February 2018]; Sally K. Ride, *Leadership and America's Future in Space: A Report to the Administrator by Dr Sally K. Ride, August 1987*,(Washington DC: US Government Printing Office, 1987), available online via <https://history.nasa.gov/riderep/main.PDF> [accessed 28 February 2018].
[116] An August 1985 letter from Gregg E. Maryniak who attended a commission session on O'Neill's behalf references a planned deadline of late December/early January for a draft of the final report, Gregg E. Maryniak to Gerard K. O'Neill, 31 August 1985, Folder: 'National Commission on Space, Misc Materials 1984-1986 3 of 4', Box 50, O'Neill Papers.
[117] National Commission on Space, *Pioneering the Space Frontier* (1986), pp. 3-4.

recommendations were 'merely reactionary'.[118] No Soviets testified before the commission, but Paine did accompany Bill Nelson's congressional delegation to Moscow in October 1985 where he was impressed by Soviet planetary exploration plans and the enthusiasm for cooperation amongst individual Soviet scientists, Gromyko's obstinacy over the SDI 'minefield' notwithstanding.[119] Paine's experience in Moscow informed his commission's final report which dealt with the USSR primarily as a potential cooperative partner. Providing technology transfer could be avoided, the report recommended that 'selective cooperation should be actively sought with the Soviet Union' and identified Mars exploration as a particularly fruitful area for coordination and collaboration.[120] The Paine Commission's outlook was fundamentally optimistic, it looked forward to a future that was America's for the taking, rather than backwards at the Soviet competitor.

By contrast, the Ride Report of August 1987 presented NASA struggling in the face of domestic criticism and determined Soviet, European and Asian challengers. The Report argued NASA was at a 'crossroads' between the 'visions' of the Paine Commission and the 'realities' of the Rogers Commission. America was no longer 'the undisputed leader in nearly all civilian space endeavours' and had yielded leadership in the crucial fields of Mars exploration and long-duration space exploration to the Soviets who were 'now the sole long-term inhabitants of low-Earth orbit'.[121] The report stressed that there was not one 'correct' strategy for space but still had much praise for the USSR's purported patience and dedication. In contrast to NASA's 'revolutionary' approach, the Soviet programme was 'systemic and evolutionary', where 'incrementally developed operational capabilities' and a 'robust infrastructure' had constructed the foundation for an entry into the commercial launch market.[122] Burrows dismissed the Ride report as NASA reverting to Cold War nostalgia, criticising Ride for using 'highly selective reporting' and gullibly assuming that the Soviets would be able to follow through on their grandiose plans.[123] Like dismissals of the Soviet space challenge in Apollo-centric histories, this misguided approach is predicated on hindsight. Today, Soviet Mars plans seem optimistic to the point of hubris, but as the preceding discussion of *Mir*, Energia and Vega has shown, Ride compiled her report amidst at atmosphere of apprehension about an increasingly assured and open Soviet space programme.

Mars Together reached its political apogee in this atmosphere. A cooperative voyage to Mars offered the American space programme an Apollo-type mission around which it could redefine itself. Space cooperation also seemed in keeping with warming US-Soviet relations as both nations' leaders resolved not to repeat the frustrating deadlock of the 1986 Reykjavik Summit.

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[118] Katherine D. Sullivan to Tom Paine, 21 May 1985, Folder 5, Box 56, Paine Papers.
[119] Thomas O. Paine, 'Impressions Received in Moscow Relating to the Future Direction of the Soviet Space Program', Folder 11: 'Soviet Union 1983-1990', Box 779, Sagan Papers.
[120] Ibid., pp. 159-162.
[121] Ride, *Leadership and America's Future in Space* (1987), pp. 5, 11.
[122] Ibid., p. 18.
[123] Burrows, *This New Ocean* (1998), p. 568.

Secretary of State George Shultz's advocacy of cautious engagement with the USSR gradually eclipsed Caspar Weinberger's more suspicious outlook and Reagan began to relish his new role as triumphant peacemaker in joint appearances at summits with his new friend 'Mikhail'.[124] A November 1987 internal Planetary Society memo urged the society's leadership and members exploit this unique 'climate of opportunity'.[125] Mars Together activists harnessed the image of Soviet ascendency in space to argue that the USSR was a viable partner for a project that was politically and technologically unprecedented. Their depiction of the Soviet programme rested on three premises: firstly, that the Soviets' abiding fascination with Mars had shaped their programme since its inception; secondly, that the USSR was carefully constructing the necessary technological foundation for crewed interplanetary flight; and, finally, that Gorbachev's reforms had prompted a new emphasis on international cooperation.

The first premise was already deeply entrenched within American writing on Soviet space exploration. In the 1960s, Charles Sheldon had propagated his belief, founded on careful analysis of Soviet propaganda, that there was a Russian 'deep philosophy' of space exploration centred on 'spreading their system of politics to all the solar system'.[126] After Sheldon's death in 1981, his protégés in cosmokremlinology James Oberg and Charles Vick continued to argue that crewed interplanetary flight was the Soviet programme's eternal goal.[127] Contemporary Soviet propaganda corroborated their interpretation. *The Road to the Red Planet*, a 1988 Novosti propaganda booklet illustrated its claim that Phobos would pave the way for future cooperative crewed missions to Mars with kaleidoscopic cosmist imagery: a portrait of Tsiolkovsky, hands reaching outwards into space and delicate flowers sprouting from red Martian soil.[128] Twenty years after Sheldon's speeches on the USSR's Martian ideology, his argument that the Soviet programme's ultimate goal was interplanetary colonisation remained persuasive.

The Soviets were not just dreaming of the Red Planet; they were assiduously working out how to get there. Both Matsunaga's *The Mars Project* and *Apollo 11* crewmember Michael Collins' Mars Together manifesto *Mission to Mars* contended that the Soviets had a demonstrated and consistent interest in the Red Planet dating back to the days of Tsiolkovsky.[129] A May 1987 pro-

[124] Deborah Welch Larson, *Anatomy of Mistrust: US-Soviet Relations during the Cold War* (Ithaca, NY: Cornell University Press, 1997), pp. 216-220; Fitzgerald, *Way Out There in the Blue* (2000), pp. 415-26.
[125] Roger Craver to Tim Lynch, 'The Political Climate and the Society's Goal', 19 November 1987, Folder 2 'Mars Missions, Mars Declaration, general 3 of 3', Box 935, Sagan Papers.
[126] For 'Deep Philosophy' see Charles S. Sheldon II, 'The Soviet Space Program Compared with the United States' Speech to Bellevue Forest Citizens Association, 26 April, 1968, Folder: Speeches by Sheldon 1968, Box 9; Sheldon kept a careful note of any Soviet pronouncement on future goals and plans see Folder: 'Soviet Space Study 66-70', Box 8, Sheldon Papers.
[127] James Oberg, *Mission to Mars*, (Harrisburg, PA: Stackpole Books, 1982), pp. 166-172; Art Bozlee and Charles P. Vick, 'The Soviets' Next Step into Space', *L-5 News*, 10, 11, December 1985, pp. 6-9 (p. 9).
[128] *The Road to the Red Planet* (Moscow: Novosti Press Agency Publishing House, 1988), available in Record Number: '15568 USSR Manned Planetary Flight', NASA History Office.
[129] Matsunaga, *The Mars Project* (1986), pp. 52; Michael Collins, *Mission to Mars: An Astronaut's Vision of Our Future in Space* (New York, NY: Grove Weidenfeld, 1990), pp. 97-8.

