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A Surrogate for War—The U.S. Space Program in the 1960s

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ABSTRACT

Soviet successes in rocketry and space, beginning with *Sputnik 1* in 1957, were perceived as a serious threat to U.S. national security; they were technological breakthroughs, disturbing a delicate global balance of power. Space firsts were also highly effective propaganda symbols of superiority as ever-growing nuclear arsenals assured mutual destruction in the event of all-out war. After Yuri Gagarin's flight in 1961, the United States was in dire need of a convincing space victory. It mobilized for the biggest peacetime technological project in its history: the Apollo program. A U.S. flag on the moon was to demonstrate to the world the superiority of the American way of life. This essay focuses on contemporary public discourse on space from the mid-1950s to the end of Project Apollo in 1972. It presents important U.S. perceptions of the struggle for space supremacy and discusses their changes during this period. The voices of policymakers, defense strategists, space experts and visionaries, mass media, and NASA personnel reveal how early space exploration is a prime example of the blurring lines between military and civilian activities in the Cold War. It lifted Soviet-American conflict out of the military sphere into peaceful competition, with astronauts fighting a symbolic battle, an alternative to nuclear war.

Introduction

Space exploration is making a comeback, or so it seems, considering the flow of current news stories on space. European and American missions to Mars are cases in point. The European Space Agency's probe *Rosetta* is on its way to attempt an historic first landing on a comet. The Cassini-Huygens project, jointly launched by Europe and the United States, went into orbit around Saturn and is showing magnificent results. President George W. Bush recently set a new course for the U.S. space program, vowing to give the National Aeronautics and Space Administration (NASA) a "new focus and vision." Ships are to be built which will carry mankind into the solar system. By the year 2020, astronauts will again be standing on the moon. A foothold on the moon will serve as a launching point for future human expeditions to Mars. "The vision I outline today is a journey, not a race," said Bush, "and I call on other nations to join us on this journey, in a spirit of cooperation and friendship."[1] The United States is preparing for an exciting journey into the unknown and it is inviting its friends to take part. The notion of space exploration as an awesome adventure and a noble challenge is reminiscent of the 1960s' "new frontier." It remains to be seen if any of these bold new plans are going to materialize. As yet, there seems to be no sufficient political support for an aggressive space venture of the kind that Bush has outlined. Since the 1960s, almost ev-

[1] "President Bush Announces New Vision for Space Exploration Program," (remarks by the President on U.S. Space Policy at NASA Headquarters, Washington, DC, 14 Jan. 2004) 15 Jan. 2004 <http://www.whitehouse.gov/news/releases/2004/01/20040114-3.html>.

ery president has announced a new space initiative.[2] Not one was met with the same enthusiasm as in that golden age of astronautics.

In current discussions about space travel, its origins in military rocketry and Cold War competition are often forgotten. The German V2 rocket, a weapon used in World War II, had a powerful motor that was capable of taking it to the edge of space. Russians and Americans alike were in a hurry to further develop this highly potential technology after the war.[3] Both sides soon possessed intercontinental ballistic missiles (ICBMs), theoretically capable of delivering nuclear warheads to targets anywhere on the planet. The "civil" spaceflights of the 1950s and 1960s were in fact paramilitary operations. They were all piloted by men with military backgrounds and used modified military launch vehicles.[4] During launch and recovery, they relied on the infrastructure and personnel of the services to supplement NASA operations. Soviet space shots gave plenty of food for thought to Western analysts because of the secrecy surrounding them. These launches and missions were kept secret until their successful completion. Their American counterparts were meant to be highly visible. During the Cold War, space shots—Soviet and American—were front page news. Both sides primarily engaged in the prestigious activity of manned spaceflight to demonstrate to the world their respective technological potential. It gave more tangible proof of power to friend and foe than naked statistics of nuclear warheads or hardened missile bases. The country that could launch the heaviest satellites had the most powerful rockets. Later, the programmed landings of cosmonauts and astronauts in designated target zones allowed conclusions about a country's missile guidance capabilities and accuracy of nuclear strikes.[5] The conquest of space with rockets, satellites, and manned space vehicles was seen as a means of changing the strategic balance of power. If the Cold War, like no other conflict before, was a war of technology, then space technology was, for decades, "at the cutting edge of 'combat.'"[6]

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[2] In 1972, Nixon approved NASA's space shuttle program to develop a reusable spacecraft to take crews and cargo into earth orbit. In 1984, Reagan directed NASA to build a permanently occupied space station "within a decade." In 1989, Bush, Sr., proposed establishing a base on the moon, sending an expedition to Mars and beginning "the permanent settlement of space." In 1993, Clinton decided to merge NASA's space station program with Russia's.

[3] Two excellent histories of the V2 and its creator are Michael J. Neufeld, *The Rocket and the Reich: Peenemünde and the Coming of the Ballistic Missile Era* (New York: Free P, 1995); Reiner Eisfeld, *Mondsüchtig: Wernher von Braun und die Geburt der Raumfahrt aus dem Geist der Barbarei* (Hamburg: Rowohlt, 1996). For the role of German engineers in the early U.S. and Soviet missile and space programs, see John Gimbel, "Project Paperclip: German Scientists, American Policy, and the Cold War," *Diplomatic History* 14 (1990): 343-65; Asif A. Siddiqi, *Challenge to Apollo: The Soviet Union and the Space Race, 1945-1974* (Washington, DC: NASA SP-4408, 2000) 24-84.

[4] Only the Saturn 1B and the Saturn V that took astronauts to the moon were developed solely by NASA and had no military application.

[5] Cf. Paul B. Stares, *Space Weapons and US Strategy: Origins and Development* (London: Croom Helm, 1985) 74-75.

[6] Donald R. Baucom, "The Formative Years: Technology and America's Cold War Strategy," R. Cargill Hall and Jacob Neufeld, eds., *The U.S. Air Force in Space 1945 to the Twenty-first Century: Proceedings Air Force Historical Foundation Symposium, September 21-22, 1995* (Washington, DC: USAF History and Museums Program, 1998) 52-59; 57.

The historiography of space exploration, concerning the period up to the Apollo moon landings, has mainly focused on the following aspects:

1. Origins of the "space race" (U.S. reaction to the Sputnik crisis, the founding of NASA, and the political decision to go to the moon).[7]
2. Individual projects (planning, management, machinery, and operations of Mercury, Gemini, Apollo, etc.).[8]
3. Evolution of space science (scientific efforts from Vanguard to Apollo).[9]
4. Astronauts (biographies, memoirs, reverent works).[10]

Only more recently have scholarly writers on space history dealt with popular conceptions of spaceflight and their consequences for public policy,[11] or with the official justification and consensus building for the national space effort of the 1960s.[12] Some of the above-mentioned works have touched the issue of the space race as war experience and the role of war symbolism in contemporary discourse on astronautics. However, to this day no academic study has dealt with it over the entire period stretching until the end of Project Apollo in late 1972. This essay offers representative U.S. perceptions of the struggle for space supremacy and dis-

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[7] Cf. Paul Dickson, *Sputnik: The Shock of the Century* (Waterville, ME: G.K. Hall, 2001); John M. Logsdon and Robert W. Smith, eds. *Reconsidering Sputnik: Forty Years Since the Soviet Satellite* (Amsterdam: Harwood Academic Publishers, 2000); Robert A. Divine, *The Sputnik Challenge* (New York: Oxford UP, 1993); Rip Bulkeley, *The Sputniks Crisis and Early United States Space Policy: A Critique of the Historiography of Space* (Bloomington: Indiana UP, 1991); Walter A. McDougall, *...the Heavens and the Earth: A Political History of the Space Age* (New York: Basic Books, 1985); John M. Logsdon, *The Decision to Go to the Moon: Project Apollo and the National Interest* (Cambridge, MA: MIT P, 1970).

[8] Cf. Barton C. Hacker and James M. Grimwood, *On the Shoulders of Titans: A History of Project Gemini* (Washington, DC: NASA SP-4203, 2002); Lloyd S. Swenson, Jr., James M. Grimwood, and Charles C. Alexander, *This New Ocean: A History of Project Mercury* (Washington, DC: NASA SP-4201, 1998); Arnold S. Levine, *Managing NASA in the Apollo Era* (Washington, DC: NASA SP-4102, 1982); Roger E. Bilstein, *Stages to Saturn: A Technological History of the Apollo/Saturn Launch Vehicles* (Washington, DC: NASA SP-4206, 1980).

[9] Cf. Donald A. Beattie, *Taking Science to the Moon: Lunar Experiments and the Apollo Program* (Baltimore: Johns Hopkins UP, 2001); William David Compton, *Where No Man Has Gone Before: A History of Apollo Lunar Exploration Missions* (Washington, DC: NASA SP-4214, 1989); Homer E. Newell, *Beyond the Atmosphere: Early Years of Space Science* (Washington, DC: NASA SP-4211, 1980).

