Sputnik Reconsidered: Image and Reality in the Early Space Age

Kim McQuaid

Canadian Review of American Studies, Volume 37, Number 3, 2007, pp. 371-401 (Article)

Published by University of Toronto Press
DOI: 10.1353/crv.2008.0001

Sputnik Reconsidered: Image and Reality in the Early Space Age

Kim McQuaid

Abstract: Chroniclers regularly affirm that Russia's Sputniks produced popular crisis. More nuanced explanations argue that a preliminary "media riot" made cosmic space races an essential counterpart of earthly missile races in the public mind. Widespread public interest and political support for the US civilian space program during its formative years is presumed, as is the concept that space explorations were a key global determinant of US Cold War prestige.

Such ideas are overdrawn. Contemporary analysts often studied to confirm what they already knew. Unattractive official findings were censored or ignored. Surveying all formerly secret and other opinion data about civilian space exploration from Sputnik 1 to the end of the Mercury program shows how space exploration advocates helped create elite panic regarding the Sputniks via selective reporting, while wider publics generally stayed indifferent to lunar and planetary missions. Elite panic, not mass panic, impelled the priorities and programs of the early space age.

Keywords: satellites, sputnik, space exploration, history, space, public opinion, astronautics, space, social aspects, journalism, social aspects, Mercury program, NASA, history, Apollo program

Résumé: Les chroniqueurs affirment régulièrement que les Sputniks russes ont provoqué une crise dans le peuple. Des explications plus nuancées allèguent qu'un « soulèvement médiatique » a fait de la course à l'espace cosmique une contrepartie essentielle de la course aux missiles terrestres dans l'opinion publique. On présume de l'intérêt public et du soutien politique à grande échelle du programme spatial civil américain pendant ses premières années, comme on présume que le concept de l'exploration spatiale était un déterminant clé global du prestige de la guerre froide américaine.

De telles idées sont révolues. Les analystes contemporains ont souvent procédé à des études afin de confirmer ce qu'ils savaient déjà. Les résultats officiels décevants ont été censurés ou ignorés. L'étude de toutes les don-

nées et opinions autrefois tenues secrètes sur l'exploration spatiale civile, de Sputnik 1 à la fin du programme Mercury de la NASA, indique comment les tenants de l'exploration spatiale ont aidé à créer une panique de l'élite en ce qui a trait aux Sputniks par le truchement de rapports sélectifs, tandis que des auditoires plus vastes demeuraient en général indifférents aux missions lunaires et planétaires. La panique de l'élite, et non une panique générale, a eu des répercussions sur les priorités et les programmes des débuts de l'ère spatiale.

Mots-clés : exploration spatiale par satellites Sputnik, historique de l'espace, opinion publique sur l'espace aéronautique, aspects sociaux du journalisme, aspects sociaux du programme Mercury de la NASA, historique du programme Apollo

The Ritual Public

Sputnik is a space age icon. Few twentieth-century events are presented in more transformative terms. Claims about science and technology-based social transformations, however, have to be handled carefully. Space advocates presented prestige-focused cosmic space races as essential complements to power-focused earthly nuclear weapons and missile races. Their ideology was well integrated, but how widely or deeply it affected popular attitudes was rarely analyzed in the formative years of the space age (Van Dyke 133).

Advocacy and anecdote, instead, often substituted for analysis. Eisenhower's United States Information Agency, State Department, and National Security Council all quickly argued that prestige was as closely mated to power as spacecraft were to rockets. In the first and second days after the satellite achieved orbit, the *New York Times* editorialized that Sputnik 1 was a major global propaganda and prestige triumph for Russian Communism. Other important regional papers, like the *Los Angeles Times* and the *St. Louis Post Dispatch,* did the same (Lule 544–56). No overnight polling technology then existed, but in a journalist's eye view of what the public thought, fear took root among the general population and national hysteria or trauma followed (Divine 44–7; Dickson 17–27).

More nuanced analyses argued that journalists created opinion as well as reported it. *New York Times* writer Richard Witkin presented "media riot" explanations, as did historian Walter A. McDougall in 1985. The US only became "a nation in shock," Witkin wrote in 1958, after it had been "deluged with news reports" for months (Witkin 3–4). "The press," echoed McDougall, "pushed the panic button," creating "a wave of public hysteria" (142, 144, 148).

McDougall and others realized journalists needed sources, and that some "exaggerated the danger of the Soviet satellite" to "marshall support for their own agendas." Their primary actors, however, remained uncritical journalists stampeding a concerned country (McDougall 142; Bulkeley 212; Koppes 84; Byrnes 24; Burrows 189).

The power of military rockets and spaceflight's prestige, however, were not necessarily two halves of a greater whole. Intercontinental ballistic missiles had ended America's geographic isolation and put Americans on the front lines of potential thermonuclear terror. Space research and exploration, in comparison, lacked the direct relevance of weaponry. Realizing this, space advocates overstated blows to American prestige. The day that Sputnik 1 orbited, noted science fiction writer Arthur C. Clarke argued all of five days later, "the United States became a second-rate power."[1]

Clarke's hyperbole sought to wed prestige races in space to earthly missile races. He wasn't unique. A "leading Washington Ambassador" soon told *Newsweek* that Sputnik had "shifted the balance of political and diplomatic power" from Washington to Moscow. *Newsweek* had noted popular indifference to the satellite but widespread support for an earthly "missile race" in the weeks following Sputnik. It now reported that while the Ambassador "might be" exaggerating, he also spoke an "element of truth." Other prominent commentators and actors were far less conditional about Sputnik's effects on American prestige, then or decades later.[2] Dr. James T. Killian, Jr., for example, was MIT's president when Russia's satellite orbited. He headed prominent weapons advisory committees and became the first Cabinet-level Presidential Science Advisor in November of 1957. Killian's memoirs, published on the twentieth anniversary of Sputniks 1 and 2, cried havoc. "Sputnik 1," he wrote, "created a crisis of confidence that swept the country like a windblown forest fire" (Killian 3, 7–10).

Killian's opinion analysis, however, was very limited. It included (in order):

- Dr. John Rinehart, an astrophysicist at the Harvard Smithsonian Observatory tracking Sputnik;

- Dr. Edward Teller, father of the H-bomb, and who announced Sputnik was a greater US defeat than Pearl Harbour;

- The editors of the *New York Times;*
- Democratic Senator Stuart Symington of Missouri: an aerospace advocate, former Secretary of the Air Force, and a candidate for the Democratic nomination for President in 1960, who argued Sputnik proved the existence of huge missile, bomber, and other gaps;
- Congresswoman Claire Boothe Luce, wife of a conservative publisher whose *Time* and *Life* magazines championed space races as essential to regaining US international prestige;
- G. Mennen Williams, Democratic governor of Michigan and vice-presidential hopeful;
- Senate Majority Leader Lyndon Baines Johnson, another Democratic presidential hopeful in 1960, whose arguments about Sputnik approximated Symington's;
- An unidentified "Japanese newspaper";
- Prime Minister Harold Macmillan of the United Kingdom; and
- Aneurin Bevan, a prominent UK Labour Party spokesman.

The only other reactions Killian reported were those of President Eisenhower, his Chief of Staff, and his Secretary of Defence, all of whom initially underplayed both the power, and especially the prestige, effects of Sputnik.

Killian's opinion sample, then, consisted of a few peak political leaders, journalists, and physical scientists. His anecdotal "windblown forest fire," however, echoed down the decades. It, and other observations like it, became William Burrows's "shrill cacophony spreading across the land like a prairie fire"; John Noble Wilford's "waves of consternation washing over America"; Stephen Ambrose's "near-hysterical reaction of the American press, politicians, and public"; Townsend Hoopes's "almost visible tremor [that] ran through the American body politic" and "sent a vivid political message to the third world"; and Paul Dickson's "Shock of the Century" (Divine xiv-xvii; Burrows 183–5, 199–202; Wilford 23–4, 26; Ambrose 423, 427, 430, 443; Hoopes 425; Bulkeley 5; Dickson 156).