cooperation *Los Angeles Times* editorial raised the humiliating prospect of America watching a Soviet Mars landing from the sidelines: 'The Russians know well that Mars is the next frontier in space, and they will concentrate their efforts on getting there....The Russians are going to Mars. So should we.'[130] Emphasising supposedly superior Soviet planning also helped detract attention from their less-than-impressive record in interplanetary probes. In contrast to their successes sending probes to Venus, every single robotic craft that the Soviets had dispatched to Mars in the 1960s and 1970s had failed.[131] Sagan's February 1986 *Parade* article acknowledged these failures but still used Soviet statements about future goals to confidently declaim, 'With or without the United States, the Soviet Union is going to Mars'.[132] References to Soviet single-minded dedication to the Martian cause conjured up images of the Soviet command economy lumbering into motion to accomplish a defined goal heedless of cost. It was a particularly potent line of attack when NASA was under fire for lacking a single defining Apollo-style raison d'être.

Mars Together activists hailed Soviet space successes as evidence that the USSR's grand Martian plans were being carefully carried out. Sagan's 1986 *Parade* article asserted that Mars was the logical conclusion to every significant Soviet programme, from the obvious intent of Phobos to long duration space station missions that were clearly designed to test the feasibility of a flight to Mars, which would take 'roughly nine months', to the Energia that would extend their reach beyond LEO.[133] University of Alabama physicist Thomas J. Wdowiak echoed Sagan's appraisal of Soviet motives in a September 1987 *Birmingham News* editorial that proposed a joint Mars mission as a remedy for NASA's long-running existential crisis. Collaboration made organisational sense: 'from a practical standpoint, the Soviets have the hardware and in-flight experience essential to a successful Mars exploration programme.' Wdowiak argued that the USSR's growing proficiency neutralised the familiar technology transfer criticism: 'any technology transfers to the East will be balanced by equally valuable transfers to the West.'[134] Michael Collins, who also believed the USSR was 'practicing for Mars in Earth orbit', complained that 'among American space doctors it is almost as if the Soviets had never ventured into space' and summarised NASA's approach as 'we have to invent an American wheel, not ride on Soviet tires'.[135] Depictions of space competition as a wasteful exercise in duplication resonated with the anxious post-*Challenger* mood. Cooperative rhetoric argued that by joining forces, Soviet successes in space could be turned into a blessing than a disaster.

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[130] 'Editorial: A Joint Mars Venture', *The Los Angeles Times*, 26 April 1987, clipping in Folder 13: 'Mars Missions Press Clippings, 1987', Box 935, Sagan Papers.
[131] For the high failure rate of Mars-bound Soviet probes see Burrows, *This New Ocean* (1998), 461, 466-8 and Huntress and Marov, *Soviet Robots in the Solar System* (2015).
[132] Sagan, 'USA and USSR: Let's Go to Mars- Together' in Sagan, 'Planets and Politics' (1989), p. 28.
[133] Sagan, 'USA and USSR: Let's Go to Mars- Together' in Sagan, 'Planets and Politics' (1989), pp. 28-29.
[134] Thomas J. Wdowiak, 'Joint US Soviet exploration of Mars could be stabilising, productive', *The Birmingham News*, 27 September 1987, clipping in Folder 13: 'Mars Missions Press Clippings, 1987', Box 935, Sagan Papers.
[135] Collins, *Mission to Mars* (1990), pp. 113, 128.

The Soviet programme's growing openness initially lent credence to arguments that cooperation was the wave of the future. Soviet secrecy had long been an impediment to cooperation. James Oberg was an enthusiastic member of the 'Mars Underground' but in 1985 he warned Sagan about dealing with the Soviets if they refused to engage in 'honest dialogue... if the truth comes first, anything is possible; if lies are the basis for negotiations, nothing can rest on such a foundation.'[136] Understandably, then, Mars Together activists delighted in news of Glasnost within the Soviet space establishment. A July 1986 *Boston Globe* article quoted Sagan's effusive praise for the Vega programme: 'It really was extraordinary, IKI was more open to me on this trip than any NASA facility is to any foreign visitor.'[137] The same month also found Sagan complaining to *The Miami Herald* that whilst 'The United States has, in effect, opted out of the scientific exploration of the solar system...The Soviet space programme is having some remarkable accomplishments, there is an increased openness about the Soviet programme, an openness that goes with success.'[138] Sagan used the Soviets' newfound enthusiasm for meaningful scientific cooperation to upend stereotypes of secretive socialists and convivial capitalists. If NASA continued ignoring the signals coming from IKI it risked turning into an inward-looking and suspicious entity, in short, the Soviet programme of old.

By this point, Roald Sagdeev was firmly ensconced within Gorbachev's inner circle and had become an indispensable ally for American advocates of space cooperation. In a *Washington Post* editorial published shortly after the 1987 Washington Summit, Sagdeev described a collaborative Martian sample return programme as an excellent way to 'sustain the hopes that were raised at last week's summit.' In a nod to Arthur C. Clarke, he even suggested such a mission might eventually lead to a crewed landing by the year 2001.[139] The following July, Sagan, Murray and Friedman attempted to reward Sagdeev for his service to the Martian cause by nominating him for the American Association for the Advancement of Science's (AAAS) Philip Hauge Abelson Prize. Their nomination letter described Sagdeev as a talented scientist who had 'championed Perestroika and Glasnost in his own institute before those words were considered by higher level authorities'.[140] Despite Reagan's rejection of Gorbachev's Mars proposal, there were still reasons for the Planetary Society to be cheerful after the Moscow Summit. US-Soviet cooperative working groups had resumed meeting and a joint Mars mission was being discussed at the highest levels of Soviet government. The launch of *Phobos 1* and *Phobos 2* in July 1988 was equally exciting; there was no official US participation, but in an address to AAAS in Boston earlier that year, IKI's Dr

[136] James Oberg to Carl Sagan, 'Questions on Soviet Space Militarisation', 26 November 1985, p. 11, Folder 6: 'Set D Oberg James, 1 of 2, 1981-1993', Box 82, Sagan Papers.
[137] David L. Chandler, 'Goal in Space: International Missions', *The Boston Globe*, 7 July 1986, pp.43-4.
[138] Stephen K. Doig, 'Space program's next goal: man on Mars', *The Miami Herald*, 28 July 1986, pp. 1A, 3A, clipping available in, Folder 12: 'Mars Missions Press Clippings 1986', Box 935, Sagan Papers.
[139] Roald Z. Sagdeev, 'To Mars Together, A Soviet Proposal' *The Washington Post*, 13 December 1987, p. M1.
[140] Carl Sagan, Bruce Murray and Louis Friedman to AAAS Executive Office, 29 July 1988, Folder 7: 'Sagdeev Roald 1979-1996', Box 89, Sagan Papers.