[10] A few good examples are: Michael Collins, *Carrying the Fire: An Astronaut's Journeys* (1974; New York: Cooper Square P, 2001); Buzz Aldrin and Malcolm McConnell, *Men from Earth* (New York: Bantam Books, 1989); Walter Cunningham with Mikkey Herskowitz, *The All-American Boys* (New York: Macmillan, 1977).

[11] Cf. Howard E. McCurdy, *Space and the American Imagination* (Washington, DC: Smithsonian Institution P, 1997); William D. Atwill, *Fire and Power: The American Space Program as Postmodern Narrative* (Athens: U of Georgia P, 1994).

[12] Cf. Roger D. Launius and Howard E. McCurdy, eds. *Spaceflight and the Myth of Presidential Leadership* (Chicago: U of Illinois P, 1997); Mark E. Byrnes, *Politics and Space: Image Making by NASA* (Westport, CT: Praeger, 1994); James L. Kauffman, *Selling Outer Space: Kennedy, the Media, and Funding for Project Apollo, 1961-1963* (Tuscaloosa: U of Alabama P, 1994).

cusses their changes over time. In what follows, this process may be divided into four major phases. First, the challenge posed by Soviet space spectaculars. Second, the U.S. reaction that resulted in the mobilization for Project Apollo. Third, an operational phase, marked by propaganda battles over spaceflights and growing criticism of the U.S. space program. Fourth, the triumph of the moon landings and the ensuing demobilization. The voices of policymakers, defense strategists, space experts and visionaries, mass media, and NASA personnel reveal the blurring lines between military and civilian activities in the Cold War. The samples presented here cover important aspects in the social construction of reality that was the backdrop of the early period of human spaceflight.

The Cosmic Challenge

At the advent of the space age, public discourse on astronautics was dominated by national security issues. However, the strategic value of the new sphere of influence as well as Soviet intentions remained dubious. The frontier that John F. Kennedy dubbed the "new ocean" was a potential theater for war, yet it was long unclear what actions and strategies were feasible. Both experts and laymen poured forth speculation about space-based nuclear bombs, giant mirrors functioning as orbital burning glasses, space stations armed with ray guns, spy satellites, and various kinds of missile defense systems. Was it necessary for the United States to preemptively deny hostile countries access to space or would its domination during times of war suffice? How could effective controls on uncooperative space vehicles be achieved?[13] Ambitious plans were discussed with both great enthusiasm and naive optimism that in retrospect appear utterly unrealistic. For example, Donald W. Cox and Michael Stoiko, a journalist and an expert in rocketry, called for the establishment of a United Nations police force in space. With hundreds of patroling spacecraft, the "UN Air and Space Force" was to help keep Soviet imperialism at bay.[14] The physicist and rocket pioneer Fred Singer proposed the use of IPBMs (interplanetary ballistic missiles) for a bizarre kind of lunar deterrence. To him, the illumination of the moon by explosions of nuclear devices would have been the ultimate demonstration of power. Bomb craters on the moon's surface could have been named after presidents and prime ministers. A portion of the lunar material hurled forth by the explosions may even have reached the surface of the earth to be examined by scientists.[15]

The costs of such undertakings seem to have been of minor importance in early astropolitical deliberations, particularly, if national security and prestige were at

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[13] Cf. Joan Lisa Bromberg, *NASA and the Space Industry* (Baltimore: Johns Hopkins UP, 1999) 34. See also Philip Siekman, "The Military Challenge," *The Space Industry: America's Newest Giant*, ed. *Fortune* (Englewood Cliffs, NJ: Prentice-Hall, 1962) 18-34.

[14] Cf. Donald W. Cox and Michael Stoiko, *Spacepower: What It Means to You* (Philadelphia: John C. Winston, 1958) 211-12.

[15] Cf. David C. Holmes, *What's Going on in Space? A Chronicle of Man's Exploration into Space Beyond this Earth* (New York: Funk & Wagnalls, 1958) 218-22.

stake. Space supremacy was extensively linked to world domination, just as in history naval power had been the foundation of the British Empire and aerial superiority had helped secure America's superpower status. Kennedy argued during his presidential campaign in 1960: "Control of space will be decided in the next decade. If the Soviets control space, they can control the earth, as in past centuries the nation that controlled the seas has dominated the continents."[16] The ubiquitous scare of the so-called "missile gap"—the supposed advantage of the Soviet Union in the field of missile armament—is representative of the contemporary discourse. The United States long possessed the strategic and psychological advantage of knowing its home territory to be protected by two oceans. Technological progress rendered this perception obsolete. The deadly combination of modern missiles and nuclear weapons fueled expectations of a conflict which threatened to destroy American cities and cause immeasurable loss of life. The American heartland was suddenly vulnerable. General Bernard A. Schriever, commander of the Air Force Ballistic Missile Division (AFBMD), described the new threat:

> These two principles—nuclear energy and rocket flight—combine to make the long-range ballistic missile the most awesome military weapon yet contrived by man. Its enormous potency as a weapon comes from the fact that it travels through space, high above the earth, at speeds up to 15,000 miles per hour. From the time of launching, until it drops down unexpectedly on a target, an intercontinental ballistic missile covers a quarter of the distance around the earth in about 35 minutes.[17]

For the first time in its history, the U.S. mainland found itself in danger of suffering a devastating surprise attack. There was neither any real defense, nor an efficient early warning system. Nuclear deterrence, an option with an uncertain effect, was seen as the only way to avoid a nuclear holocaust. Public trust in national security had been deeply shaken by events like the Soviet acquisition of nuclear arms. According to a survey conducted in the mid-1950s, most Americans anticipated that they would more likely perish in a Soviet attack than die from natural causes.[18] Soon, communist space firsts would make matters even worse.

The steady buildup of ever more powerful arsenals on both sides of the iron curtain made the strategy of deterrence a success in the sense that it convinced political leaders of the impossibility of all-out war between nuclear superpowers. Many spectacular weapons tests put unparalleled destructive might on display. Missiles with nuclear warheads became "doomsday machines," non-weapons that could only serve

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[16] John F. Kennedy in *Missiles and Rockets* magazine, 10 Oct. 1960, qtd. in "Selected Statements of President Kennedy on Defense Topics, December 1957-August 1, 1962," 15a, NASA Historical Reference Collection, NASA History Office (NASA HO), Washington, DC, File 12508.

[17] Bernard A. Schriever, "The Search for Peace in Space" (address at National Women's Press Club, Washington, DC, 16 Dec. 1959) NASA HO, File 6387, "Military Use of Space."

[18] Cf. Curtis Peebles, *High Frontier: The U.S. Air Force and the Military Space Program* (Washington, DC: Air Force History and Museums Program, 1997) 3. A good description of the "anxious America" of the 1950s and 1960s is Margot A. Henriksen, *Dr. Strangelove's America: Society and Culture in the Atomic Age* (Berkeley: U of California P, 1997) ch. 3: "Duck and Cover: Civil Defense and Existential Anxiety in America" 87-111.

as deterrents. Thus, direct exertion of military power lost significance as a geopolitical instrument between the superpowers. What remained was a strange kind of peace—held up by mutual fear of the bomb. The United States and the Soviet Union found themselves locked in a state that could be described as an imaginary or virtual war, with all the implied psychological consequences.[19] The Cold War turned into an all-encompassing competition between the two leading capitalist and communist societies that was essentially a surrogate for war. As early as 1955, newspaper magnate William Randolph Hearst, Jr., recognized this development. During a visit to Moscow he cabled the following message to his editors (a copy went to the White House):

> Kruschev [sic] who unquestionably is the boss at present, made clear they still hope achieve communist domination world, but they want confine struggle measures short of war. That is meaning of competitive co-existence. It is the battle we must prepare for now. I think we should prepare for it with program of initiative and enterprise. It means convincing the people of Russia, China, India, as well as Europe, that our system is the best.[20]

The unqualified propaganda success of the world's first artificial satellite, the Soviet *Sputnik 1*, soon confirmed Hearst's words. With its innovations of radar and the atom bomb, World War II had brought a quantum leap in the decisive role of technology in war. The conquest of space was a logical next step in the race for technological dominance. Against the backdrop of fresh memories of the Korean War, fears of a direct confrontation with the sabre-rattling enemy were growing in the United States. With each new phase of the arms race, the political leadership further emphasized the fundamental importance of developing and displaying technological power as a means to provide the necessary credibility to deterrence. The nuclear strikes on Japan in 1945 had anchored in the minds of people all over the world the notion that the nation which led scientifically and technologically would dominate the globe. After *Sputnik*, an idea that had long worked in America's favor came back to haunt the nation. The significance of innovation was strategic and symbolic. As Michael L. Smith described it, with each new weapons breakthrough both superpowers began to emphasize functionally unrelated attributes of their country: "the intelligence of its scientists, the wisdom of its leaders, the superiority of its political system."[21] The same holds true for space technology. Because of its dual use potential, it was largely treated in the same way as other high-tech weapon systems. The air and space industry journal *Aviation Week* wrote in 1961:

> As the chill of the cold war cuts deeper, it becomes increasingly obvious that the United States must devote considerable thought and energy to projecting a realistic image of its strength, vitality and determination to maintain its basic concepts for friends, foes and

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[19] Two insightful texts on this subject are Mary Kaldor, *The Imaginary War: Understanding the East-West Conflict* (Cambridge, MA: Blackwell, 1990) and Bernd Greiner, "Zwischen 'Totalem Krieg' und 'Kleinen Kriegen': Überlegungen zum historischen Ort des Kalten Krieges," *Mittelweg 36* 2 (2003): 2-20.