The Real World

Contemporary sociopolitical realities, however, were different. The symbiosis between space races and arms races was more an elite than a mass phenomenon. The most extensive opinion survey that began immediately after Sputnik 1 illustrated the point. Respected political analyst Samuel Lubell, too, felt "utter dismay" about Sputniks 1 and 2, but, unlike MIT's Killian, Lubell investigated how people dealt with "something completely new" (Lubell, "Sputnik" 15; Lubell *Current Biography* 387–8).

Lubell promptly surprised himself. He found "no evidence at all of any panic or hysteria in the public's reaction." "Only rarely" did people turn against Eisenhower because of Sputnik. In the cities, farm counties, and suburbs Lubell surveyed in the weeks ending just after Sputnik 2 orbited, he was "astounded repeatedly" by "the curious processes by which public opinion takes shape in this country" ("Sputnik" 16). The first Gallup poll conducted a week after Sputnik 1 also reported little panic. Half were surprised Russia had launched an earth satellite first; half were not. Half said it was "a serious blow to US prestige"; half didn't. Sixty per cent said the next great technological advancement would be American, not Russian. A week later, half of all educational levels believed Russia was moving ahead of the US in long-distance rocketry, but, significantly, no wave of support for space exploration accompanied that view. The same sorts of results characterized a *Newsweek* poll published 28 October. Rockets, not satellites, were on peoples' minds. Only half of respondents in a third Gallup poll reported 30 October would even estimate how many years it might take to get men to the moon (Gallup 1519–22; McDougall, "*Heavens*" 144–5). When Columbia University's Graduate School of Journalism hired Lubell on 2 November to help train a new breed of modern science reporters, his observations weren't discounted by contemporaries.[3]

Killian's "wind-blown forest fire," therefore, was an elite, not popular, panic. Educational scarcity, economic conditions, and secrecy barriers assisted this result. Only 10 per cent of American males and 6 per cent of females in 1957 were college graduates, and fewer than half of adults over twenty-five were high school graduates. The US slid into a sharp recession in late 1957, and jobless rates reached 7.5 per cent: the highest in a decade (Vatter 73, 115–20). Pocketbook issues mattered most to Americans. Economically anxious people and Democratic partisans concluded Sputnik demonstrated failures

by a Republican President. The economically satisfied thought otherwise (Lubell, "Sputnik" 17).

Secrecy, meanwhile, assisted Eisenhower; via his military background, confidence in secret military projects, and widespread views that the Sputniks had no military significance and were only "propaganda defeats." Eisenhower was a general who had led US and allied forces to victory in America's greatest foreign war, and weapons were "Ike's" strong suit. In a Cold War America layered in secrecy, it was also easy to believe that Manhattan Project-style ventures were underway and that US rocketry difficulties would be temporary (as they were, in fact). The most important military uses of space, meanwhile, involved non-weaponry technologies like spy satellites, the existence of which was kept as secret from the vast majority of Americans as they were from Communist enemies until the 1970s. A *Newsweek* poll of "informed opinion," published on 28 October, wanted a "crash program to put the United States ahead in the missile race"; there was no popular clamour for space races. Given normally secret issues, Lubell's interviewees looked to Eisenhower for leadership, and not to journalists, scientists, or congressmen.[4]

Despite this, Sputnik, and Sputnik 2 in particular, caused a political furore within portions of Congress and the executive branch after secret panels of national security advisers wildly overestimated Russia's current and potential rocket strength at the time. Leaks of these results pushed Eisenhower into a greatly accelerated missile race to avoid supposed grave dangers to America's survival (Gallup 1519–22; Divine 77–8, 84–5, 125–7, 185).

While bipartisan elite panic raged in Washington, the grassroots stayed calm. Norma Krause Herzfeld analysed editorials in forty-four major Catholic weeklies published in the month after Sputnik 1. Catholics were a bastion of American anti-communism: if panic was widespread, diocesan editors working for bishops should have embodied it. But "on the whole," Herzfeld found that the Catholic editors were "inclined to keep cool," and there was "relatively little" criticism of Eisenhower's leadership. However, most "not too much concerned" Catholic editors added the general public was probably "confused and fearful" (541).

Such journalistic assumptions were wrong, Donald N. Michael told members of the American Rocket Society in February of 1958, the

same month Herzfeld's survey appeared. Michael had degrees in physics and social psychology from Harvard; he'd been an electronics engineer in the Army Signal Corps; done weapons evaluation work for the Pentagon; and advised the National Science Foundation on social surveys. Michael's unusual mix of science and social science helped him understand that "editorial response, news media coverage and the responses of national leaders" were not necessarily "the intensity, direction, and duration of interest in the public" (Michael, "Space Exploration" 20–2, 88–9).

Michael's arguments used concepts familiar since the 1920s. Politics was composed of insiders and outsiders. Public opinion was pluralistic and differentiated by age, race, class, sex, education, occupation, and other variables. Instead of one public, there were many. There could only be infinitesimal "phantom publics" for unfamiliar issues (Lippmann, *Public Opinion;* Lippmann, *Phantom Public*). There was "no good reason to believe," Michael wrote, that there would be strong public pressure for space exploration "*unless very special efforts are made to elicit it.*" Space simply wasn't yet close enough to most peoples' "day-to-day reality" to affect their interests, values, and beliefs (Michael, "Space Exploration" 88).

The highly regarded Institute for Social Research at the University of Michigan published data two months later confirming many of Michael's points. This Rockefeller Foundation-funded, fifty-seven-page study was also by far the most extensive opinion survey of the early space age (*Satellites)*. A relatively affluent and schooled eleven to twelve per cent who could name any specify scientific uses for spacecraft, like "finding out about weather and atmospheric conditions," stayed constant in polls done six months before and after Sputnik. Those who vaguely realized scientific purposes for satellites existed rose, from eight per cent to sixteen per cent. However, the major shifts came in two other areas. Only one in a hundred people had thought about space in military terms before Sputnik; six months afterwards, one in five in all education levels did. An identical twenty per cent now considered space a frontier for interplanetary flight, lunar bases, and resources (*Satellites* 1–7).

Enlarged space awareness, however, did not mean strong support for early NASA projects. NASA, created nine months after Sputnik, made a prestige-based manned lunar program its major priority in late 1959 and early 1960. However, only three per cent of Institute for Social Research respondents then selected putting a man on the

moon as their top scientific priority if funding were available for only one alternative. Even the eight per cent who believed Russian science was "greatly superior" to American vastly preferred medical research or other earthly options to an astronautics program that soon would account for seventy per cent of NASA's 1960s budgets. Only five per cent of even the most enthusiastic science readers polled saw putting men on the moon as their top science priority. The Sputnik era was also the era of the double helix and the revolutions in biochemistry and genetics. Scientists, particularly, never forgot that (*Satellites* 44, 52).

The effect of one in every thirty-three adults seeing prestige-focused space exploration as a number one scientific priority, therefore, was hardly Killian's "wind-blown forest fire." People—in 1959 or afterwards—differentiated military rockets from celebrity projects. As Donald Michael later wrote, "Unanimous shock or national loin girdling, as the press and many issue makers have insisted," never took place at any time in the three years from Sputnik 1 to the 1960 elections ("The Beginning" 575).

Levels of post-Sputnik concern regarding extraterrestrial spacecraft further elaborated upon Michael's point. Official Air Force data showed fear levels—as measured by UFO reports—spiked after Sputnik 1, but as quickly decreased as understanding of spaceflight increased. By January 1958, pre-Sputnik UFO sightings levels resumed, despite headlines about national humiliation after America's first satellite launch failed on 6 December. The US did not orbit a satellite until 31 January 1958, four months after Sputnik 1, but UFO panics weren't spreading in that interim; indeed, the situation was quite the opposite (Jacobs 159; Peebles 119–27).