Albert A. Galeev had promised to keep 'Friends like Professor Bruce Murray at Caltech abreast of what we are doing.'[141]

Mars Together activists predicted the Soviet space programme's parade of successes would continue but some American space experts were more sanguine. In a July 1987 press briefing Marcia Smith, Charles Sheldon's successor as chief CRS space expert, addressed the media's increasingly hyperbolic appraisal of Soviet space capabilities. Smith stressed that crewed spaceflight was the only area where the Soviets possessed a present advantage over the US and that the Energia, despite having 'captured the imagination of Western space observers', would only put the Soviets 'at a point where the United States stood 20 years ago'. Smith concluded by warning that 'in these trying times for the US space programme, overreaction... is a danger.' Snap judgements about 'who's ahead' were a poor way to assess space capabilities and risked creating 'another 'Sputnik' environment'.[142] Smith urged the American space community to avoid repeating the mistakes of the past by placing the USSR's recent successes within a bigger picture. Space cooperation activists were about to receive their own brutal lesson on the dangers of overreacting.

On 15 November 1988, the USSR's *Buran* ('Snowstorm') space shuttle finally made its first automated, non-crewed test flight, launched aboard the new Energia rocket.[143] The orbiter had been revealed to the press in April 1987 but its debut launch had been postponed twice, causing nervous officials to halt plans for live coverage.[144] A Soviet Space Shuttle had been the subject of feverish speculation within the American space community since *Aviation Week* journalist Craig Covault had been briefed on Soviet space plans in 1977. A striking photograph released by Australian Air Force Intelligence of Soviet sailors recovering a model used in suborbital aerodynamic tests repeatedly resurfaced throughout the 1980s as proof of the imminent appearance of a Soviet shuttle.[145]

Despite this anticipation, American reaction to *Buran* was considerably more muted than the uproar that had greeted *Mir* and the Energia. By this point, NASA's shuttle had returned to service, considerably allaying fears of the Soviet space challenge and American coverage of the *Buran* launch often centred on allegations that the Soviet craft was 'virtually identical' to the

[141] Malcolm W. Brown, 'Soviet Spacecraft Will Use Laser to Examine Moon of Mars', *New York Times*, 23 February 1988, p. C4.
[142] Marcia Smith, 'Manned Spaceflight and Launch Vehicles' in American Institute of Astronautics and Aeronautics, 'AIAA Media Briefing: The US/Soviet Space Race, Today and Tomorrow' Folder: US/Soviet Union Space Race AIAA Media Briefing, Box 12 Series II Subject Files, Stucky, Edward Files, White House Staff Member and Office Files, Reagan Library.
[143] The best account of Buran's development remains Vis and Hendrickx, *Energia-Buran* (2009).
[144] For the first launch and Soviet media policy see Ibid., pp.337-359.
[145] for the history of this test vehicle, the BOR-4, see Vis and Hendrickx, *Energia-Buran* (2009), pp. 314-5 for examples see Defense Intelligence Agency, 'DDB-1400-16-84: Soviet Military Space Doctrine', August 1981 pp. 20; the front cover of the 1986 space-themed techno thriller *Alpha Bug* used this image as the basis for its highly manoeuvrable Soviet space plane, see M.E. Morris, *Alpha Bug* (Novato, CA: Presido Press, 1986).

shuttle.[146] This was an exaggeration, but there were extensive similarities between the two spacecraft that resulted from *Buran*'s mid-1970s origins as a way to compete with the shuttle's much-hyped military capabilities. The Energia-Buran project had been the most expensive in the Soviet programme's entire history but the November 1988 launch was the final time that either orbiter or rocket were launched. A funding crisis was enveloping the Soviet programme as the 'Steel Eaters' of the military-industrial complex began to feel the effects of the USSR's economic collapse.[147] With Glasnost in full swing, internal divisions were now difficult to conceal from the West. *A New York Times* article on Soviet criticism of *Buran* described an 'unusually blunt article' by Sagdeev that had described the Soviet shuttle as a costly mistake and quoted James Oberg's appraisal that a schism was emerging between IKI's scientific programme and the military programme in charge of crewed flights.[148] As subsequent flights failed to materialise, *Buran* was transformed from a symbol of vigour into a symbol of dysfunction.

Mikhail Gorbachev had introduced his Glasnost campaign in the spirit of Marxist-Leninist self-criticism, declaring: 'Truth is the main thing. Lenin said: More light! Let the Party know everything!' By 1989, though, this transparency was rapidly eroding the Communist Party's political legitimacy.[149] With Glasnost empowering Soviet journalists to interrogate accepted orthodoxies, this was a tumultuous time for Western observers of the Soviet space programme. Charles Vick would later characterise the late 1980s as a 'rollercoaster' as a torrent of revelations 'taught us lessons in what we got right and wrong'.[150] In 1988, James Oberg published an entire book on previously concealed Soviet disasters, including the deaths of cosmonaut trainees and numerous catastrophic launch vehicle explosions.[151] However, one of the most astounding revelations occurred serendipitously when a delegation of MIT aerospace engineers visited the collection of the Moscow Institute of Aviation's cosmonautics department in December 1989. A trip report by MIT's Dr Laurence Young describes his group's astonishment at finding themselves face to face with the USSR's hitherto secret *LK-3* lunar lander when 'the very existence of this program' had been debatable and 'to our knowledge, nobody from the West had ever seen the actual hardware'.[152] Glasnost dispelled the illusions and deceptions of the Shadow Programme

[146] John Noble Wilford, 'Soviet Design Appears in Debt to US Shuttle', *New York Times*, 16 November 1988, pp. A14; 'Soviet Space Shuttle Completes Mission', *The Washington Post*, 15 November 1988, pp. A21, A24.
[147] For the importance of competitive rationales in Buran's approval see Vis and Hendrickx, *Energia-Buran* (2009), pp.53-60; for the costliness of the programme and its cancellation, Siddiqi, *The Soviet Space Race with Apollo* (2003), pp. 840-1.
[148] John Noble Wilford, 'Like Its American Cousin, Soviet Shuttle is Criticised', *New York Times,* 22 November 1988, pp. C1, 10.
[149] Mikhail Gorbachev, *Perestroika: New Thinking for Our Country and the World*, (New York, NY: Harper and Row, 1987), p. 75.
[150] Brian Harvey, 'Hidden in Plain View' in *Cold War Space Sleuths* ed. by Phelan, (2013), pp. 31-59 (pp. 45-52); Oral history interview conducted with Charles P. Vick by Thomas Ellis, 27 May 2016.
[151] James Oberg, *Uncovering Soviet Disasters* (1988), pp. 156-210.
[152] L. R. Young, 'MIT Aero/Astro Visit to Moscow Aviation Institute (MAI), November-December 1989', Folder: 'Committee on Human Exploration of Space Correspondence (1)', Box 231, H. Guyford Stever Papers, Ford Library.

including Mars Together's image of the Soviet programme as a cohesive entity, united as it strove towards a single goal.