[20] Qtd. in Walter A. McDougall, "Sputnik, the Space Race, and the Cold War," *Bulletin of Atomic Scientists* (May 1985): 20-25; 20.

[21] Michael L. Smith, "Selling the Moon: The U.S. Manned Space Program and the Triumph of Commodity Scientism," Richard Wrightman Fox and T.J. Jackson Lears, eds., *The Culture of Consumption* (New York: Pantheon, 1983) 175-211; 189.

> neutrals to see and believe. [...] For it is the galloping new technologies of the aerospace frontiers that the world at large has found a readily applicable yardstick by which to measure the relative vitality of the competing systems of the United States and the USSR.[22]

Frank Gibney, a former aide to the House Committee on Science and Astronautics, called *Sputnik* and the successful Russian *Luna* moon probes of 1959 symbols of a strategic "force-in-being," admitting no competitor. Gibney spoke for many when he expressed grave concern over the psychological impact of Soviet space feats on people's minds in sensitive regions such as the Middle East and Eastern Europe: "Where two systems of great military power are locked in a bitter, but bloodless struggle—and looking for allies—a glance at the chess board can have the same effect on a neutral as two years of World War II."[23] Neither in the Soviet Union nor in the United States did the even more impressive manned spaceflight projects develop from an urge of policymakers to discover the origins of our solar system. "'The compelling urge to explore the unknown,'" which President Dwight D. Eisenhower's scientific advisor James Killian called the driving force behind the U.S. space program, Gibney was sure "might make a good motto for a college mountain-climbing society; but an urge, however noble, is not a firm base for national policy."[24] Through its successes in rocketry, the U.S.S.R. was able to create an image of general progress, as well as military and economic power. The United States, too, did not enter the space arena to pursue an expensive scientific hobby. Its actions were primarily driven by the perceived Soviet challenge. The steady decline in world opinion of America's status as world leader, which was to a large extent based on the nation's image of being the foremost technological power, called for a vigorous reaction. NASA was created and Eisenhower initiated Project Mercury. The goal of NASA's first major undertaking was to put an astronaut into space—if possible, before the Russians. Eisenhower only reluctantly accepted the need for a competitive U.S. space program. His successor would soon be ready to take more drastic measures.

War is, as Carl von Clausewitz pointed out, "more than a true chameleon that slightly adapts its characteristics to the given case."[25] If one way of implementing power becomes obsolete, one has to turn to other fields to display prowess. Nikita Khrushchev, encouraged by Soviet victories in space, boasted that communism was now powerful enough to prevail over capitalism without open military conflict.[26] Likewise, more and more influential people in the West considered alternative means to overcome the opposition. Lloyd V. Berkner, a space pioneer and

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[22] Robert Hotz, "Our Best Foot Forward," *Aviation Week and Space Technology* 17 June 1961. Some of the newspaper and magazine sources cited in this essay are given without page numbers. They are taken from NASA's bulletin *Current News*, a collection of news clippings archived at the NASA HO.

[23] Frank Gibney, "The Missile Mess," *Harper's Magazine* (Jan. 1960): 38-45; 44.

[24] Gibney 45.

[25] Carl von Clausewitz, *Vom Kriege*, ed. Wolfgang Pickert and Wilhelm Ritter von Schramm (Hamburg: Rowohlt Taschenbuch, 2002) 23, quote translated by the author.

[26] Cf. Murrey Marder, "Khrushchev Changed East-West Relations," *Washington Post* 16 Oct. 1964: 6F.

widely respected mediator between the American science community and government agencies, wrote in 1959:

> [L]et us seek other measures to protect and to extend the realm of freedom. We have the chance to earn the right to leadership through demonstrating intellectual preeminence. We enjoy the advantages of a free society where diversity of interest and individual initiative are incalculable assets. But we must be aware that there is a race and that we are in it.[27]

In February 1960 Congressman Victor L. Anfuso (D-NY) stressed the psychological impact of symbolic victories:

> Since the theorists themselves believe that no thermonuclear hot war will occur, if both sides keep their guard up, the cold war is likely to be decisive. It is a war of science, economics, espionage and subversion, politics and diplomacy—above all, a struggle for men's minds.[28]

To ordinary people, nuclear parity seemed unreal, said Anfuso. That nation was regarded as superior which could strike the hardest or lead in "some significant and representative activity."[29] Political pressure for reaction culminated in the aftermath of Yuri Gagarin's first human spaceflight in April 1961. The *New York Times* called Major Gagarin a soldier in a propaganda war that had occupied the world since the superpowers had begun fearing the consequences of a thermonuclear conflict.[30] For the newspaper's military expert, Hanson W. Baldwin, the facts were clear:

> No one in high place or with great influence was able to convince President Eisenhower—and so far, apparently, no one has been able to persuade President Kennedy—of the tremendous political, psychological and prestige importance, entirely apart from scientific and military results, of impressive space achievements.[31]

Even though the United States was in reality still by far the strongest military power, Baldwin wrote, a world impressed by the Soviet space feat was led to believe that America had fallen back technologically and, therefore, militarily. He warned of the diplomatic dangers of such impressions. Neutral states might be tempted to side with the Soviets. Even friends and allies could turn away from the United States.

Gagarin's achievement was indeed a turning point. The question was no longer if the U.S. was going to fly to the moon at some point in the future (NASA had made initial plans), but how it could end its unbearable inferiority in space as soon

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[27] Lloyd V. Berkner, "The Impact of Sputnik," Eugene M. Emme, ed., *The Impact of Air Power: National Security and World Politics* (Princeton, NJ: Van Nostrand, 1959) 849-55; 855.

[28] Victor L. Anfuso, "Is Space a Way to Peace or War?" (address at National Secretaries Association, Washington, DC, 16 Feb. 1960) *Cong. Rec.* 17 Feb. 1960: A1345.

[29] Anfuso 1346.

[30] Cf. Harry Schwartz, "Moscow: Flight Is Taken as Another Sign That Communism Is the Conquering Wave," *New York Times* 16 Apr. 1961. See also Marvin Miles, "Satellite Bomb Possible, But—," *Los Angeles Times* 16 Apr. 1961; "Space Flight Puts a Foe 100 Miles from All U.S.," *Washington Star* 19 Apr. 1961.

[31] Hanson W. Baldwin, "Flaw in Space Policy: U.S. Is Said to Lack Sense of Urgency in Drive for New Scientific Conquests," *New York Times* 17 Apr. 1961.

as possible. An American space first was needed that would produce dramatic results. "There's nothing more important," Kennedy told his advisors.[32] People had elected him because he had promised to make America second to none again. Only about a week after Gagarin, the Bay of Pigs fiasco suggested that Americans had voted for a president who was inexperienced, if not incompetent, in foreign affairs. After the negative experiences in Laos and the Congo, the setback in Cuba was one more Cold War defeat of the kind the young leader had pledged to avoid. Kennedy needed to channel public interest away from these issues quickly. A new task had to be found that would identify Kennedy with a cause and unify the nation behind his administration.[33] The conquest of space for the welfare and security of the "free world" looked like a promising solution. Some even suggested it could be the purpose that the nation had been searching for in the face of spreading communism.[34]

Mobilization

On May 25, 1961, before departing to a summit meeting with Khrushchev in Vienna, Kennedy addressed the Congress. His special message on "urgent national needs" was an unusual second state of the union address. He described the grave situation on the geopolitical chessboard:

> These are extraordinary times. And we face an extraordinary challenge. Our strength as well as our convictions have imposed upon this nation the role of leader in freedom's cause. [T]he adversaries of freedom plan to consolidate their territory—to exploit, to control, and finally to destroy the hopes of the world's newest nations; and they have ambition to do it before the end of this decade. It is a contest of will and purpose as well as force and violence—a battle for minds and souls as well as lives and territory. And in that contest, we cannot stand aside.[35]

The president talked about economic and military assistance to "free world" countries in a partnership for self-defense. He then announced new programs to build fallout shelters to strengthen civil defense. Near the end of his speech, Kennedy made the announcement that, unlike any other political directive, secured him a place in the collective memory of his people and the world:

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[32] Qtd. in Hugh Sidey, *John F. Kennedy: President* (New York: Athenaeum, 1963) 123.