NASA Ignores Social Research

Anxieties, however, flowered in official Washington, as did belief in the prestige importance of space exploration, even as NASA's first—and for another fifteen years, only—opinion survey demonstrated how little even college-educated white male professionals knew about America's new civilian space agency and its programs (Cherington et al.).

NASA's now unknown exercise in social research was a product of entrepreneurial Harvard Business School academics who desired

long and profitable consulting relationships with NASA. The leader of this group, Professor Paul W. Cherington, possessed Washington insider connections. According to two surviving colleagues, Cherington made a key alliance with a lawyer involved in drafting the NASA Act, Gerry Siegel. Siegel's boss, Senate Majority Leader Lyndon Johnson, was the major Congressional sponsor of America's new civilian space agency.[5] Cherington's alliance helped get a social research function added into the NASA Act of 1958, and thus gave Siegel and Cherington advisory hunting licenses (Logsdon et al. 335).

By 1960, Cherington and Siegel had acted. NASA was trying to leapfrog Russia's Sputnik and Luna spacecraft with a Mercury manned orbital program. However, seventeen flight tests were plagued with failures, and morale at NASA plummeted. A successful suborbital test didn't occur until December (Swenson, Grimwood, and Alexander 193). That same month, NASA's lame duck Republican top administrator, Keith Glennan, belatedly met with two senior Washington editors to get basic advice about how to avoid journalistic frenzies should launch explosions produce dead astronauts.[6] Lyndon Johnson, meanwhile, had failed to gain the 1960 Democratic presidential nomination, become John F. Kennedy's vice-presidential running mate, and had received policy prominence in space matters from an uninterested Kennedy after his victory over Richard Nixon in November. In this context, NASA's Mercury problems, its fears about media and public disfavour, and Cherington and Siegel's previous work all became interwoven. As their associate Dan Fenn recalled, Cherington and Siegel got headquarters managers, including NASA Chief Counsel John A. Johnson, interested in "finding a constituency as a firewall when, as NASA leaders thought inevitable, some astronauts would get blown up."[7]

In June, Cherington's consultancy, United Research Inc. (URI), signed NASA contract NASw–168. Responsibility for this opinion and mobilization study was given to two men who later had distinguished government careers: Dan H. Fenn, Jr. and Ellis R. Mottur. Both saw elite meritocracies as necessary social governors and stabilizers. To them, most adults were opinion-takers, and dependent for knowledge about complex issues on college-educated professionals. The professional organizations to which such professionals belonged, accordingly, were a fulcrum of politics. Individuals couldn't provide NASA with a political "firewall," but organized groups could.URI's Fenn and Mottur identified 160 national science,

engineering, and technology organizations that might be interested in NASA's efforts. Their combined membership was 9,900,000 in a population of 180 million (Cherington et al. 4–5, 163).

NASA, however, utilized such groups poorly. Education and advocacy groups, including the National Geographic Society (with two and a quarter million members) and the American Association for the Advancement of Science (with 57,000 members, half of them PhDs; networked with 312 scientific affiliates; publisher of the US's only weekly science magazine), were key bases from which to build. Groups like the American Society of Automotive Engineers were as well. One-sixth of the ASAE's technical meetings were *exclusively* aerospace-oriented. ASAE's twenty-four thousand members and 134 permanent staff had longstanding technical relationships with the Aerospace Industries Association. They had also done many technical spacecraft projects for the Defence Department. NASA, however, had not asked groups like ASAE for assistance (Cherington et al. 148, 159–63).

NASA, in fact, had no national professional institutional base to mobilize other than aerospace executives and engineers—many of whom were then active in an American Rocket Society of seven thousand to ten thousand members. This was dangerous, URI warned. By 1960, NASA's budget was one per cent of federal spending, and doubling every year. By 1963, NASA would spend four per cent of the budget, one-third of Defence Department outlays, and one-third of total federal R&D spending. Such success, URI predicted, would quickly breed opposition.

> As the glamour wears off, as individuals and interested groups find themselves touched by its program, centres of disagreement and dissent as well as potential support are bound to appear. It will be important for NASA … to have a solid base of public understanding and support. It will need to keep in touch with national attitudes on a broad front in its policymaking. It will need a firm foundation of good-will. (Cherington et al. 10)

"General news media," URI added, were not going to sell space for NASA. Television was no political short cut. Levels of press coverage were not levels of support for space missions, and public opinion was not "a media-eye's view of what the public thought." Media-based mass mobilization ignoring organized groups was a badly aimed "shotgun" strategy, which "often missed the target". Space coverage had expanded hugely in three post-Sputnik years,

but most people only saw "a mass of data they automatically screen out of their consciousness." NASA hadn't risen above "background noise" in public awareness. The agency, meanwhile, never once analysed patterns of TV or print coverage of space during its formative decades, and normally presumed that news people held sway over television viewers (Cherington, et al. 20, 22; Dotto *passim;* Wainwright 251–79; Wolfe 156ff).

URI argued that NASA could not assume that it already had broad popular support, or that college-educated or informed people were the only "public" that mattered. To clarify why, URI interviewed members of one scientific and one non-scientific professional group. The non-scientists were lawyers identified by the American Bar Association. The scientists were "closed-system ecologists" of the American Institute of Biological Sciences. Attorneys were chosen because they were important at all levels of American political life. Closed-system ecologists, meanwhile, were professionals that would be essential in designing spacecraft and understanding lunar or planetary environments.[8]

URI's interviewing techniques, like Samuel Lubell's, polled people at length and informally. Respondents weren't informed about NASA. URI also avoided "yes/no/don't know" queries that could "destroy rapport—and bias the responses towards the best/most-informed on an issue." URI sought to know what educated professionals *thought* they knew. The results were humbling. Few respondents had ever given space sustained attention. National leaders of the American Bar Association often "had never heard of NASA and did not know whether it was a government or a private agency." Knowledge was so low that URI's Dan Fenn illustrated the "degree of naiveté":

> A man from a major oil producing area [in Oklahoma] told the interviewer that his colleagues had been having problems in the field of outer space law recently which were having direct impact on their daily law practice. "You see," he said, "in my state we have a lot of oil wells that go way up in the air, and there's always a lot of litigation over them" (Cherington et al. 108–12, 114, 116).

The leader who claimed paternity of ABA's Committee on Outer Space Law knew nothing. A relatively well-informed president of the bar association in one of the nation's largest cities had heard something about satellites and the Mercury project. A "top leader"

within the ABA thought that NASA was a private "do gooder" outfit. The best informed were attorneys who had ongoing dealings with NASA, and those who lived "near a major NASA installation and had taken some casual interest in its operations." Politics were local and direct experience was the best teacher (Cherington et al. 107–8, 110–1, 113–4, 193–4).

Ecologists, too, often had minimal knowledge about space, even in their own area of life sciences. Scientists knew more than lawyers, but a lot of what they knew (particularly about manned spaceflight) they didn't like. "Specialists in various refined areas," URI concluded,

> are much more concerned with the immediate problem on which they are working than the possible implications of space exploration on their professional field and interests … the man occupied with insects wonders why NASA doesn't use bugs instead of monkeys. The man studying nitrogen is irritated because NASA isn't apparently at least as concerned with the nitrogen cycle as with oxygen; the biology teacher complains that NASA doesn't give him teaching materials; the industrial chemist in the food business wants more attention to weather control. (Cherington et al. 181–4, 190–4)

Accordingly, "only a handful" thought NASA exciting. Few scientists either hated or were enthusiastic about its growing exploration aspirations, and most maintained a "generally disinterested and dubious attitude toward the scientific validity of the space effort" (Cherington et al. vi–viii).