In September 1988, a single digit coding mistake in a message IKI controllers sent to *Phobos 1* caused its orientation system thrusters to shut down, rendering the spacecraft inoperable. Even more devastatingly, on 27 March 1989 IKI lost contact with *Phobos 2*; the entire 200 million ruble Phobos programme had ended in failure.[153] The prospect of robotic flights to Mars' moons had thrilled Mars Together activists; Friedman had enthused about such a 'very ambitious mission' in his testimony to Matsunaga's space cooperation hearings. Brian O'Leary had hoped the mission would prove his theory that Phobos might contain water that could be processed into fuel for Mars-bound rockets.[154] After the failure of *Phobos 2*, Friedman maintained that cooperative missions had been 'predicated on the concept of parallel systems' rather than jointly developed spacecraft but outside observers like space policy scholar John Logsdon commented that the Phobos failure was a 'profound setback for advocates of collaboration.'[155] At a post-mortem meeting in Moscow, Bruce Murray spoke for the disappointed foreign scientists who had placed their hopes in the Phobos programme when he blamed the programme's 'shameful' failure on dysfunctional organisational approach that had pitted scientists against an uninterested military-industrial bureaucracy.[156] The Phobos debacle indicated that something was badly wrong with the Soviet space programme; from this point onwards, Mars Together's image of the Soviets incrementally advancing along their roadmap to Mars was increasingly implausible.

Just as IKI's Martian dreams were dying, the newly inaugurated Bush administration was attempting to refocus America's space programme around eventual crewed flights to the Red Planet. Announced at a NASM event commemorating the 20th anniversary of the *Apollo 11* lunar landing, George H. W. Bush's Space Exploration Initiative was yet another attempt to reset American space policy around a programme that would eventually send astronauts to Mars. From a policy perspective, the SEI was a fiasco: a hastily prepared proposal that was rushed to announcement only to collapse ignominiously less than a year later amidst bitter warfare between NASA and the newly resurrected Space Council.[157] For Mars Together advocates, though, the SEI represented a crucial opportunity to influence NASA's future direction. In October 1989, Sagan wrote to Space Council Executive Director Mark Albrecht urging him to ensure the Soviets were brought into any future Mars programme. Sagan drew on the sense of new possibilities brought about by the Cold War's end to make his case, 'the world is changing very rapidly.

[153] For the failure of the Phobos programme see Sagdeev, *The Making of a Soviet Scientist* (1994), pp. 313-24; Huntress and Marov, *Soviet Robots in the Solar System* (2011), pp.367-387.
[154] O'Leary, *Mars 1999* (1987), pp. 50, 107-9.
[155] John Noble Wilford, 'Space Failure: US Partnership Fades', *New York Times*, 30 March 1989, p. A8.
[156] Sagdeev, *The Making of a Soviet Scientist* (1994), pp.324.
[157] Hogan, *Mars Wars* (2007), pp. 159-165.

Possibilities exist now that were unthinkable just a few years ago.'[158] Albrecht invited Sagan to participate in a Blue Ribbon Discussion Group on the SEI where the scientist continued his lobbying effort. In March 1990, the Bush administration announced its intention to solicit foreign cooperation in SEI projects.[159] However, with the USSR descending into political and economic turmoil, the SEI consultative process proved to be the Mars Together movement's last hurrah.

At an October 1990 Federation of American Scientists hearing on space policy Sagan admitted that 'new facts have emerged which, I claim as a scientist, we have to respect and take account of', namely a major economic downturn and the end of the Cold War. Still he believed these problems had only 'incrementally weakened his argument', particularly as 'the two nations still have some 55,000 nuclear weapons between them.'[160] The Warsaw Pact had disintegrated and space exploration now appeared to be a luxury the USSR could ill-afford. The April 1989 announcement that *Mir* would be left crewless for three months was correctly interpreted by American observers that the Soviet space programme was beginning to feel the effects of the problems overwhelming the USSR's rapidly deteriorating economy.[161] In November 1990, Friedman sent a report titled 'What about the Soviets?' to members of the Augustine Commission, yet another panel examining potential directions for US space policy. Friedman dismissed 'present headlines' that predicted Gorbachev's successors would scrap the space programme as he argued that space cooperation should be a key element of America's immediate geopolitical priority: ensuring the Soviet Union's 'emergence into the community of free, industrialised nations.'[162] The Planetary Society had recognised that nuclear security remained a significant problem, but it could not avoid the fact with the easing of US-Soviet ideological tensions Mars Together appeared increasingly superfluous.

By the autumn of 1991, the USSR's continued existence, let alone that of its space programme, was doubtful. Significantly, one of the plotters in the failed coup against Gorbachev had been space industry potentate Oleg Baklanov, the Minister of General Machine Building.[163] In an

[158] Carl Sagan to Mark Albrecht, 16 October 1989, Folder 3: 'Mars Missions, Speeches, Statements and testimony by Sagan 1982-1990', Box 938, Sagan Papers .
[159] Hogan, *Mars Wars* (2007), Ibid., pp. 99-100, 109-110.
[160] Sagan, 'Human Missions to Mars: Edited Proceedings of the Scientists Hearing on Space Policy', 3 October 1990, pp. 5-7, Folder 3: 'Mars Missions, Speeches, Statements and testimony by Sagan 1982-1990', Sagan Papers.
[161] 'Soviets Say Orbiter Will Be Unmanned for Several Months", *The Washington Post*, 13 April 1989, pp. A24; Martin Sieff, 'Space Funds Shrinking for Soviets', *The Washington Times*, 28 April 1989, p. A9.
[162] Louis Friedman, 'What About the Soviets?', 28 December 1990, Folder 2, Box 14, Paine Papers; For further coverage speculating about the Soviet programme's future see; William J. Broad, 'Soviet Woes Tarnish Once-Shining Space Efforts', *New York Times*, 8 January 1991, pp. C1, C7; Craig Covault, 'USSR Breakup Paralyzing Advanced Soviet Military, Space Development', *Aviation Week and Space Technology*, 2 September 1991, p. 22
[163] For Oleg Baklanov's career see Sagdeev, The Making of a Soviet Scientist (1994),258-262, 310-16,325-9; Even after serving a brief prison sentence he continued to command respect within the Russian space industry, Jeffry Manber, *Selling Peace: Inside the Soviet Conspiracy to Transform the US Space Program* (Burlington, Ontario: Apogee Books, 2009) p. 141.