[33] Cf. Michael R. Beschloss, "Kennedy and the Decision to Go to the Moon," Launius and McCurdy 51-67; 56. See also Logsdon, *Decision* 112; Logsdon, "The Challenge of Space: Linking Aspiration and Political Will," *Blueprint for Space: Science Fiction to Science Fact*, ed. Frederick I. Ordway and Randy Liebermann (Washington: Smithsonian Institution P, 1992) 147-54; 150.

[34] Eisenhower had established a commission for national goals, a project financed by the Rockefeller Foundation worked on the same problem, and *Life* magazine printed a series of essays on the topic of "The National Purpose." John K. Jessup et al., *The National Purpose* (New York: Holt, Rinehart and Winston, 1960); John W. Jeffries, "The 'Quest for National Purpose' of 1960," *American Quarterly* 30 (1978): 451-70.

[35] U.S. President, *Public Papers of the Presidents of the United States* (Washington: GPO, 1962) John F. Kennedy, 1961, 396-97.

> I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth. [I]t will not be one man going to the moon [...] it will be an entire nation. For all of us must work to put him there.[36]

Kennedy found a focal point with the goal of a moon landing before the end of the 1960s. An American setting foot on the moon would be the symbolic climax of an epic earthly power struggle. At the start of the Kennedy presidency, an uncertain America in need of a clear national purpose accepted the space challenge as a welcome instrument to prove that it was still capable of taking on a task that others thought impossible to accomplish. The intense superpower rivalry stimulated public patronage, as well as political and moral support for large research and development programs that were thought to be indispensable to national security. Driven by the need to counter Soviet successes, the United States was going to mobilize in peacetime the biggest technological project in its history. Apollo would restore the nation's lost self-confidence by offering a strong traditional sense of mission and reaffirm its status as the world leader. The moon landings were going to be triumphs of American engineering. Once the formidable task in the "battle for minds and souls" was accomplished, there would be no more doubt about true global power relations. The numerous newly independent countries in the Third World that the superpowers sought to impress with their space programs would be won over for the West.[37] Linda T. Krug described the new astropolicy that was expressed in Kennedy's moon speech and many other statements on space. Her analysis showed that "what was at hand was not just a *race* but also a *struggle*. Kennedy, in other words, turned our attention away from the competitive process that underlies any ordinary *race* and toward the outcome; he fashioned an attitude of 'winner takes it all.'"[38] Unlike Eisenhower, Kennedy openly accepted the space race. He went even further and declared this contest a decisive theater of the Cold War. The fate of the nation was linked with the acceptance of the challenge to race for the moon. Interestingly, the Soviets never officially made that challenge, but the American side always implied it. The purpose of Kennedy's commitment was twofold. First, it was to demonstrate the superiority of the U.S. political system and the American way of life. Second, it was to keep the communist system in check, and,

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[36] Kennedy, *Public Papers, 1961*, 404.

[37] A memo the vice-president wrote to Kennedy about a month before the official decision to go to the moon was explicit about this particular goal: "This country should be realistic and recognize that other nations, regardless of their appreciation of our idealistic values, will tend to align themselves with the country which they believe will be the world leader—the winner in the long run. Dramatic accomplishments in space are being increasingly identified as a major indicator of world leadership." Lyndon B. Johnson (memorandum for the President, "Evaluation of the Space Program," 28 April 1961), John M. Logsdon, ed., *Exploring the Unknown—Selected Documents in the History of the U.S. Civil Space Program*, Vol. 1, *Organizing for Exploration* (Washington, DC: NASA, 1995) 427-29; 427. See also Walter A. McDougall, "Technocracy and Statecraft in the Space Age—Toward the History of a Saltation," *American Historical Review* 87:2 (1982): 1010-40; 1025; McCurdy, *Space and the American Imagination* 97.

[38] Linda T. Krug, *Presidential Perspectives on Space Exploration: Guiding Metaphors from Eisenhower to Bush* (New York: Praeger, 1991) 32.

in the long run, help to bring about its downfall. Therefore, this surrogate for war was not only important for the self-esteem of a world power. It was deemed crucial for its survival. The space race would become the most visible Cold War front of the 1960s, because of its unique symbolism and ability to capture world interest.

At the outset of the space age, there were many different views on the true meaning of the cosmic struggle for preeminence. Many expected the end of geostrategic parity through the conquest of space. Military men sought to secure what they often called the "new high ground." They wanted a strong military presence in space and worked to reverse the political tendency toward a predominantly civilian national space effort. Others wanted to avoid at all costs the spread of earthly conflicts into the cosmos. For them the race to the moon with civilian space vehicles would be an alternative to war that might function as a kind of superpower "space Olympics." Leonard S. Silk of *Business Week*, later longtime economic analyst for the *New York Times*, explained the advantages of this type of operation:

> [W]e have devised this scientific adventure [...] as a means of giving employment to our scientists and engineers and, at the same time, of giving entertainment to the masses, just as the Middle Ages invented the tournament to give employment to warlike knights and to provide fun and games for the people (because you simply couldn't be waging real wars all the time—that would be simply too destructive). This new version of the medieval tournament, the race into space and other sectors of the unknown, has, in a highly industrialized society, the added advantage of providing opportunities for industry, and thus preventing a breakdown in the existing economic, political, and social order.[39]

As Silk noted rather optimistically, the race had, apart from its entertainment value, other useful side-effects, such as the stimulation of the economy and the stabilization of society. Another bonus was the fact that the contest in space with manned satellites, in contrast to the arms race on the ground, brought only minimal danger of direct violent acts,[40]—at least for the time being. Even if they had wanted to fight, the crude early space vehicles were technically far from being able to engage in dogfights. However, the lack of a means to wage war in space did not lead to peaceful feelings. At the height of the Cold War in the nuclear age, there was no need for shots fired in order to mobilize an already anxious America. Anxiety over its technological inferiority—whether real or imagined—incited an urgency that had thus far only appeared in times of war.

Soviet secrecy and pompous propaganda led to one Western misjudgment after another. After the bomber gap, it was the missile gap, and the space gap soon followed. Washington would rather suppose the men in the Kremlin were pursuing an overly aggressive cosmic campaign than later be punished for neglecting the country's open flank in space. Historically, it is common that every new medium mastered by humankind is immediately used for military purposes. First, one fought on water, then in the air. It would not be long until unfriendly acts were

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[39] Leonard Silk, "John Q. Public and the Space Age," Oscar H. Rechtschaffen, ed., *Reflections on Space: Its Implications for Domestic and International Affairs* (Colorado Springs: U.S. Air Force Academy, 1964) 63-67; 64.

[40] Cf. Robert Jastrow and Homer Newell, "The Space Program and the National Interest," *Foreign Affairs* 50 (April 1972): 532-44; 533.

committed in space.[41] Therefore, Charles R. Coble, Jr., of the Air Force Academy, wanted a space program that focused on preemptive measures. He compared the value of the evolving space technology with the invention of gunpowder. The deployment of this technology would secure the survival of a people or a country. This argument is still popular today, as the current U.S. administration legitimizes preemptive military actions to keep "rogue states" from acquiring weapons of mass destruction. Coble argued that in the space age there was no time for adopting a policy of wait and see. A country merely trusting in its traditional ability to react could quickly find itself in a weak position that was irreversible:

> "Time compression" is a term used to describe the increasingly obvious fact that the time span of the traditional cycle [...] (technology appears, it is assimilated, applied, and ultimately exploited, perhaps in a decisive way) has decreased at almost an exponential rate, and continued to decrease.[42]

The effects of time compression were especially grave in the Cold War setting. The iron curtain could shield secret developments of new weapon systems. It could be much too late to react when they were finally discovered. "Sequential or true reactions as a mode of defensive arms race activity suffer from the limitation that the United States is competing with a very closed society," wrote Colin S. Gray: "To await firm evidence of Soviet system development action would be to accept a technological lead time disadvantage in excess of five years."[43] Even the advocates of peaceful competition in space did not want this to happen.

The cosmos provided an ideal arena for those unconvinced by the notion of peaceful coexistence. The feuds they believed to be inevitable could be decided in space. Wernher von Braun, who portrayed himself as a peace-loving visionary despite his role in creating weapons for both Nazi Germany and the United States, thought space could save the earth from a self-destructive war: "If man must fight, let him fight out there."[44] Von Braun was a key figure in the technological war, whose frontlines lay in the factories and laboratories of the U.S. and the Soviet Union. In his native Germany, a country dependent on missile deterrence, von Braun was held in the same high esteem for being a Cold War soldier as he was in the United States. After the successful launch of *Explorer 1*, America's answer to *Sputnik 1*, the West-German news magazine *Der Spiegel* hailed him and his rocket team as "Deutsche an der Front."[45] There were other experts who foresaw fighting in space. They recommended waging war as far away from the earth as possible. Nuclear physicist S.E. Singer, a member of the Washington Defense Atomic Support Agency, hoped for a reconsideration of the conventions of warfare between super-rich superpowers under the unconventional circumstances of the Cold War. In an article for *Space Digest* he wrote:

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[41] Cf. Philip Siekman, "The Fantastic Weaponry," *Fortune* 65.6 (1962): 156-59, 214, 216, 218, 223-24. See also G.K.C. Pardoe, *The Challenge of Space* (London: Chatto & Windus, 1964) 18.