NASA, meanwhile, was uninterested in cooperation. The American Medical Association had created a Committee on Aerospace Medicine that NASA hadn't yet approached. NASA also wasn't working with a national association for radio, electronic, and computer engineers that was regularly consulted by the military and the Federal Trade Commission. URI's suggestions about building bases of professional political support went to President Kennedy's new NASA head, James Webb, in February of 1961, where they achieved instantaneous policy irrelevance. URI never did any space-related or social survey work for NASA again (Cherington, et al. 34–8, 157–8).[9]

The Triumph of Prestige Politics

Opinion data presented here argues against crisis or transformative explanations of Sputnik. A vague awareness of space as a new arena for Cold War competition increased after Sputnik 1, but the available data does not show that most Americans understood spaceflight as a prestige substitute for US-USSR power confrontation. Nor does it show that military missiles and space explorations were two sides of the same popular coin. Precisely such complementary power-prestige conceptions as these, however, dominated portions of official Washington.

Such well-placed ideas existed despite informed opposition. In December of 1958, NASA's Keith Glennan first addressed how to build public support for his new agency with a delegation of nine academics from Harvard, Yale, Columbia, Illinois, the Social Science Research Council, the RAND Corporation and the Council on Foreign Relations. They argued that NASA, a civilian agency, had no mandate to expand space frontiers because of either "(a) military factors or (b) [prestige] competition with Russia." The academics suggested NASA instead emphasize worldly applications like weather and communications satellites, international cooperation, and "attitudinal research."[10]

Glennan, however, preferred to listen to other policy makers who favoured prestige races. John Foster Dulles was Eisenhower's Secretary of State until his death in May 1959. Dulles's brother, Allen W. Dulles, was the top spymaster for Eisenhower's Central Intelligence Agency. Both strenuously argued that the Sputniks had had immediate and catastrophic effects on US global prestige (Hoopes 425ff). Only five days after Sputnik 1 orbited, for example, both State and the CIA informed presidential foreign policy planning staff on the National Security Council (NSC) that Sputnik was exerting "a very wide and deep impact" in Western Europe, Africa, and Asia. Six days later, the Dulles's reiterated that America's world standing had "suffered a severe blow." The global balance of power was moving against the US via unattributed leaks to the *New York Times.* Quick surveys of handfuls of foreign leaders were advertised as tectonic shifts in world opinion. Only the already-enslaved in the captive nations of Eastern Europe, ironically, appeared unfazed as they made jokes about how Sputnik was a political "satellite" successfully fleeing to liberty.[11]

A memorable example of how Dulles's State Department and a closely associated United States Information Agency (USIA) selectively analyzed global opinion came in an unknown joint confidential poll of 11 December 1957. In an era when telephones were rare and a call to Paris—if you had earlier reserved a line—cost fifty of today's dollars, conducting rigorous door-to-door foreign opinion surveys took time. A month after Sputnik 2, however, ex-USIA official and head of the Institute for International Social Research Lloyd Free completed a "Post-Sputnik Opinion in Western Europe" poll, which stayed secret until 1999. Pollster Free's conclusions were Samuel Lubell's:

> The primary generalization that can be made about the current situation is this: the "sputniks" have not led to anything even remotely resembling "panic" in Western Europe; in fact, the initial impact has been surprisingly (perhaps even excessively) limited and moderate—a tribute either to the obtuseness or to the good sense of Western Europeans, depending on one's point of view.[12]

Free's secret judgements quickly got censored. The very next day, USIA alone issued another confidential—but, this time, selectively leaked—version of the report. Free's previously quoted paragraph disappeared. So did others saying that Russian challenges to US claims to universal superiority had actually made the US easier to like and improved "psychological ties that bind" with key allies.[13] Domestic propagandizing like this was definitely not in USIA's charter, but censorship of Free's findings insured that USIA, state, and CIA pictures of massive international prestige effects weren't questioned. USIA's first research report on Sputnik, published a week after the satellite orbited, had already claimed Sputnik had spread consternation and radical ideas worldwide. Communist advances among "backward, ignorant, and apolitical audiences" were massive. Even the "sophisticated opinion" of an "informed intelligentsia" couldn't limit damage to US prestige.[14]

State, USIA, and NSC all argued for a space race to win back the hearts and minds of the peoples of the globe. Politically adept scientists like Dr. Lloyd V. Berkner played key elite persuasion roles. Berkner was co-creator of the International Geophysical year, scientific seedbed for Sputnik. He helped marry federal money to physical science R&D from the radio age to the space age. In January of 1958, Berkner addressed America's foreign policy establishment at the Council on Foreign Relations in New York. At CFR were gath-

ered those few hundred Wise Men who then always influenced and often determined what US governments did about major diplomatic issues. Berkner told the Council that space exploration was a critical component of foreign policy. Cold War prestige was no longer based primarily on military strength: thermonuclear war was too horrible to wage. American or Russian economic power was, similarly, limited by the lack of educational and other infrastructure in developing nations. Thermonuclear overkill and structural barriers to economic development combined to create "a kind of power vacuum" and Russia had now filled that vacuum with claims to technical leadership symbolized by Sputnik. These claims legitimized socialist short cuts to economic development. Satellites and spacecraft, then, should become very powerful instruments of national policy. By "demonstrating intellectual pre-eminence" in space exploration, America could wage and win the Cold War (Berkner, "Earth Satellites" 221, 224–6, 231).

Berkner's agile polemic presented space as a substitute for war and underwrote earlier prestige-centred arguments. It also strengthened the force of space as the "ultimate position" of world power ideas that Senate Majority Leader Lyndon Johnson—with an assist from Dr. Edward Teller—expressed to Democratic congressional leaders that same month. Such combined power-prestige rationales exercised major influence in Washington throughout 1959 and 1960. The RAND Corporation, meanwhile, confidentially told NASA there was a "lack of developed, informed public opinion" about space exploration. Americans still cared far more about earthly missiles than space-based prestige (Caro 1028–9; Reedy 59; RAND *passim*).

Despite RAND's findings, elite concern about Sputnik's prestige effects continued. In September and October 1959, Russia's spacemen celebrated the second anniversary of Sputnik 1 with the Luna 2 and 3 probes. A flurry of activity then created a secret NASA presidential advisory committee chaired by the DuPont Corporation's Clifford Greenewalt. Together with Vice-President Richard M. Nixon, this panel decided upon a prestige-based strategy for NASA in December of 1959.[15]

This policy still required calculated overstatement. In January of 1960, top USIA and State Department officials explained to Congress how Russia's and America's space efforts were influencing world opinion. Before addressing the House Committee on Science and Astronautics, USIA head George Allen had NASA Chief Glen-

nan redraft his opening remarks. Space, thus, became "the primary symbol of capability in all aspects of science and technology" and "the relative merit of a nation's economic and social system" and "the primary symbol of world leadership."[16]

Allen repeated such hyperbole, and then added extravagance of his own. Sputnik 1 had created a worldwide "intensity of reaction … which has rarely been paralleled by any other single discovery or invention" among people "in even the most remote areas." Global opinion had tipped significantly toward Communism. Given USIA's and State's censorship of Lloyd Free's first foreign poll results, what new data was Allen basing his claims upon (House of Representatives 36–7)?

Not much, it seemed. The chair for the House Committee on Science and Aeronautics began the hearing by asking Allen a friendly question: were "educated people" or "illiterate people" more impressed by Russian space achievements? USIA's director evaded answering. At first, he had no figures,only country-by-country data, or said that there were no very consistent patterns. Then Allen switched to polls regarding comparative military power conducted in Western Europe. Here, the "space equalled rockets and rockets equalled prestige" logic seemed evident. Shifting again, Allen blamed US journalists for America's "tremendous loss" of global prestige. Communist propagandists, ironically, were reprinting the panicked reporting that Allen was helping to create (House of Representatives 43–5).

Congressmen again asked for specifics; again, Allen dodged into obscurities. Finally, a rare legislator with a science background cut through the pretence.

> Mr. [Joseph] Karth [of Minnesota]: These spectacular space achievements of the Russians have had no significant effect that you can see at all?
>
> Mr. Allen: I don't think so. (House of Representatives 51)

Civilian space exploration, Allen admitted, was one of many factors influencing whether foreign leaders supported, opposed, or ignored Russian or US desires. Concurrent State Department testimony before Congress was equally artful. Overstatements about massive prestige gains produced by Russia's space program disappeared in follow-up questioning.