October 1991 letter to Albrecht, Sagan stressed that Baklanov had no connections to a Soviet space delegation that would shortly be visiting the US. Sagan acknowledged that the Soviet programme was in 'substantial disarray' but restated his belief that 'the US and Soviet programmes are beautifully compatible' and the only obstacle preventing cooperation was 'a kind of American chauvinism, a sin of pride'.[164] The 1990s did see unprecedented US-Russian space cooperation in the form of the Shuttle-Mir project and the planning of the International Space Station, but these endeavours were considerably less ambitious than a joint Mars mission.[165] The USSR's collapse provided considerable scope for cooperation in Earth's orbit but it also removed the need for transcendent symbolic gestures that demonstrated astronauts and cosmonauts could put aside their ideological differences. Mars remained a fixation for many members of the pro-space movement; in November 1996, *Apollo 11* astronaut Buzz Aldrin wrote to Sagan proposing a new push for a presidential commitment to a Martian programme. Sagan was terminally ill but, mustering the effort to reply, wrote that he agreed that Mars was a good 'long-term goal for humanity' but argued a presidential commitment for crewed missions was 'the wrong way to go about it' given that 'President Bush's Space Exploration Initiative sank like a stone'.[166] What Sagan did not write was that there was no longer a compelling earthly political rationale for a voyage to Mars.

Gerard K. O'Neill had never been impressed by the idea of a cooperative Mars Mission, believing it to be an 'empty political gesture' that would distract the US from the goal of developing space industry.[167] In a private note written in August 1987, the futurist had predicted that Mars Together's central political rationale would soon vanish. O'Neill believed that the 'economic deterioration of the Soviet bloc over the next 10-15 years, and the consequent rapid political change' would 'make the conventional Cold War a thing of the past.' Thus, no space programme based on Cold War 'posturing', whether a competitive Apollo-type effort or a cooperative 'hypothetical US-USSR manned trip to Mars, makes any sense in the world of 1990 and

[164] Carl Sagan to Mark Albrecht, 3 October 1991, Folder 4, Box 14, Paine Papers.
[165] For Shuttle-Mir and post-Cold War cooperation see Angelina Long-Callahan, 'Russian-American Cooperation in Space: Privatisation, Remuneration and Collective Security' in *NASA in the World* ed. by Krige, Callahan and Maharaj, (2013), pp. 153-184; Mark Albrecht, *Falling Back To Earth: A First Hand Account Of The Great Space Race And The End Of The Cold War* (Lexington, KY: New Media Books, 2011); Clay Morgan, *Shuttle-Mir: The United States and Russia Share History's Highest Stage.* NASA SP-2001-4225 (Washington DC: US Government Printing Office, 2001),Available online via <https://history.nasa.gov/SP-4225.pdf> [accessed 28 February 2018]; Von Bencke, *The Politics of Space* (1997), pp. 99-109;Karash, Yuri, *The Superpower Odyssey* (1999), pp. 172-233.
[166] Carl Sagan to Buzz Aldrin, 22 November 1996, Folder 7: 'Set D Aldrin Buzz, 1994-1996', Box 47, Sagan Papers.
[167] In a confidential newsletter to friends and colleagues O'Neill wrote that 'if something doesn't make sense for the US to do on its own, making it a cooperative venture won't change the facts' Gerard K O'Neill, 'Confidential Newsletter to SSI Senior Associates', 5 December 1988 p. 4, Folder 1, SSI Confidential Newsletter, Box 10, O'Neill Papers.

beyond.'[168] O'Neill's prophecy cuts to the heart of why the Mars Together project never materialised. It was ultimately just another instance of space policy based on 'Cold War posturing'. Conceived in response to the mid-1980s tensions over space militarisation, Mars Together was nurtured by post-*Challenger* fears that the Soviet programme would soon eclipse its American rival. The turmoil that engulfed the Soviet space programme at the end of the 1980s raised doubts about whether the USSR was capable of mounting an interplanetary programme. The Soviet Union's collapse invalidated the proposal's principal political rationale. Why embark upon a multi-billion dollar decades-long scheme designed to reduce Cold War tensions when that ideological conflict no longer existed?

[168] Gerard K O'Neil, 'Alternative Plan for US National Space Program', August 1987, Folder 9: 'SSI Not Chrono 1986-1991', Box 10, O'Neill Papers.

Conclusion: The Soviet Space Programme in the American Imagination

'I wish to express the confidence that the space science, technology, and industry of the Soviet Union, given the necessary state and public support, will be able, in conditions of peace, to bring our people, and not only them, more and more tangible and useful results in all spheres of human life.' -Mikhail Gorbachev, April 1991.[1]

'If there is no governmental money we will earn it ourselves or we will perish. Like any firm, if it does not have money, it has to find partners and make money or go bankrupt. There is no third way.' - *Mir* Programme Director Viktor Blagov, October 1991.[2]

During the USSR's final days, the Soviet space programme continued to fulfil its symbolic function by offering melancholy vignettes encapsulating the communist system's rapid collapse. There was cosmonaut Anatolii Artsebarskii, who in 1991 smuggled a Soviet flag aboard *Mir*, affixing it to the station's highest point, the 'Sofora' girder, at a time when the Hammer and Sickle was being defaced across the crumbling Soviet Empire.[3] Alternatively, there was Artsebarskii's crewmate Sergei Krikalev who the Western media poetically dubbed 'The Last Soviet'. Krikalev had been launched from the Kazakh SSR in May 1991 but funding problems and political turmoil prolonged his mission to the point that his Soviet homeland no longer existed when he finally returned to Earth in March 1992.[4] The world that Artsebarskii and Krikalev returned to differed starkly from the one which Yuri Gagarin had orbited thirty years before. The historian can neatly draw a line in 1991, 1989, or 1988 and declare the US-Soviet ideological struggle over but the underlying prejudices and tensions that fuelled the Cold War proved more durable than the concrete of East Berlin's 'Anti-Fascist Protection Rampart'. A group of Soviet scientists and engineers from the Kurchatov Institute, Moscow's premier nuclear physics research institution, discovered this for themselves when they visited the United States in 1991 to advertise the USSR's space-based nuclear reactor technology.

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[1] Speech by USSR President Mikhail Gorbachev at a meeting held in the Hall of Columns in the House of the Union, Moscow marking the 30th anniversary of Yuri Gagarin's space flight, 10, April 1991, translated in FBIS-SOV-91-070 11 April, 1991, clipping in Record Number: 15583 'US-USSR 1988 1991', NASA History Office.

[2] Greg Nadier, 'Cosmonauts try capitalism' *The Washington Times*, 20 October 1991, pp. 16-7.