[42] Charles R. Coble, Jr., "Space: The Policy Dilemma," Rechtschaffen 177-79; 178.

[43] Colin S. Gray, *The Soviet-American Arms Race* (Westmead: Saxon House, 1979) 22.

[44] Qtd. in Lew Cole, "Moon Race Urged Instead of War," *Cleveland Press* 31 Aug. 1961.

[45] *Der Spiegel* 12 Feb. 1958.

> Space warfare as a form of limited warfare is a possible solution to this dilemma, and the moon and its environs are close enough to the prospective combatants to be convenient but far enough from the inhabitants of earth to ensure their safety. At first blush the use of the moon as a locale for conducting limited war is surely somewhat fantastic. The possible annihilation of mankind in a total nuclear war is also fantastic. Perhaps a fantastic problem requires a fantastic solution.[46]

Walter Dornberger, who had been von Braun's superior in the V2 program in Peenemünde and now was working for Bell Aerosystems, imagined the peacetime use of weapons in space. He foresaw "a kind of hide-seek-and-destroy war game [...] costing a lot of money, leading to no political decision, but preventing war on earth."[47] These are just a few of the voices expressing such hopes and fears. Such views far outnumbered those that did not perceive space as a decisive component of America's future.

Although Kennedy chose to answer the Soviet challenge with a "peaceful" effort, statements by the people directly involved in the nation's civil space program show that they were convinced to be *fighting* for a good cause in space. In a speech on future space activities, for example, the head of the Office of Manned Spaceflight (OMSF), Brainerd Holmes, said in early 1962:

> We are [...] compelled to achieve and maintain leadership in space research and technology because our own fate as a free nation and, in fact, the fate of human civilization as we know it, will depend upon whether the spacecraft of the future are devoted to peaceful purposes or to the destruction of the human race.[48]

Two months later, *Life* recounted the following incident from the OMSF:

> A few weeks ago Brainerd Holmes [...] found himself in an elevator with a secretary. Turning to him, she said, more by way of support than rancor, "I'd just like you to know, Mr. Holmes, that there hasn't been anything like this in Washington since the war." Holmes tells of this confrontation with pride, for as boss of the U.S. moon program he feels he is fighting a kind of war and likes to think that his staff feels the urgency. He has at least one tangible enemy—a Russian man-to-the-moon team which no doubt keeps its engineers and secretaries working late too.[49]

The feeling of being part of an overall effort to fight a "kind of war," as it was described in the *Life* article, was very common during the Cold War. Many Americans were convinced that their work was an important contribution to the containment of communism. Members of the space program were especially motivated in this respect. Many NASA employees worked in relative isolation at a frantic pace for years on end. A lot of them did not even take notice of important events in their country or elsewhere in the world outside of Apollo. "I missed the entire Vietnam War," said one. "I watched no television, read no newspapers, came to work at six

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[46] S.E. Singer, "The Military Potential of the Moon," *Space Digest* (Jan. 1960): 62-65; 63.

[47] Qtd. in Siekman, "Military Challenge" 30-31.

[48] D. Brainerd Holmes, "Forseeable Activities in the Space Age: What We Must and Will Do" (address at Engineers, Scientists, and Architects Day, Washington, DC, 21 Feb. 1962), NASA News Release No. 62-38, NASA HO, File 7068, "Apollo General, 1962."

[49] "Our Next Goal: Man on the Moon," *Life* 27 April 1962, 62-67, 81-82B, 85; 81.

in the morning and worked until nightfall, six or seven days a week for years."[50] The space race had an emotional side to it that reached far beyond the science and technology of the actual space flights or the pursuit of personal careers. Christopher C. Kraft, longtime NASA flight director, recalled in his *Flight: My Life in Mission Control* how serious he and his colleagues took their contribution to the fight:

> We knew that, come hell or high water, we were going to put an American into orbit around the world. And we knew that more than national pride rested on beating the Russians to the punch. This space race wasn't a game. It was deadly damn serious, and the future of our American way of life was at stake.[51]

Other NASA veterans described their job as being "almost a crusade," unlike any other work they had ever done.[52] In her study on NASA technicians, Sylvia D. Fries called the early careers of her sample of Apollo-era engineers indicative of "the successful mobilization by the United States of the civilian, technical manpower to wage the Cold War."[53]

There was sustained bipartisan political support for Apollo. Congressman J. Edward Roush (D-IN) interpreted the moon shot as a good method "to go on the offensive in a peaceful way in this great battle in the cold war."[54] His colleague H.R. Gross (R-IA) agreed: "In this cold war fight with the Communists, the new battlefield is space."[55] Even NASA's Associate Administrator for Space Science and Applications, Homer E. Newell, a man mostly concerned with getting as much science as possible out of the prestige flights, also viewed the cosmic competition in geopolitical terms. Here was a chance to beat the enemy without firing a shot. Superior American economic potency would make a difference, as he told the House Space Committee in March 1965:

> One of the major advantages of mounting a comprehensive scientific and engineering effort for the exploration of outerspace in competition with the U.S.S.R. is that it is a game we can well afford to play, in contrast to the arms race. In the game with nuclear warheads, there are no winners. Our economy is larger and more viable than Russia's. The Soviet Union can compete in space only by subtracting what it puts into it from what otherwise would largely have gone into military budgets.[56]

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[50] Qtd. in Charles Murray and Catherine Bly Cox, *Apollo: The Race to the Moon* (London: Secker & Warburg, 1989) 308.

[51] Chris Kraft, *Flight: My Life in Mission Control* (New York: Dutton, 2001) 67. See also Glen E. Swanson, ed., *"Before This Decade Is Out... ": Personal Reflections on the Apollo Program* (Washington, DC: NASA SP-4223, 1999) 220; Howard E. McCurdy, *Inside NASA: High Technology and Organizational Change in the U.S. Space Program* (Baltimore: Johns Hopkins UP, 1994) 166.

[52] Murray and Cox 459.

[53] Sylvia D. Fries, *NASA Engineers and the Age of Apollo* (Washington, DC: NASA SP-4104, 1992) 82.

[54] *Cong. Rec.* 1 Aug. 1963: 13882.

[55] *Cong. Rec.* 1 Aug. 1963: 13887.

[56] Qtd. in Congress, Senate, Committee on Aeronautical and Space Sciences, *Soviet Space Programs, 1962-65: Goals and Purposes, Achievements, Plans, and International Implications*, staff report, 89th Cong., 2nd sess., 30 Dec. 1966, 127. See also "Marsch zum Mond," *Der Spiegel*, 2 May 1962, 90, 93-94; 90.

Apollo's advocates came from two influential groups, namely the establishment of the military-industrial network and the media. The first group included Pentagon strategists, representatives of the aerospace industry, weapons manufacturers, scientists and engineers working in research and development for defense. They had their allies among civil and military authorities, members of Congress, and presidents who found a strong space program to be politically useful.[57] For the mass media, space was a perfect topic. The Cold War and human drama were staged in front of the fascinating background of space. This was a scenario that needed no criticism or controversy to keep the audience interested. The space race was primarily executed through the media. The opponents observed one another through media representation and media filters. Neither country actually faced its adversary in space. The race itself was also heavily influenced by the media. Because most of the discussions on astronautics took place in or were covered by the press or television, the success of the American technological campaign depended on the positive display of its achievements on a massive scale.[58] This odd symbiosis between the national news media and the space program affected news reports. An enthusiastic style based on both patriotism and a love of technology pervaded. Many early reports on the U.S. space program certainly lacked professional standards of critical journalism. Rooting for the "home team" seems to have been more important than asking enlightening questions.[59] Cosmic adventures and the significance of the missile race for national security—which was always underscored—made "space" one of the most prominent media topics of the 1960s. The editors of daily newspapers and radio stations affiliated with the Associated Press voted space the top story of 1961. Later surveys showed that not even the war in Vietnam—often called the prototypical "media war"—or the assassinations of Robert Kennedy and Martin Luther King got more media attention than the astronauts and their moon expeditions.[60] In its early years, NASA had no difficulty convincing taxpayers of the necessity of its extensive operations. Patriotism reinforced the coalition of interests behind the space program and rendered serious criticism ineffective.

Space Heroes—The Role of the Astronauts

Right from the start, the astronauts were to play the leading role in the conquest of space. They gave the program a face people could identify with and relate to the complex technical events. The extensive and, initially, always positive media cover-

[57] Cf. Smith, "Selling the Moon," 175; Ken Hechler, *Toward the Endless Frontier: History of the Committee on Science and Technology, 1959-79* (Washington, DC: U.S. House of Representatives, 1980) 170-71; 175; Kauffman 98-101.

[58] Cf. Byrnes 147.