Exaggeration, however, had impressive journalistic and political consequences. "USIA Director Allen says USSR Feats Have Cost US Prestige throughout the World," read a page one story in the *New York Times* the day after he testified. President Eisenhower quickly denied America's world standing required space races. NASA's Glennan, John Foster Dulles's successor as Secretary of State, the Defence Department's R&D chief, and others then disagreed with the titular head of their own administration. World War II science mobilizer Vannevar Bush of MIT adroitly countered that the pride of select Americans was hurt, not national prestige. Bush's, however, was a minority voice. The *Times,* Democratic presidential candidates, and Eisenhower's National Security Council—in its final space policy planning document, which Eisenhower approved on 26 January 1960—raised cries of studious alarm.[17]

America's oldest military-industrial think-tank, the RAND Corporation, also got publicly involved in the peak political furore. Its "International Political Implications of Activities in Outer Space" report circulated confidentially in May and June. Soon afterwards—and unusually, in that era—it was published. Author Gabriel Almond of Yale argued the Sputnik crisis had activated and altered opinion on international affairs markedly. Russia's space successes were a prestige disaster for the US. "Popular opinion" saw space competition as "indicative of overall technological and military strengths." Global expectations of "American scientific and technical superiority" vital to US international success had been "lost for the indefinite future." America could now only hope for equality, which might decrease "the tendency towards desertion." Echoing Almond's laments, NASA's Glennan told a Yale University audience in October 1960 that Americans being second-best in some elements of space competition " … probably means, in some vague way, that we are [perceived as] second-best in everything" (Almond 77, 93–5; Van Dyke 123).

As Glennan spoke, John F. Kennedy and Richard M. Nixon were locked in a vanishingly close presidential contest. Talk of space gaps soon complemented Kennedy's campaign themes regarding economic growth, education, social welfare, and military missile gaps. In the final ten days of the 1960 election, leaked USIA polls normally restricted to high-ranking members of the executive branch made headlines in the *New York Times.* Again, secret USIA data claimed to show a loss of confidence in American capacity for world leadership among both the "more sophisticated" and "mass opinion"

abroad. Space firsts were necessary, the *Times* promptly editorialized, to regain US global prestige and leadership.[18]

Meanwhile, other findings, which disputed such frenetic interpretations, were ignored. Two Columbia University professors on contract to the Air Force, for example, interviewed national legislators and university students in Brazil and Finland in April and June of 1960. They found fewer than ten per cent of either group in either country believed that either America or Russia being first in human spaceflight would benefit either ideologically. Fifteen other international variables weren't likely to be affected by space firsts at all. Such reports stayed unknown and unreported.[19]

An identical fate awaited a Brookings Institution study directed by Donald N. Michael. He'd gotten a NASA contract to propose priorities for the agency's new social science research function. To avoid offence, Michael kept certain key ideas implicit. Prestige or military rationales for civilian space programs weren't criticized but simply ignored. Michael's group concentrated instead on space-based systems that promised practical earthly benefits. His group also posed hundreds of research questions in the hope that some might interest NASA (Michael, "Proposed Studies" 1–4).

None of it worked. Michael's Brookings Institution report reached NASA headquarters in March of 1961, a month after the Cherington/URI report. Both analyses were dead on arrival. NASA's "public" remained more anecdotal than real. Eisenhower had quadrupled NASA's budget, while caring little for NASA's prestige-based arguments. He funded only a manned Mercury orbital program and limited a manned lunar program to small feasibility studies. He also left office warning about policy becoming the captive of a "military-industrial complex" and a "scientific-technological elite" (Killian 237–9).

Kennedy, however, was a different sort of leader: "unskeptical in his belief in prestige, [and] passionate in his desire to win the cold war." Kennedy's credulity about space exploration's prestige value soon cast NASA in a heroic Cold War mould. Two events were pivotal: first, Russia orbited a cosmonaut, Yuri Alekseyevich Gagarin, on 12 Apri1 1961. Then Kennedy botched an effort to overthrow the only radical government in the Western hemisphere by launching an anti-Communist Cuban émigré invasion of Fidel Castro's Cuba in the days immediately following (Young, Silcock, and Dunn 73–5; Wyden, *passim*).

The coincidence of these two events was awful for Kennedy but providential for NASA. Kennedy lost credibility with liberals for attempting a coup against Castro, and with conservatives for not succeeding. Given Gagarin's flight, space became the means by which Kennedy sought to win back standing. For the first time, a President embraced the idea that space was crucial to US national vigour. Champions of prestige-based explorations finally had their hour (Logdson 111–2, 159–71; Sorensen, Theodore 524).

Success Breeds Failure

Kennedy first insured the support of influentials via Vice-President Johnson. Then he finalized what NASA's James Webb and Secretary of Defence Robert S. McNamara emphasized were "space projects aimed at enhancing national prestige" by 8 May, three days after America's first suborbital astronaut flew. Significantly, no mass panic whatsoever was reported after Gagarin's flight. Spaceflight advocates got the Apollo program and much else besides via elite politics; panic no longer needed to be projected onto the country. "For space supporters," Roger Launius and Howard E. McCurdy later observed, "the imperial presidency was a godsend."[20]

Kennedy's standing wasn't very imperial in early 1961, however. So, in addition to depending heavily upon Lyndon Johnson, he also probably hired Gallup to poll Americans at unusual length about manned lunar missions. Three months before, URI had reported widespread professional ignorance. Gallup also found information limited. One in three Gallup respondents, however, expressed the single opinion discussed in this paper that most historians always cite. This one-third approved paying their individual share of an estimated "$40 billion—or an average of about $225 per person—to send a man to the moon." Sixty per cent, however, were unwilling, and ten per cent didn't answer. Median pre-tax yearly US family income, the historians don't note, was $5,737.00 in 1961. So, one-third of adults willing to spend four per cent of that for Apollo was not-unimportant, but neither was it a secure popular mandate for exploring space (Gallup 1720; Trento 38, 297; *Historical Statistics* 297).

Kennedy, then, had an opportunity, rather than a mandate, for prestige-based space races. When he proposed Apollo to Congress in a nationally televised address on 25 May 1961, accordingly, he proceeded carefully. Space was not the advertised theme of a speech

in which Kennedy proposed ten strategies to meet "urgent national needs" and promote a global "freedom doctrine." He only began to discuss Apollo three-quarters through a forty-seven-minute speech. He also surrounded a (carefully unbudgeted) Apollo program with far cheaper applied satellite proposals he could claim credit for, in-case Congress's lunar enthusiasms did not match his own.[21]

Kennedy, additionally, was concerned enough about congressional reaction that he repeatedly called upon legislators to bear the burden "to win the battle for men's minds" in a "most serious time in the life of our country and in the life of freedom around the globe." America had to "specify long-term goals on an urgent time schedule," he said: 'For while we cannot guarantee that we will one day be first, we can guarantee that any failure to make this effort will make the US last." NASA and Apollo symbolized everything about the future of Communism and freedom around the world.[22]

When Congress subsequently funded Apollo, the Cold War international prestige arguments that had begun with Sputnik 1's successful orbit three-and-a-half years before had triumphed. More confidential USIA polls, meanwhile, confirmed the wrenching global status effects of Russian space firsts (McDougall, "... *Heavens* " 240–4, 497). Such USIA data was important to Apollo's elite politics success, but it also clearly meant less than advertised, especially for the world outside of Western Europe, where most Cold War competitions were waged after 1960. It is perhaps not accidental, then, that Kennedy had earlier appointed former USIA officer Lloyd Free to propose reforms in agency operations after obtaining the Democratic presidential nomination (Sorensen, *War* 119).

Kennedy's agency concerns did not stop with Free, who knew just how selective USIA's reporting could be. Once elected, Kennedy picked Edward R. Murrow, the most widely respected journalist of his day, to underwrite USIA's credibility as agency director. Kennedy teamed Murrow with two top members of his presidential transition team. Number two at USIA, Don Wilson, was a former Washington bureau chief for *Time* magazine who was friendly with the President's brother, Attorney General Robert F. Kennedy. The number three man was USIA's Deputy Director of Policy and Plans Thomas C. Sorensen, a USIA career officer whose brother Theodore was Kennedy's top political adviser and speechwriter (Kendrick 471; Sperber 624–5).