[3] Speech by Anatolii P. Artsebarskii at British Interplanetary Society Chinese/Soviet Technical Forum event, London, 21 July 2015.

[4] A 1993 BBC documentary used Krikalev's iconic title to explore the fate of the Soviet space programme, 'Arena: The Last Soviet Citizen' dir. by Leslie Woodhead, (BBC 2, 1993); For Krikalev and his enforced stay aboard *Mir* see Zimmerman, *Leaving Earth* (2003), pp.307-324, the documentary is available online via <https://www.youtube.com/watch?v=qk1JWWu-GF0> [last accessed 28 February 2018]; Jorgensen, 'States of Weightlessness', *Science Fiction Film and Television*, 2, 2, (2009), pp. 204-225 (p. 220); for American coverage of Krikalev's flight see, Francis X. Clines, 'Above it All, Mir Astronauts ask about the State of the Union', *New York Times*, 7 September 1991, pp. 1,4; 'Lost in Space' *Los Angeles Times*, 7 October 1991, p. 3.

By the late 1980s, the Soviet Union had been using space-based nuclear reactors to power its RORSAT naval reconnaissance satellites for almost two decades. The SDIO had become increasingly interested in the potential of space-based nuclear power sources; the funding crisis enveloping the Soviet space programme offered a valuable opportunity to jumpstart American research into space-based nuclear power and propulsion. In December 1990, a joint venture was agreed between an SDIO-sponsored consortium of American space entrepreneurs and a collection of actors from the Soviet space community, headed by the Kurchatov Institute's Dr Nikolai Ponomarev-Stepnoi, to further investigate the potential of the USSR's new TOPAZ-II space-based nuclear reactor. The following month, a non-functioning display model of a TOPAZ-II was flown to the US to be exhibited at the Eighth Symposium on Space Nuclear Power in Albuquerque, New Mexico.[5] American press coverage hailed the deal as an excellent chance to learn more about Soviet space technology and a breakthrough in superpower cooperation that would have been 'unthinkable a year or two ago'.[6] For the Soviet scientists, engineers and managers who proudly displayed the TOPAZ-II model in New Mexico, the deal was a vital lifeline at a time of extreme uncertainty. With the Soviet state unable to sustain its vast space industry, the American military-industrial complex had shifted from being a competitive rival to commercial patron.

Much to the Soviet delegation's dismay, when the time came to return the TOPAZ-II model to Russia, they were prevented from doing so by the Nuclear Regulatory Commission (NRC). The geopolitical Cold War was ending but anxieties about technology transfer and nuclear espionage remained. Even though the model was a non-functioning display unit of entirely Soviet provenance, the NRC ruled that repatriating it would constitute exporting a 'nuclear utilization facility' without the proper permit. The NRC only relented after five months of pleading and wrangling from the SDIO and New Mexico's Republican Senator, Pete Domenici.[7] The SDIO's interest in forming a partnership with Soviet space scientists proved that fears of the Soviet space threat had subsided, but the Kafkaesque situation that TOPAZ II's minders found themselves in demonstrates how suddenly the Cold War had ended. American regulators had had little time to catch up with the momentous political changes overtaking Eastern Europe.

The TOPAZ-II deal prefigured the uneasy commercial and cooperative ties that would define the relationship between the Russian and American space communities during the 1990s. The Soviet space programme had been transformed from an impediment to space commercialisation into its next great frontier as a source of technology, expertise and cheap labour. However, as the NRC's

[5] Richard Dabrowski, 'US-Russian Cooperation in Science and Technology: A Case Study of the TOPAZ Space-Based Nuclear Reactor International Program', *Connections: The Quarterly Journal,* 13, 1, (2013) pp. 73-80.
[6] William J. Broad, 'US-Soviet Space Deal: US is Ready to buy an Advanced Soviet Reactor', *New York Times*, 7 January 1991, pp. A1, B8; R. Jeffrey Smith, 'US Consortium to buy Soviet Reactor', *The Washington Post*, 8 January 1991, p. A6.
[7] R. Jeffrey Smith, 'Red Tape for a Soviet Reactor', *The Washington Post*, 27 May 1991, p. A21; Dabrowski, 'US-Russian Cooperation in Science and Technology', (2013) pp. 80-1.

blunder proved, the former Cold War adversaries were psychologically unprepared for the reality of true cooperation. Furthermore, the USSR's collapse had thrown up unexpected new problems as well as opportunities. Not least, what to do about the launch vehicles and rocket engines mouldering in warehouses in the newly independent former Soviet republics? Some Cold Warriors, like Ronald Reagan or Dr Edward Teller, were now proposing buying up Soviet space technology to prevent it from falling into the wrong hands.[8] By this point, though, the Soviet space programme was no longer a worrying portent of a potential tomorrow; it was merely another part of the post-Soviet world's complicated inheritance.

American Perceptions of the Soviet Space Programme

This thesis has argued that space historians have tended to downplay Cold War themes in the post-Apollo period in order to prove that their discipline has broken out of its earlier narrow focus on the 1960s Moon Race. The laudable effort to broaden space history has produced many fascinating works, but it has also ended up obscuring outer space's continuing importance within Cold War political culture. This thesis has used the perceptions of the Soviet space programme as a prism through which to examine the latter half of the Cold War, a period in which cooperative hopes flourished and withered as ideologues on both sides of the Berlin Wall struggled to understand a world that seemed increasingly incomprehensible. By taking Cold War space rivalry beyond the 1957-1969 period, it challenges a traditional narrative of an initial hysterical 'panic' at Soviet space successes gradually subsiding to the point that the USSR's space programme was largely irrelevant by the end of the 1960s. It has revealed a longer and more complex history of American engagement with the Soviet space presence, one in which a protracted, fitful effort to engage the USSR in cooperative space pageantry coexisted alongside doom-mongering about impending communist blackmail from the heavens.

The Soviets may have lost the Moon Race, but secrecy concealed the full extent of their programme's organisational problems, fuelling an image of grim determination to conquer the cosmos that lasted until the late 1980s. NASA ended up turning to its former competitor for support as it sought to navigate the difficult transition to the post-Apollo era and cooperation with the Soviet space programme ended up becoming a key symbol of US-Soviet detente. However, hopes of sustained businesslike space cooperation proved short-lived as detente's early promise curdled into resentment and mistrust during the latter half of the 1970s. Anxieties about the Soviet space presence were fuelled by a lack of reassuring NASA crewed spaceflight activity, prompting speculation that America's hard-won space leadership might be slipping. With superpower relations rapidly deteriorating, visions of space cooperation were supplanted by those of the USSR constructing an orbital Iron Curtain to deny America its rightful spacefaring

[8] Warren E. Leary, 'Reagan Warms to Idea of Buying from Enemy', *New York Times*, 26 March 1992, available online at nytimes.com via <http://www.nytimes.com/1992/03/26/world/reagan-warms-to-idea-of-buying-from-enemy.html?mcubz=1> [accessed 28 February 2018].

birthright. The SDI, which has been largely overlooked by spaceflight historians, cannot be properly understood without discussing the re-emergence of these Sputnik-era space control discourses. The SDI turned space warfare into a mainstream political issue and the policy's defenders and detractors both used images of the Soviet space programme to sell astrofuturist visions of the end of the Cold War. Just two years before the fall of the Berlin Wall, Americans from across the political spectrum were still depicting the Soviet programme as a cohesive effort dedicated to realising the utopian goal of space colonisation.