[59] Cf. Edwin Diamond, "The Dark Side of the Moon Coverage," *Columbia Journalism Review* (fall 1969) 10-17; 14.

[60] Cf. Tom Henshaw, "Man in Space Is Tops," *Huntsville Times* 28 Dec. 1961; "Moon Flight Voted Top News of 1968," *Washington Evening Star* 26 Dec. 1968; "Why Moon Flight Was Biggest News," *Times-Picayune* 2 Jan. 1971; "Apollo Hit the Headlines," *Washington Daily News* 3 Dec. 1970; "Apollo 13 Selected Top Story," *Washington Star* 28 Dec. 1970. See also Atwill 70-71.

age turned the elite pilots into celebrities before they even flew into space. Their actual missions made them national heroes. America loves heroes and therefore it loved space. John Glenn and his comrades were textbook idols. They were successful, hard-working, male, white, Protestant, and most of them came from simple, small-town backgrounds. Whether by flying combat missions in enemy airspace over Korea or by serving as death-defying test pilots at home, they had literally proven that they were up for higher tasks. In space, they personified the ideal American pioneer at the frontier of civilization, who, in a vertical extension of "Manifest Destiny," broke new ground for the nation. Tom Wolfe called them "single combat warriors"—contenders who, in an age-old ritual, would fight on behalf of their people to decide the fate of all.[61] After their return from space, the heroes were celebrated in Congress. Presidents gave them medals and sent them on goodwill tours around the world as ambassadors of the American way of life. Political leaders could point to NASA's work as an exciting state-sponsored civilian project and a positive example of science and technology under control during times of great public anxiety about a military-industrial complex getting out of hand. A country in disarray over racial unrest, poverty, an emerging counter-culture, and military failures abroad could still find solace in its accomplishments in space. The otherwise divided nation found itself united with pride in their astronauts whenever they flew again. Journalist Hugh Sidey later described the phenomenon as follows:

> They came one by one—Carpenter, Schirra, Cooper, Young, McDivitt, White, Conrad—counterweights to Bull Connor with his dogs in Birmingham and Lester Maddox and the ax handles in Georgia. When the Viet Cong began to move through the jungle shadows in Southeast Asia, American spacemen were taller and more visible than ever. They became the one secure thread binding a nation becoming more divided.[62]

America's strongest patriotic experience in astronautics, apart from the first moon landing, was John Glenn's Mercury flight. On February 20, 1962, a modified Air Force Atlas ICBM carried the first "free man" into orbit around the earth. An estimated 135 million television viewers followed the event. Glenn became a household name and was the epitome of the nation's effort to catch up with the Russians. The U.S.S.R. would score further propaganda victories like the first simultaneous flight of two space capsules and the first woman in space. But in the struggle for worldwide recognition, the U.S. method of executing its high-risk missions in the fierce light of publicity was a big advantage. The successes of these deliberately peaceful space expeditions were strong arguments for the American cause. The perceived openness of the American operation stood in sharp contrast to the secrecy of the Soviets, who always reported about space events after the fact and treated the names of their key rocket designers as state secrets. A proud Kennedy told the nation that Kremlin chief Khrushchev had sent his congratulations on Glenn's outstanding feat. Four million people lined the streets of New York at a ticker tape parade for this space soldier and future senator from Ohio.

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[61] Tom Wolfe, *The Right Stuff* (New York: Farrar, Straus, and Giroux, 1979) 122-26.

[62] Hugh Sidey, "Pioneers in Love with the Frontier," *Time* 10 Feb. 1986: 29.

A Moral Equivalent of War?

Was the space race of the 1960s the kind of "moral equivalent of war" that philosopher William James had envisioned? "The military feelings are too deeply grounded to abdicate their place among our ideals until better substitutes are offered than the glory and shame that come to nations as well as to individuals from the ups and downs of politics and the vicissitudes of trade," James wrote in 1910, responding to the naval arms race between Great Britain and Germany. As if he could foresee the Cold War, he went on:

> "Peace" in military mouths to-day is a synonym for "war expected." [...] Every up-to-date dictionary should say that "peace" and "war" mean the same thing, now *in posse*, now *in actu*. It may even reasonably be said that the intensely sharp competitive *preparation* for war by the nations *is the real war*, permanent, unceasing [...].[63]

James did not yet see a substitution of war as the only institution able to discipline whole societies. Nevertheless, he hoped that someday war would be replaced, for the good of mankind, by an occupation of similar fascination and power to move the masses:

> But I have no serious doubt that the ordinary prides and shames of social man, once developed to a certain intensity, are capable of organizing such a moral equivalent as I have sketched, or some other just as effective for preserving manliness of type. It is but a question of time, of skilful propagandism, and of opinion-making men seizing historic opportunities.[64]

With the space age, that moment seemed to have come. A report issued by the House Committee on Science and Astronautics in August 1961 referred to scientists who found astronautics to be the solution. It pointed out "that the conquest of space may prove to be the moral equivalent of war by substituting for certain material and psychological needs usually supplied through war." The study held that the "absorption of energies, resources, imagination, and aggressiveness in pursuit of the space adventure may become an effective way of maintaining peace."[65] The following paragraph from the same report shows the kind of optimistic belief in progress that is typical of contemporary space discourse:

> Indeed, there are some who already foresee a complete substitution of space for defense, and who prognosticate that in the 1990's "the economy of nations is now based on the astronautics industry, instead of war." Certainly, some new economic force would be crucial to nations deprived of the need for devising and manufacturing weapons.[66]

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[63] William James, *The Moral Equivalent of War and Other Essays* (1910; New York: Harper & Row, 1971) 3, 6.

[64] James 7.

[65] Congress, House, Committee on Science and Astronautics, *The Practical Values of Space Exploration (Revised August 1961)*, staff study of the Committee on Science and Astronautics, 87th Cong., 1st sess. 17 Aug. 1961, 22.

[66] Congress, House, *Practical Values of Space Exploration*, 41. Some enthusiasts even compared the importance of astronautics for twentieth-century America with the social impact of the railroad in the nineteenth century. In order to present the positive role of astronautics for the future development of the nation, a socio-scientific study financed by NASA paralleled the space age with the heyday of the railroad. Cf. Bruce Mazlish, ed., *The Railroad and the Space Program: An Exploration in Historical Analogy* (Cambridge, MA: MIT P, 1965).

Eventually, the space program's impetus toward national integration and a new sense of purpose turned out to be stronger than the utopian prospect of a complete abolition of war and its replacement by a peaceful competition for space firsts or even international cooperation in space. Colin Gray outlined the domestic social and political stability the "power elite" and "national security managers" sought to generate through interstate competition:

> The fears, alarms and satisfactions that necessarily attend an arms race wonderfully concentrate the public mind in "healthy" ways. Patriotic feeling is encouraged, national solidarity and identification is enhanced, authority—political, military, economic and social—should be strengthened in the face of foreign danger.[67]

Kennedy spoke in that respect in an address at Rice University on September 12, 1962: "We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills [...]."[68] It is hardly surprising that this initiative was embraced by the aerospace business. The vice-president of General Electric, George L. Haller, was one of many industry leaders who were taken with Kennedy's drive for large-scale technological competition. In a hearing before the House Committee on Science and Astronautics, Haller stated:

> One of the added values of the manned space flight program is its ability to marshal the spirit of the American people in support of a rather magnanimous national effort. In my lifetime I have only seen this attitude manifested in the grim determination to defeat our enemies on the battlefield.[69]

In addition to defense against outside threats, the space program was used politically as an instrument of national integration. As *Newsweek* wrote two weeks before the triumph of *Apollo 11*:

> Yielding success, it was a mirror that could confirm the American self-image. Here, the dream could come true, however sticky the going in Vietnam or in the cities, however frustrating the revolt of the young and the black. Clean, empty, amenable to rational analysis and injections of money, space has become an outlet uniquely matched to the energies and talents of the country in a period when it needs success.[70]

If the U.S. space program was later often criticized as being a giant waste of money, it was initially praised just as often for being a constructive effort that used superpower competition to foster economic growth and bring out the best in people and institutions.[71] In this regard, one can compare the U.S. space program of the 1960s with the extensive buildup of the German navy around 1900. Here too, in a delicate balance of power between Great Britain and Germany, two great powers were

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[67] Gray 32.

[68] U.S. President, *Public Papers of the Presidents of the United States* (Washington: GPO, 1963), John F. Kennedy, 1962, 669.

[69] Qtd. in Vernon van Dyke, *Pride and Power: The Rationale of the Space Program* (Urbana: U of Illinois P, 1964) 149.

[70] Henry T. Simmons, "Go for Apollo," *Newsweek* 7 July 1969.