Given Thomas Sorensen's background, position, and connections, he was exceedingly well placed to answer global prestige questions. Conseqently, public affairs leadership at NASA headquarters promptly asked Sorensen to inform them about the prestige effects of civilian space programs on 27 June 1961, a month after Kennedy introduced Apollo (Sorensen, "Remarks" 2). USIA's "grassroots" abroad, Sorensen began, were "students, intellectuals, journalists, teachers—opinion-makers of every kind." Even these educated elites, however, rarely differentiated NASA's programs from America's military space effort. Only "a small select group" in Western Europe even knew NASA existed. America's "space image abroad was blurred," as URI had discovered it was in America (2, 7).

In "less sophisticated" and "underdeveloped" regions, meanwhile, NASA simply didn't count. There, said Sorensen, a simple logic ruled: space was rockets and rockets were power. "They are neither interested in nor impressed by NASA's scientific approaches … They are impressed by *power,* which Russia's rockets demonstrate in abundance" (7–8). Once American rockets clearly became superior to Russian rockets, "newly-developing and neutralist countries [which] often lean toward the strongest power" would stop their post-Sputnik dalliances with Moscow and move back toward the US. These people shared the view of the chief military correspondent of the *New York Times,* who argued in a book published in 1958 that the "real significance of the Sputnik launch was not the satellite but its launcher" (Sorensen, "Remarks" 7–8; Burrows 190, 329).

Sorensen's report, then, told NASA's own public affairs leaders that prestige-based space exploration meant far more in official Washington than in the rest of the world. Military rockets also meant far more than spacecraft, astronauts, or exploration. Sorensen's conclusions, moreover, did not imply that American leaders needed Apollo—or other space prestige programs—to win Cold War contests on earth. Rockets and warheads still mattered more than spacecraft or astronauts, or the lunar and planetary exploration projects that Webb and McNamara discussed as "part of the battle among fluid front of the cold war" and valuable "even though the scientific, commercial, or military value of the undertakings may by ordinary standards be marginal or economically unjustified."[23]

By June of 1961, however, ideas about enhancing national prestige via lunar and planetary space races were ascendant in official Washington. Opportunism, self-interest, patriotism, and self-delu-

sion were mixed together in about equal proportions. Most space advocates thought in transcendent terms. Sputnik had created a new heaven and a new earth, in which new media technologies, powerful presidents, and frontier mindsets would insure popular support.

NASA, accordingly, ignored its own early opinion research. It didn't study the public impact of Sputnik 1 at all until July of 1963, after its first of many serious funding troubles began in Congress. The chronological report that resulted was of "select, informed, and influential segments of American public opinion." NASA reassured itself by personal statements of influential individuals and by Gallup polls. A few of the USIA and other results reported in this essay got added in. But findings which argued against widespread knowledge or interest in NASA programs were ignored—or unknown. In closing, NASA's first chief historian assured readers that "Sputnik in October of 1957 … demolished man's traditional concept of the universe.… Men everywhere now looked at space with practical eyes, for technology had opened the way to extraterrestrial realities. The world was never to appear the same again … "(George and Wheeler 25).

History Real & History Imagined

Twenty years later, Dr. Alex Roland, a NASA historian from 1973 to 1981, began criticizing such romanticized analysis. Another twenty years on, Dr. Roger Launius, NASA chief historian from 1990 to 2003, wrote that 'If I have heard it once, I have heard it a hundred times, "If NASA just had the popular support it enjoyed during the 1960s all would be well.'" Launius argued for "consistently good news for NASA and the cause of human space exploration overall," at least "insofar as data exists." But, he nevertheless concluded that NASA's favoured Apollo program was never popular. It had "general acquiescence," however, contended Launius, because it existed for "hard-edged" Cold War prestige reasons as a "surrogate for face-to-face military confrontation." Launius provided no data to prove his point about passive popular acceptance. "Polls in the 1960s," he also rightly observed, "consistently ranked spaceflight near the top of those programs to be cut in the federal budget." By the 1970s, space exploration was more unpopular than welfare, and almost as unpopular as foreign aid. Popular enthusiasm for Apollo, Launius concluded, was also so anaemic that when Apollo ended in

1972 it was like "a limping marathoner straining with every muscle to reach the finish line before collapsing" (Launius, "Opinion Polls" 163–4, 166–8; Roland 39).

Launius's essay concluded that "very real cold war objectives" led Kennedy and NASA to Apollo, and that "too many fail to recognize" this. As we have seen, however, the power (military rocketry) aspects of early space flight were always widely understood, at home, abroad, and by historians. The real problem is that analysts have routinely overestimated the prestige effects of early space programs (Berkner, "Scientific" 22; Logsdon 159ff; Van Dyke *passim*).

The pioneers of the early space age told tales truer than the truth to create prestige contests like Apollo. In the process, they also often deluded themselves about the depth and breadth of popular and political interest in manned and scientific space spectaculars with few or no practical earthly applications or effects. As one result, prestige-based space visions created a build-up to Apollo that was not sustainable, then or for decades afterwards. Illusion, however, lived on at NASA as one of the more ironic and enduring heritages of Sputnik (Gehman et al. 99–118).[24]

Notes

1 "Free Zone Urged In Outer Space." *New York Times* 10 Oct. 1957: 20.

2 "Satellites and Our Safety: Stepping Up the Race." *Newsweek* 21 Oct. 1957: 28, 31. The article was followed up on 14 Oct. 1957: 20–1; 28 Oct. 1957: 31–2; and 11 Nov. 1957: 35–6. See also 21 Oct. 1957: 28–31; 28 Oct. 1957: 31–2; 11 Nov. 1957: 35–6.

3 *New York Times* 3 Nov. 1957: 76.

4 See, i.e., "The US, Ike, and Sputnik." *Newsweek* 28 Oct. 1957: 31–6; idem, 14 Oct. 1957: 21, 37–8; Lubell,"Sputnik" 17–18; Klass. See also Ellsberg; Perrett, esp. 564; Parmet, esp. 536.

5 This section is based on interviews in 2001 and 2002 with Ellis R. Mottur of Bethesda, Maryland, and on interviews with Dan Fenn of Lexington, Massachusetts. Mottur and Fenn were the two principal authors of the URI report in 1961. See also Boxes 11 and 13 of the Paul W. Cherington papers at the Baker Library, Harvard Business School.

6 Shelby Thompson, Letter to Keith Glennan, 14 Dec. 1960, NASA Public Affairs Office files, NASA History Office (hereafter: PAO, NHO).

7 Daniel Fenn personal interview, 6 and 7 Sept. 2001; Ellis Mottur personal interview, 12 June 2001.

8 URI Report, 34–8; 157–8.

9 The only NASA work the author found in the Cherington Papers was a small contract regarding civil aviation support.

10 Transcript of "Discussion of Non-Scientific Problems of the Space Age, Washington, DC, 18 December 1958" in Keith Glennan papers, Subject Files, NHO. Hoopes expresses his opinion on the subject as well in his own work (425ff).

11 "Moon Top Story in German Press," *New York Times* 10 Oct. 1957; "Soviet Bloc Cool to the Satellite," *idem* 9 Oct. 1957: 16; "World Seen Reaching a Balance of Terror, Soviet Achievements Expected to Have Wide Effect Among Neutralist Nations; US Advantage Erased," idem. 13 Oct. 1957: I; "New Soviet Gains Seen," idem. 20 Oct. 1957:12.

12 "Reports of Foreign Public Opinion, VI: Post-Sputnik Opinion in Western Europe, 11 December 1957: Prepared Jointly by the Department of State and the United States Information Agency," USIA Collection, National Archives, Suitland, Maryland. This is an un-numbered "Summary" page of an eleven-page report, declassified on 4 Nov. 1999.