Outer space remained a crucial terrain within Cold War rhetoric, whether as a final, decisive battleground or venue for diplomacy and reconciliation. In contrast to the assumptions made by previous histories, this thesis has found a sustained interest in Soviet space activities amongst members of America's space, Intelligence and National Security communities. Whilst interest from political leaders, legislators and the mainstream press was more intermittent, Soviet space activities did not go 'almost unnoticed'. The post-Apollo space slump's effects were real but they should not be overstated. The space age aesthetic may have been out of vogue and space age technocracy was increasingly maligned, but a pervasive association of outer space with the future ensured that actions in space continued to have profound strategic and symbolic consequences. The period covered by this thesis did see the emergence of European and Asian space programmes but, as the recurrent anxiety over the security of America's 'leadership' in space proves, many American pundits and policymakers continued to view the world of space exploration as one which was 'essentially bi-polar'. Asserting the Soviet space programme's continuing impact is not to argue that America was stuck in a Sputnik time-warp. Instead, recovering American reactions to Soviet space activities illuminates the continuing importance of outer space as a political terrain: a place where societies broadcast statements of intent and project their hopes and fears of the future.

Influences on American Perceptions and Avenues for Further Study

It is difficult to summarise how Americans perceived the Soviet space programme because this depended upon the perceiver and their temporal context. The Soviet space programme that Frank Borman encountered during his 1969 tour of the USSR differed profoundly from the one that the High Frontier Panel argued was poised to seize LEO in 1981, or the one that SDIO officials negotiated with to purchase TOPAZ-II reactors a decade later. Nevertheless, broader currents can be discerned by focusing on the influences that shaped Americans' images of the Soviet programme. Perceptions of the Soviet space programme were not straightforward reflections of the course of the Cold War or the actual activities that the USSR was performing in space. It is self-evident that major shifts in the superpower relationship and the success or failure of particular Soviet programmes would affect American perceptions but this thesis has found that these influences were only part of the story. Perceptions were shaped by four principal factors:

the pervasive association of outer space with the future, secrecy surrounding Soviet activities and plans, wider perceptions of the USSR and its motivations and the spaceflight activities that the US space programme was, or was not, performing.

The engrained connection between outer space and the future within American culture had a profound effect on American perceptions of Soviet space activities. The Soviet programme's early successes had been so shocking because Cold War America depicted the USSR as a nation stuck in the past, whether because of an essential 'Russian' tendency towards tyranny or because communism was, as President Kennedy had claimed, merely a new gloss applied to a system 'as old as the pharaohs'.[9] Much American writing on the Soviet space programme was an attempt by American astrofuturists to reconcile the existence of a persistent communist presence in the optimistic and limitless frontier that they believed would eventually be explored, prospected and settled by the United States. Some argued that the Soviets' interest in space validated their own; the USSR's cosmist-influenced propaganda, space station projects and planetary probes were all held as proof of space's strategic, economic and political value. However, the warnings about orbital Iron Curtains that this view often fostered ended up undermining the astrofuturist vision's primary appeal: its depiction of outer space as a limitless realm of infinite possibility. In space control discourse, outer space degenerated into another high ground or choke point: a claustrophobic place that the USSR could dominate with just a few ASAT weapons. An alternative perspective argued that a truly space age worldview was incompatible with communist dogma. Space cooperation advocates depicted space exploration as a way to civilise the Soviets and open their closed society whilst Gerard K. O'Neill depicted space colonies as future havens for Soviet free thinkers.

Historians now know that the Soviet space programme was an often-chaotic collection of military organisations, design bureaus, research institutes and bureaucracies. The baroque scheming and brutal infighting that defined its internal politics would have staggered even the most jaded veteran of NASA's own internal rivalries. However, a heavy cloak of secrecy concealed this reality from the West and any information that reached American audiences was filtered by both Soviet and American censorship regimes. Despite the best intentions of professional cosmokremlinologists, a lack of verifiable information fostered multiple competing depictions of the Soviet programme. Secrecy also fuelled a 'Shadow Programme' of rumour and speculation that exaggerated Soviet space prowess and presented an image of ruthless, single-minded determination. The Shadow Programme's greatest success was the tenacious lie that the USSR had never been in the Moon Race at all. Historical literature has often dutifully described openness as a virtue, proof of NASA's confidence and Western moral superiority. For many years, though, secrecy offered considerable propaganda advantages; American observers repeatedly

[9] 'Text of Kennedy Talk at Party Dinner', *New York Times*, 21 September 1960, p. 24.

overestimated Soviet space capabilities and the level of cohesion within the Soviet space effort. The Phobos Programme's failure was so devastating because IKI had announced its overall goal and direction years in advance and it occurred in full view of foreign scientific collaborators and media outlets. Unlike previous failures, Soviet spokesmen could not dismiss Phobos as a momentary stumble on the long road to interplanetary colonisation. Ultimately, it was Glasnost rather than *Apollo 11* that finally dispelled the image of the Soviet programme as the mighty Integral.

Perceptions of the Soviet Union were often intensely revealing about America's own self-image and American depictions of the Soviet space programme were often projections of anxieties about the scope and direction of its own space effort. One of this thesis' key findings is that the three greatest post-Vostok periods of anxiety about Soviet space activities all corresponded to enforced hiatuses in NASA's crewed space programme. The grief-stricken disbelief that followed the *Apollo 1* fire proved fertile ground for rumours of an impending Soviet circumlunar mission, concern about a cosmic Iron Curtain mounted during the American space community's impatient wait for the shuttle and alarming predictions of 'second Sputniks' proliferated in the aftermath of the *Challenger* disaster. The literature on the space slump depicts the post-Apollo astronaut as a vaguely pathetic figure who was largely ignored by a society that had outgrown his signature brand of technological heroism. This thesis has found that whilst astronauts may no longer have inspired outpourings of adulation, their absence from orbit was keenly felt. It became much more difficult for NASA to reassure media and political critics that America space leadership was secure when cosmonauts were the sole occupants of LEO.