[71] Cf. Jay Holmes, *America on the Moon: The Enterprise of the Sixties* (Philadelphia: J.B. Lippincott, 1962) 26.

locked in an arms race that was at the cutting edge of technology. As a big engineering project, it was not directed at a goal as concrete as the voyage to the moon, but it featured the same fixation on symbols of superior national vitality that would bring domestic social discipline and political integration even in peacetime. In the bipolar Cold War world, this aspect was even more important. The political elite itself was insecure about the role of the space arena, but at the same time knew how to take advantage of public apprehensions over an omnipresent nuclear threat. Their politics was often based on rhetoric that was tantamount to the proclamation of a state of emergency. A steady flow of oversimplified and exaggerated depictions of the communist threat to America and the "free" (i.e., the non-communist) world helped legitimize expensive large-scale technological plans and projects. In a conflict that was often characterized as a struggle of good versus evil, the pursuit of "permanent preparedness" required a total mobilization of society.[72] Arguably, the most important act in this existential drama was NASA's campaign for preeminence in space. The mobilization for the early U.S. space projects is often compared, in relative scale, with the American effort during World War II.[73] In a very short period of time, the U.S. saw a nationwide buildup of the necessary infrastructure. The rapid development of space technology created America's new "arsenal of democracy." NASA's annual budget rose from under 500 million dollars in 1960 to 5.2 billion in 1965. For a long time, Congress, the White House, and the American taxpayers were united in their will to spend whatever it would take to overcome the crisis in space. By mid-1971 the United States had spent about 60 billion dollars on civil and military space projects. Apollo alone would amount to roughly 25 billion dollars. About half a million people worked to make this project a reality.[74]

In many ways, the space race was an equivalent to war. But was it morally sound? When the decade of competition outlined by Kennedy had elapsed, public sentiment had all but turned on Project Apollo. Kennedy was gone and the fear of impending nuclear war had gradually subsided since the Cuban missile crisis of 1962. The successful space program was overshadowed by negative headlines on the war in Vietnam. On the day of the first lunar landing, July 20, 1969, a *New York Times* editorial headline read: "Heroic Materialism Is Not Enough." Like a number of his colleagues, its author condemned Apollo, considering it an expensive form of escapism that brought only a "brief uplifting of the spirit."[75] However diverse opinions were on the world's biggest single technological project, Apollo was without a doubt a quintessentially American phenomenon. A young president with a highly competitive character had rallied the nation behind his choice instrument of crisis management. As Charles Murray and Catherine Bly Cox described it:

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[72] Cf. Robert H. Johnson, *Improbable Dangers: U.S. Conceptions of Threat in the Cold War and After* (London: Macmillan, 1994) 32-33, 37. See also Greiner 9-11.

[73] Cf. Sylvia K. Kraemer, "Organizing for Exploration," Logsdon, *Exploring* 1:613.

[74] Science Policy Research Division, Library of Congress, Washington, DC, *United States and Soviet Progress in Space: Some New Contrasts*, Congressional Research Service report by Charles S. II. Sheldon, 12 Jan. 1971, 1.

[75] Anthony Lewis, "Heroic Materialism Is Not Enough," *New York Times* 20 July 1969.

> Kennedy's Apollo was not a spacecraft, not an engineering project, not a means of adding to man's scientific knowledge. Kennedy's Apollo was a heap of chips pushed to the center of the table. Kennedy's Apollo came out of a long and honored tradition of great American boasts—that we could whip the British, cross the Rockies, build taller buildings, grow more corn and make better mousetraps than anyone else. Childish boasts, some would say, for there was never anything subtle about them: "Anything anyone else can do, America can do better." But there was always an added clause that gave them weight and dignity: "If you don't believe it, just watch us."[76]

From Conquering Space to Exploring the Universe

In the mid-1960s, astronauts and cosmonauts duelled for space firsts in two-seater spacecraft. Alexei Leonov achieved a ten-minute "space walk" in the spring of 1965. Photographs showed Leonov as the first human being floating freely in space. He wore the Cyrillic letters "CCCP" on his helmet, the emblem of the enemy. David West Reynolds wrote about Edward White, the *Gemini 4* astronaut, who matched the feat: "His nation had prepared him as well as it could, and now he was on the front line." White's space suit, sporting a big American flag on the sleeve, looked like space age armor: "The photos [...] revealed his space walk to the world in all its glorious color, and an amazed America shared in the space knight's heroism."[77] The Mercury and Gemini projects already indicated that the U.S.S.R. had awoken a sleeping giant. As the U.S. space program began to score its own firsts, and the gap between Soviet and American achievements in rocketry was visibly closing, public discourse on space showed signs of growing tensions between support and criticism. More and more people questioned whether the goal was worth its price. Was there a space race at all? This question was often raised in longer phases without Soviet spaceflights. One of the sharpest criticisms of the mid-1960s came with Amitai Etzioni's book *The Moon-Doggle.* The Columbia University sociologist called the U.S. space program a crude imitation of Soviet propaganda acts, without any real scientific perspective. He attacked the space hawks, arguing that

> [O]nce the Russians show that they can bomb any corner of the earth, who cares if they can bomb the moon too? [...] Some observers claim that we are so insecure that we need these spectaculars not to impress allies, third nations, or the Russians, but ourselves.[78]

Where were all those countries that were expected to join the communist camp after *Sputnik* and Gagarin? Only Cuba had since turned communist and its decision had little to do with developments in space. Etzioni lamented America's tendency to get caught up in technology and materialism: "[W]e seek to uphold humanist concerns and a quest for a nobler life under the mounting swell of commercial,

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[76] Murray and Cox 447.

[77] David West Reynolds, *Apollo: The Epic Journey to the Moon* (New York: Harcourt, 2002) 49. See also "The Glorious Walk in the Cosmos," *Life* 18 June 1965: 26-39.

[78] Amitai Etzioni, *The Moon-Doggle: Domestic and International Implications of the Space Race* (Garden City, NY: Doubleday, 1964) 156, 159.

mechanical, and mass-media pressure."[79] Other critics demanded the use of comparatively cheaper satellites and probes for the conquest of space and to use the money saved on public healthcare or the war on poverty. According to them, successes on earth were more likely to earn worldwide respect for America. "This is a moral issue, and we are making the wrong choice," warned the famous nuclear physicist Leo Szilard. "To race the Russians to the moon and let our old people live on almost nothing is immoral. The moon is not science—not bread. It is circus. The astronauts are the gladiators. It's lunacy, I say."[80] This kind of protest against overly prestige-oriented projects in space came from the scientific community. Among its most prominent figures were Vannevar Bush, organizer of the Manhattan-Project, Philip H. Abelson, editor of *Science* magazine, and physicist and Nobel laureate Polykarp Kusch.[81] Their arguments were continuously countered by political hardliners who emphasized national security issues. Their popular domino theory worked well in the debate on space, too. Once the Soviets controlled inner space and the moon, the whole planet would soon be at their mercy. In May 1963, Senator Clinton P. Anderson (D-NM) drew a parallel between the space race and the Korean War. He explained that in Korea, 5.8 percent of U.S. officers lost their lives fighting the Communist. About as many American scientists were now engaged at the technological front in space. This sacrifice was as noble as it was absolutely necessary, Anderson held.[82]

During the Johnson administration, the space program came under increasing pressure in the face of rising expenditures for the war on poverty at home and the war against the Vietcong abroad. Even Johnson, who had been the most ardent space supporter among political leaders, soon saw his interests diverted to other problems when he became president. Faced with a choice between the elusive space exploration or solving the country's inner city problems, most voters would rather spend their tax dollars closer to home. To many, space projects seemed like an embarrassing national self-indulgence. Consequently, a large cutback of funds and a far-reaching demobilization of the NASA-industry space machine for the time after Apollo was not surprising.[83] Space had lost much of its potential to scare Americans. Johnson did not even mention it in his State of the Union address of 1966. However, the conquest of space—with Apollo as its most prominent symbol—remained an important contribution to the containment of communism for both the public and policymakers.[84] The perceived need to keep up with or

[79] Etzioni 195.

[80] Qtd. in Rechtschaffen 118.

[81] Cf. Congress, Senate, Committee on Aeronautical and Space Sciences, *Scientists' Testimony on Space Goals*, Hearings, 88th Cong., 1st sess., 1963, 51-53, 63, 66. See also Albert Eisele, "Nobel Winners Criticize Moon Project," *Washington Post* 6 May 1963; Vannevar Bush, "Moonshot Opposed," *New York Times* 17 Nov. 1963.

[82] Cf. *Cong. Rec.* 24 May 1963: 8963.

[83] Cf. W. Henry Lambright, *Powering Apollo: James E. Webb of NASA* (Baltimore: Johns Hopkins UP, 1995) 140-41; Robert Dallek, "Johnson, Project Apollo, and the Politics of Space Program Planning," Launius and McCurdy, 68-91.