13 Ibid, 6, 7-A, 11; The USIA's "Post-Sputnik Opinion in Western Europe, Report # [*sic*]" was dated 12 Dec. 1957. This USIA "Special Report #5–14–57" was declassified on 5 Sept. 1985. See USIA Collection, National Archives.

14 USIA, "World Opinion and the Soviet Satellite: A Preliminary Evaluation, 17 October 1957." Declassified on 16 Nov. 1993, and reprinted in David S.F. Portree, ed., "NASA's Origins and the Dawn of the Space Age," Washington, DC: NHO, 1998, 21–6.

15 Nixon argued that Congress's space "motivation will be largely the prestige factor, but the excuse for action will be military implications." Please see "Remarks By the Vice President, 29 December 1959," "Conference at White House/Soviet Union 1955–1965" files, Hugh L. Dryden Papers, Johns Hopkins University Archives. See also McDougall "*Heavens*", 203ff; "Sputnik," 20–5.

16 Keith Glennan Letter to Allen, 14 Jan.1960, NASA-1960 files, Dryden Papers.

17 Van Dyke, 124–5, 151. See also the following articles in the *New York Times*: 23 Jan. 1960: 1; 23 Jan. 1960: 6; 27 Jan. 1960: 14; 28 Jan. 1960: 12; 31 Jan. 1960: 31; 4 Feb. 1960: 12; 9 Feb.1960: 5; 14 Feb. 1960: 24; 25 Feb. 1960: 1; 5 May 1960: 16; 7 April 1960: 13. For the NSC, see Logsdon (362ff).

18 *New York Times* 26 Oct. 1960: 1, 28. See follow-up articles: 27 Oct. 1960: 1, 27–8; 27 Oct. 1960: 29; 29 Oct. 1960: 10.

19 Air Force Office of Scientific Research Study # AF 49 (638)–473 is summarized in Michael, *Proposed Studies* 200 n58.

20 For the lack of panic, see Finney, "Kennedy Praises Soviet Space" Logsdon, et al. 423–52, esp. 443–4; Launius and McCurdy (*Spaceflight* 1).

21 *New York Times* 26 May 1961: 12.

22 *New York Times* 26 May 1961: 12 (column 6).

23 "Recommendations [by NASA's James Webb and Secretary of Defense Robert S. McNamara] for Our National Space Program: Changes, Politics, Goals," 8 May 1961. In Logsdon et al. 444.

24 "Organizational Culture" "refers to the basic values, norms, beliefs, and practices that characterize the functioning of a particular institution." It resists change and survives "reorganizations and the departure of key personnel" (Gehman et al. 101). NASA's "Manned Spaceflight Organizational Culture" has not gained sufficient public or political support to essay bold, Apollo-style, missions to Mars (or back to the moon) in 1969–1970, 1989–1990, and, currently, after the Bush Space Vision of 2003. For one reason, see McQuaid.

Works Cited

Air Force Office of Scientific Research Study #AF 49 (638)–473. Summarized in Donald N. Michael, et al., *Proposed Studies on the Implications of Peaceful Space Activities for Human Affairs.* Washington, DC: GPO and the Brookings Institution, 1961.

Almond, Gabriel. "Public Opinion and the Development of Space Technology." 1960. *Outer Space in World Politics*. Ed. Joseph, M. Goldsen. New York: Praeger, 1963. 71–96.

Ambrose, Stephen. *Eisenhower: The President.* New York: Simon, 1984.

Berkner, Lloyd V. "Earth Satellites and Foreign Policy." *Foreign Affairs* (Jan. 1958): 221, 224–6, 231.

———. *The Scientific Age: The Impact of Science on Society.* New Haven, CT: Yale UP, 1964.

Brewer, Garry D. "Perfect Places: NASA as an Idealized Institution." *Space Policy Reconsidered.* Boulder: Westview, 1989. 157–73.

Broad, William J. *Teller's War.* New York: Simon, 1992.

Bulkeley, Rip. *The Sputniks Crisis and Early United State Space Policy.* Bloomington: Indiana UP, 1991.

Burrows, William. *This New Ocean: The Story of the First Space Age.* New York: Random, 1998.

Byerly, Radford. ed. *Space Policy Reconsidered.* Boulder: Westview, 1989.

Byrnes, Mark. *Politics and Space: Image-Making by NASA.* Westport, CT: Praeger, 1995.

Caro, Robert. *The Years of Lyndon Johnson: Master of the Senate.* New York: Knopf, 2002.

Cherington, Paul, Dan Fenn, Ellis R. Mottur, Raymond A. Bauer, et al. "A Pilot Research Study to Determine the Patterns of Communication between NASA and Groups within the Scientific and Professional Community." NASW-168. Cambridge, MA: United Research, 1961.

Dickson, Paul. *Sputnik: The Crisis of the Century.* New York: Walker, 2001.

"Discussion of Non-Scientific Problems of the Space Age, Washington, DC, 18 December 1958." Transcript. Keith Glennan Papers, Subject Files. Washington, DC: NASA History Office, Public Affairs Office Files.

Divine, Robert A. *The Sputnik Challenge.* New York: Oxford, 1993.

Dotto, Lydia. "Mass Media Coverage of the American Space Program." September 1971, Box 1. Washington, DC: NASA History Office, Public Affairs Office Files.

Ellsberg, Daniel. *Secrets.* New York: Viking, 2002.

Emme, Eugene V. "The Impact of Sputnik 1: Case Study of American Public Opinion at the Break [*sic*] of the Space Age, October 4, 1957." Washington, DC: NASA History Office, Public Affairs Office Files.

Fenn, Daniel. Personal Interview. 6-7 Sept. 2001.

Finney, John. "Kennedy Praises Soviet Space Trips." *New York Times* 13 Apr. 1961: 1, 15.

"Free Zone Urged In Outer Space." *New York Times* 10 Oct. 1957: 20.

Gallup, George H., ed. *The Gallup Polls: Public Opinion, 1935–1971,* Vol. 3. New York: Random House, 1972.

Gehman, Admiral Harold, et. al. *Columbia Accident Investigation Board Report,* Vol. 1. Washington, DC: GPO and NASA, 2003.

George, Ed, and Martha Wheeler, eds. "The Impact of Sputnik I: Case Study of American Public Opinion at the Break of the Space Age, October 4, 1957." National History Office, NASA, 1963: 25.

Glennan, Keith. Letter to Allen, 14 Jan. 1960, NASA-1960 Chronological File, Hugh L. Dryden Papers, Johns Hopkins University Archives.

Herzfeld, Norma Krause. "State of the Question: The Way Sputnik Looked to the Catholic Press." *America* 8 Feb. 1958: 541–3.

Historical Statistics of the US, Colonial Times to 1970, Vol. 2. Washington, DC: GPO, 1976: 297.

Hoopes, Townsend. *The Devil and John Foster Dulles.* Boston: Atlantic Monthly, 1973.

House of Representatives, Committee on Science and Astronautics. "Review of the Space Program … Hearings … January, 1960." Washington, DC: GPO, 1960: 36–7, 43, 45, 51

Jacobs, David M. *The UFO Controversy in America.* Bloomington: Indiana UP, 1975.

Kendrick, Alexander. *Prime Time: The Life of Edward R. Murrow.* Boston: Little, Brown, 1969.

Killian, James T. *Sputnik, Scientists and Eisenhower: A Memoir …* Cambridge: MIT, 1977.

Klass, Philip J. *Secret Sentries in Space.* New York: Random, 1971.

Koppes, Clayton R. *J.P.L. and the American Space Program.* New Haven, CT: Yale UP, 1982.

Launius, Roger D., and Howard E. McCurdy, eds. *Spaceflight and the Myth of Presidential Leadership.* Urbana: U of Illinois, 1997.

———. "Opinion Polls and Perceptions of US Human Spaceflight." *Space Policy* 19, (2003): 163–75.