Moscow propagandists were not the only ones to use the Soviet space programme as a symbol for the USSR. Americans often compensated for the lack of verifiable information about Soviet goals in space by filling these gaps with their own preconceptions and prejudices about the Soviet Union. Die-hard Cold Warriors like Jerry Pournelle or Lt. Gen. Daniel O. Graham were more likely to view the Soviet space programme as an existential threat because they believed the USSR to be a Leninist theocracy hell-bent on world domination. Equally predictable was the way liberal, anti-militarist scientists like Carl Sagan were more likely to embrace the Soviet programme as a potential cooperative partner. Cooperative contact with the Soviet programme's personnel often fostered a more positive perception. Sagan and the astronauts who trumpeted space brotherhood experienced feelings of transnational kinship with Russian scientists and spacefarers that were reinforced through sustained collaboration. By contrast, Pournelle and Graham's suspicions were fuelled by the fact that they encountered the Soviet programme principally through propagandistic Soviet media reports or intelligence community appraisals. There were, of course, exceptions to this tendency; Arnold Frutkin's experience of frustrating negotiations during the 1960s informed his profound mistrust of the Soviet programme. However Apollo-Soyuz did

lead him to accord his Soviet rivals a grudging respect. For all that perceptions of the Soviet space programme reflected wider attitudes towards the USSR; they did not offer a perfect mirror image. Often, the futuristic glamour of space travel acted as an ameliorating influence, as when conservative celebrities found themselves charmed by cosmonauts or when Dr Charles Sheldon privately thrilled to the prospect of a Soviet Moon-shot spurring humanity onwards and outwards into the cosmos.

Often when Americans were talking about the Soviet space programme, they were actually discussing what their own space programme should be doing. The Shadow Programme's image of single-minded determination may have arisen in Soviet propaganda, but it was sustained by recurrent post-Apollo angst about NASA's perceived lack of direction and purpose. The Soviet programme as the beautiful enemy, compensating for its technological backwardness with a manic drive to succeed was a persuasive, and useful, one in the second half of the Cold War. NASA administrators like Tom Paine, the anti-communist astrofuturists of the Citizen's Advisory Council on National Space Policy and the planetary science evangelists of the Mars Together movement all used this image at various times. They argued that the Soviet danger could only be defeated, or co-opted, if America learnt from the USSR's example and wholeheartedly embraced the space age's opportunities. Self-interest undoubtedly informed these depictions of Soviet purposefulness, but dismissing them as a purely cynical ploy overlooks what they can tell us about the debate over America's space exploration goals.

In contrast to the preceding historiography which has focused on how space programmes were perceived by the societies that they emerged from, this thesis has explored how one society perceived the space exploration activities and propaganda of its principal geopolitical rival. It has used these perceptions as a lens through which to examine the relationship between two societies and how their visions of the future concur and differ. With this template in mind, several potential avenues for further study present themselves. The first would extend this study chronologically and use the world of space exploration as a unique case study through which to analyse American reaction to communism's collapse and the lawless hyper-capitalism of the Yeltsin era. Another logical project suggested by this thesis is its mirror image: a study of how the Soviets perceived the American space programme. Much work has already been done on how Soviet designers, managers and leaders sought to compete with NASA projects such as the Apollo Programme or Space Shuttle, but a study that reconstructed cultural, press and propaganda responses to American space activities would be a valuable addition to the literature on Soviet space culture.[10] Finally, Global space history has often been a euphemism for the superpowers'

[10] Asif Siddiqi's *Sputnik and the Soviet Space Challenge* (2003), and *The Soviet Space Race with Apollo* (2003), discuss competitive rationales within the Soviet space industry extensively, as does Hendrickx and Vis' *Energia Buran* (2009); This approach would also circumvent the increasing difficulty of accessing

relations with their European clients.[11] This elides the fact that space programmes were often justified as demonstrations of technological might aimed at impressing developing nations. A project focused on how superpower space propaganda was received by its intended targets in the global south would fill an important historiographical gap.

Sixty years after the launch of the first satellite, Sputnik is the name of a controversial Kremlin-sponsored news outlet and crewed missions to Mars are more likely to be proposed by bored Silicon Valley billionaires than by international associations of peace activists.[12] But the Soviet space programme did not disappear entirely along with the communist regime it had glorified. In April 2017, over 60 'Yuri's Night' events ranging from *Star Trek* trivia nights to science fairs and dance festivals were held across United States as part of a global network of events celebrating space exploration. The Yuri's Night website included a stylized image of the first cosmonaut alongside a quotation from Gagarin imploring Earth's citizens to defend their planet's beauty.[13] As in Soviet hagiographies, the Gagarin of Yuri's Night was a carefully airbrushed creation; its Cosmonaut Number One may no longer have been a paragon of communism but he continued to be a symbol of technological achievement and human unity. A month after Yuri's Night, a blog post on *The National Interest*'s website warned that Russia and China were developing anti-satellite weaponry to challenge America's 'superiority in space'.[14] Both of these stories carry echoes of the way Russian space activity was perceived in the post-Apollo era, a potential gateway to unity, or a military threat that must be contained. America did not exist in a continual state of post-Sputnik 'panic' from 1957 until the dissolution of the USSR but the shockwaves of Sputnik and Gagarin continued to reverberate long after the first satellite burned up on re-entry and the first cosmonaut was solemnly interred in the Kremlin Wall Necropolis.

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sensitive material in Russian governmental archives, for the archival obstacles for students of Soviet space history in the post-1991 period see Jenks, *The Cosmonaut Who Couldn't Stop Smiling* (2011), pp. 19-23.

[11] Commendable exceptions to this tendency are Vucetic's essay on Yugoslav perceptions of spacefarers, 'Soviet Cosmonauts and American Astronauts in Yugoslavia: Who did the Yugoslavs love more' in *Soviet Space Culture*, ed. by Richers, Rüthers and Scheide (2011), pp. 188-205; Ashok Maharaj's chapters on US-Indian space relations in *NASA in the World* ed. by Krige, Callahan and Maharaj,(2013); and Muir Harmony's discussion of Apollo Astronauts on tour, *Project Apollo, Cold War Diplomacy and the Framing of Global Interdependence* (2014), pp. 190-209.

[12] Jack Moore, 'Sputnik News Under FBI Investigation as Russian Propaganda Arm', newsweek.com, 11 September 2017, <http://www.newsweek.com/russian-network-sputnik-under-fbi-investigation-possible-kremlin-propaganda-662844> [accessed 28 February 2018]; Mike Wall, 'SpaceX's Mars Colony Plan: How Elon Musk Plans to Build a Million-Person Martian City', space.com 14 June 2017, available online via <https://www.space.com/37200-read-elon-musk-spacex-mars-colony-plan.html> [accessed 28 February 2018].

[13] Yuri's Night 2017 Events List available online via <https://yurisnight.net/events/#north_america> [accessed 28 February 2018].

[14] Dave Majumdar, 'How Russia and China Would Wage War Against America: Kill the Satellites', thenationalinterest.org, 14 May 2017, available online via <http://nationalinterest.org/blog/the-buzz/how-russia-china-would-wage-war-against-america-kill-the-20658> [accessed 28 February 2018].

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