Lanius, Roger D, John M. Logsdon, and Robert W. Smith, eds. 1997. *Reconsidering Sputnik: Forty Years Since the Soviet Satellite.* Amsterdam, The Netherlands: Harwood, 2003.

Lippmann, Walter. *Public Opinion.* New York: Boni and Liverwright, 1922.

———. *The Phantom Public.* New York: Harcourt, 1925.

Logsdon, John. *The Decision to Go to the Moon.* Cambridge: MIT, 1970.

Logsdon, John M., et al., eds. *Exploring the Unknown: Selected Documents in the History of the US Civil Space Program.* Volume 1: *Organizing for Exploration.* Washington, DC: NASA, 1995.

Lubell, Samuel. *Current Biography – 1956.* New York: H.W. Wilson, 1957.

———. "Sputnik and American Public Opinion." *Columbia Review* 1 (1958): 15–21.

Lule, Jack. "Roots of the Space Race: Sputnik and the Language of US News in 1957." *Journalism Quarterly* 68 (1987): 544–56.

McDougall, Walther A. " … *the Heavens and the Earth": A Political History of the Space Age.* New York: Basic, 1985.

———. "Sputnik, the Space Race, and the Cold War." *Bulletin of the Atomic Scientists* (May 1986): 20–5.

McNamara, Robert S., and James Webb. "Recommendations for Our National Space Program: Changes, Politics, Goals." 8 May 1961. *Exploring the Unknown: Selected Documents in the History of the US Civil Space Program.* Volume 1: *Organizing for Exploration.* Ed. John M. Logsdon, et al. Washington, DC: NASA, 1995. 444.

McQuaid, Kim. "Selling the Space Age: NASA and Earth's Environment, 1958–1990." *Environment & History* 12 (2006): 127–63.

Merrill, John. *The Elite Press: Great Newspapers of the World.* New York: Pitman, 1968.

Michael, Donald N. "Society and Space Exploration." *Astronautics* Feb. 1958: 20–2, 88-9.

———. "The Beginning of the Space Age and American Public Opinion." *Public Opinion Quarterly* 24 (1960): 573–82.

———. *Proposed Studies on the Implications of Peaceful Space Activities for Human Affairs.* Washington, DC: GPO and the Brookings Institution, 1961.

"Moon Top Story in German Press." *New York Times* 10 Oct. 1957.

Mottur, Ellis. Personal Interview. 12 June 2001.

Needell, Allan A. *Science, Cold War, and the American State: Lloyd V. Berkner and the Balance of Professional Ideals.* Amsterdam, The Netherlands: Harwood, 2000.

"New Soviet Gains Seen." *New York Times* 20 Oct. 1957: 12.

New York Times, 3 Nov. 1957: 76; 23 Jan. 1960: 1, 6; 27 Jan. 1960: 14; 28 Jan. 1960: 12; 31 Jan.1960: 31; 4 Feb. 1960: 12; 9 Feb. 1960: 5; 14 Feb. 1960: 24; 25 Feb. 1960: 1; 7 Apr. 1960: 13; 5 May 1960: 16; 26 Oct. 1960: 1, 28; 27 Oct. 1960: 1, 27–9; 29 Oct. 1960: 10; 26 May 1961: 12; 26 June 1961: 12 (column 6).

Parmet, Herbert S. *Eisenhower and the American Crusades.* New York: Macmillan, 1972.

Peebles, Curtis. *Watch the Skies! A Chronicle of the Flying Saucer Myth.* Washington, DC: Smithsonian, 1994.

Perrett, Geoffrey. *Eisenhower.* New York: Random, 1999.

Persico, Joseph E. *Edward R. Murrow: An American Original.* New York: McGraw-Hill, 1988.

RAND Corporation. "Operational Plan for NASA Advisory Committee." 7 Aug. RAND Report. 1959. Washington, DC: Glennan Papers, NASA History Office.

Reedy, George. *The Twilight of the Presidency.* New York: NAL, 1970.

Remarks By the Vice President, 29 December 1959. "Conference at White House/Soviet Union 1955–1965" files, Hugh L. Dryden Papers, Johns Hopkins University Archives.

"Remarks of Thomas C. Sorensen, Deputy Director of the USIA, Before the Office of Public Information Staff Conference, NASA, 10:00 am, Tuesday, 27 June 1961." Washington, DC: NASA History Office, Public Affairs Office Files.

"Reports of Foreign Public Opinion, VI: Post-Sputnik Opinion in Western Europe, 11 December 1957: Prepared Jointly by the Department of State and the United States Information Agency." Suitland, MD: USIA Collection, National Archives.

Roland, Alex. "Barnstorming in Space: The Rise and Fall of the Romantic Era of Spaceflight, 1957–1986." *Space Policy Reconsidered.* Ed. Radford

Byerly, Jr. Boulder: Westview. 33-52.

"Satellites and Our Safety: Stepping Up the Race." *Newsweek* 14 Oct. 1957: 20.

Satellites, Science, and the Public: A Report of a National Survey on the Public Impact of Early Satellite Launchings. Survey Research Center, Institute of Social Research: University of Michigan, 1959.

Schulzinger, Robert D. *The Wise Men of Foreign Affairs: A History of the Council on Foreign Relations.* New York: Columbia, 1984.

Sorensen, Theodore. *Kennedy.* New York: Harper, 1965.

Sorensen, Thomas C. "Remarks … Before the Office of Public Information Staff Conference, NASA, 10:00 am, Tuesday, June 27, 1961." Washington, DC: NASA History Office, Public Affairs Office.

———. *The Word War: The Story of American Propaganda.* New York: Harper, 1969.

"Soviet Bloc Cool to the Satellite." *New York Times* 9 Oct. 1957: 16.

Sperber, A.M. *Murrow: His Life and Times.* New York: Bantam, 1987.

Swenson, Jr., John M., James M. Grimwood, and Charles C. Alexander. *This New Ocean: A History of Project Mercury.* Washington, DC: NASA, 1966.

"The US, Ike, and Sputnik." *Newsweek* 14 Oct. 1957: 37–38; 28 Oct. 1957: 31–36.

Thompson, Shelby. "Summary of Discussion … 8 December 1960." Washington, DC: NASA History Office, Public Affairs Office Files.

Thompson, Shelby. Letter to Keith Glennan. 14 Dec. 1960. Washington, DC: NASA History Office, Public Affairs Office Files.

Trento, Joseph and Susan. *Prescription for Disaster*. New York: Crown, 1987.

USIA. "Post-Sputnik Opinion in Western Europe, Report #1" [*sic*] dated 12 December 1957. USIA Special Report #5–14–57. Declassified 5 Sept. 1985. Suitland, MD: USIA Collection, National Archives.

———. "World Opinion and the Soviet Satellite: A Preliminary Evaluation, 17 October 1957." Declassified 16 Nov. 1993. *NASA's Origins and the Dawn of the Space Age*. Ed. David S.F. Portree Washington, DC: NASA History Office, 1998.

Van Dyke, Vernon. *Pride and Power: The Rationale of the Space Program.* Urbana: U of Illinois, 1964.

Vatter, Harold G. *The US Economy in the 1950s.* New York: Norton, 1963.

Wainwright, Loudon. *The Great American Magazine: An Inside Story of LIFE.* New York: Knopf, 1986.

Wilford, John Noble. *We Reach The Moon.* New York: Norton, 1969.

Witkin, Richard, ed. *The Challenge of the Sputniks.* Garden City, NY: Doubleday, 1958.

Wolfe, Tom. *The Right Stuff.* New York: Farrar, 1979.

"World Seen Reaching a Balance of Terror, Soviet Achievements Expected to Have Wide Effect Among Neutralist Nations; US Advantage Erased." *New York Times* 13 Oct. 1957: 1.

Wyden, Peter. *The Bay of Pigs.* New York: Simon, 1979.

Young, Hugo, Bryan Silcock, and Peter Dunn. *Journey to Tranquility.* Garden City, NY: Doubleday, 1970.