[84] Cf. Evert Clark, "Moon Plan Given Backing in Polls," *New York Times* 15 Nov. 1964.

ahead of the enemy was at least sustained long enough to insure Apollo's success. Except for a tragic accident in January 1967, when three astronauts died in a ground rehearsal, the well-oiled NASA machine marched on to the moon. Dramatic Soviet space achievements had become rare. The development of the world's first space station (*Salyut* became operational in 1971) was still discussed as potentially dangerous for U.S. national security.[85] However, the deep anxiety that had dominated public discourse on space for years had all but disappeared. There was no longer any doubt about who would win the race to the moon. The balance of power was not going to be changed in America's disfavor by Soviet superiority in space. What did change was public perception of space travel. The early moonflights were already more often celebrated as milestones in the history of exploration, continuing the tradition of Columbus or Lewis and Clark, than as demonstrations of technological prowess in the Cold War.[86] A rare example of the blending of symbols of discovery and war was a drawing in the *Minneapolis Tribune* of July 15, 1969. It depicts three astronauts erecting a flag on the moon. The flag shows an image of Columbus's landing in the New World. The astronauts' pose makes obvious reference to the iconographic picture of U.S. Marines hoisting the Stars and Stripes after the taking of Iwo Jima in 1945.[87]

Triumph and Demobilization

The American flag was put up on the moon on July 20, 1969, and the astronauts declared that they had come in peace, as space rhetoric had been demilitarized for some time. The universe was now optimistically discussed as a place where the superpowers could practice peaceful cooperation or at least peaceful coexistence, as they had done in Antarctica. *Apollo 8* had transmitted the first of a series of awe-inspiring photographs of "Spaceship Earth" that came from the Apollo Project. The poet Archibald MacLeish expressed the new consciousness that had emerged with the experience of human voyages to outer space. In a statement that influenced peace and environmental movements, he described the effect of pictures of earth rising over the moon: "To see the earth as it truly is, is to see ourselves as riders on the earth together, brothers on that bright loveliness in the eternal cold."[88] The presentation of the astronauts had also changed. It was no longer only one man who ventured into space, but two in Gemini and even three in the Apollo flights. The space heroes had become so numerous that the public found it increasingly difficult to recognize them. The image of the rocket-riding supermen from

[85] Cf. Thomas O'Toole, "Russia Emphasizes Space Stations, but Keeps Moon-Landing Plans Secret," *Washington Post* 14 Nov. 1969; "Russians Put Space Into a New Dimension: Soyuz Feat Shows that Soviet Could Put a Platform in Orbit—a Useful Thing in Peace or War," *Baltimore Sun* 26 Jan. 1969; "Priorities in Space," *New York Times* 13 Aug. 1971.

[86] Cf. "Columbuses of Space," *New York Times* 22 Dec. 1968; "Footprints in the Dirty Sand," *Washington Post* 28 Dec. 1968.

[87] Cf. NASA HO, File 31094, "Cartoons, January 1-July 18, 1969."

[88] Qtd. in "Men of the Year," *Time* 3 Jan. 1969: 9.

the "wild blue yonder" had slowly been replaced with serious astronaut-scientists who were after discoveries rather than spaceflight records.[89] They were still considered heroes. But this high regard was now based on them being part of an elite group, whose members seemed interchangeable to most Americans.[90]

The main goal of the undertaking, namely a national demonstration of overwhelming power, was achieved with the landing of *Apollo 11* on the moon. The moon race as surrogate for war had been won earlier. Khrushchev's decision in 1964 to launch a Soviet manned mission to the moon was not followed by an effort that could beat Apollo. After taking the lead with the successes of Gemini, NASA held on to it. Ironically, because of the experience in Vietnam, public support for war and global Cold War competition was at an all-time low just when Apollo's moment of triumph had arrived. Much of the prestige gained in space was at the same time lost in the failed demonstration of American military-technological power in Southeast Asia.[91] Even glowing advocates of human space travel could not ignore the dubious circumstances accompanying Apollo. The publicist Carl Sagan found the bitter irony of the historic moment manifested in a plaque attached to the lunar lander *Eagle*. Signed by the *Apollo 11* astronauts and President Richard M. Nixon, its message said: "We came in peace for all mankind." Sagan lamented: "As the United States was dropping 7¾ megatons of conventional explosives on small nations in Southeast Asia, we congratulated ourselves on our humanity: We would harm no one on a lifeless rock."[92] On the moon, there was no hunger and violence, no disease, pollution or urban decay, only a shining American flag.

During the period of the actual moon landings, criticism of Apollo and ambitious plans for follow-up space projects finally prevailed. After the fire accident in 1967 and various scandals involving astronauts that followed, the media almost constantly attacked NASA. By the end of the 1960s, the space drama had turned almost routine and more and more Americans were growing indifferent. Reports about space were often relegated to the back pages. It was mainly the money drain caused by the war in Vietnam, however, that ended Apollo with the cancellation of its last three flights. Von Braun, whose work on Apollo's launch vehicle Saturn V was key to its success, characterized the then predominant mood in the *Chicago Tribune* in February 1971: "President Kennedy committed this nation to reach the moon. Once we won the technological war, everybody wants to bring the troops home."[93] On December 11, 1972, *Apollo 17* was the last piloted spacecraft to reach the moon.

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[89] Smith, "Selling the Moon," 202-03. See also "Men of the Year," *Time* 3 Jan. 1969: 9; "A New View of the Ocean of Storms," *Time* 5 Dec. 1969: 33, 35; "From the Good Earth to the Sea of Rains," *Time* 9 Aug. 1971: 7, 9; "Apollo 17: Farewell Mission to the Moon," *Time* 11 Dec. 1972: 30-32.

[90] Cf. Cunningham and Herskowitz 158-59.

[91] During 1971 and 1972, political cartoonists often underscored this in the newspapers. NASA HO, Files 31122 and 31123, "Cartoons."

[92] Carl Sagan, *Pale Blue Dot: A Vision of the Human Future in Space* (London: Headline, 1995) 212.

[93] Qtd. in Nick Thimmesch, "Asks Renewed Faith in Space Program," *Chicago Tribune* 14 Feb. 1971.

Conclusion

The analysis of the 1960s' debate on space shows the fundamental importance of war experience in space history. Public perception of the space race as a surrogate for war was strongest during the early years of Kennedy's space initiative, but it continued until the triumphant first voyages from the earth to the moon.

It is known today that the "missile gap" that helped Kennedy win his bid for the White House did not exist. Neither was there any clear and imminent threat to American security posed by Soviet space successes when he announced the plan to fly to the moon. Nonetheless, expectations of war and fears of technological inferiority were so powerful at the time as to generate the necessary broad consensus underlying a project of the size of Apollo. It was a peculiar mix of pioneering spirit and global power politics that propelled the U.S. space program to the moon. As Michael S. Sherry wrote in his Cold War history *In the Shadow of War*, Apollo's appeal lay in its "capacity to lift Soviet-American conflict out of the military sphere into peaceful competition, with astronauts fighting a symbolic battle, an alternative to nuclear war."[94] Although it functioned as an outlet for aggressive potential, the space race, Sherry pointed out, was indeed a Soviet-American war. Combat may have been only symbolic and the battlefield far from American soil. But at no other time in the Cold War did Americans more fear the possibility of being attacked on their own territory.[95]

Early space exploration is a prime example of the blurring lines between military and civilian activities during the Cold War. NASA's achievements helped generate an image of technical dynamism that in times of nuclear parity could be equaled with the impact of actual weapons. The space age not only extended military rivalry into space, it militarized civilian technology, making it the most prominent emblem of national vitality.[96] Apollo mirrors the great optimism of 1960s American liberalism regarding the feasibility of big technological projects. Astronauts personified the old ideal of the independent American pioneer in a modern environment. As heroes, they were also figures that linked peace and war. They were all military men, gladiators in a space circus, representing the American way of life and fighting a symbolic battle for a noble Western cause.

In the latent conflict between the superpowers in the 1960s, the perception of the space race changed over time. Depending on which phase is examined, the main points in public discourse lie in the expectations of and preparations for war in and through space, space exploration as a substitute for war or as a means to overcome war for good. The term "surrogate for war" used to describe this competition between political systems in space is flexible. It undergoes a process of change that is influenced by public perceptions of whether America is dangerously behind or reassuringly ahead in the race. In the late 1950s and early 1960s, many

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[94] Michael S. Sherry, *In the Shadow of War: The United States Since the 1930s* (New Haven: Yale UP, 1995) 239.

[95] Cf. Sherry 241.

[96] Cf. Alex Roland, "Science and War," *Osiris*, 2nd ser., 1 (1985): 247-72; 267. See also McDougall, *...the Heavens and the Earth* 174.

believed the cosmos was the battleground of the future. This concept of actual war was mostly held by military men and politicians from the conservative-anticommunist camp. Public discourse was often militarized, especially in the phases of reaction to the Soviet challenge and mobilization for big space projects. Space advocates in Congress continued to link astronautics and national security until the end of Apollo, as it was the most powerful argument to secure funding. This notion of essentially extending the arms race into space as part of an overall strategy of technological-military preparedness was soon joined by another interpretation. It also saw the conquest of space and the resulting dominant geopolitical position as the main goal of the struggle. But these were to be achieved through a spectacular and strictly peaceful demonstration of superior technological potency. The civil space agency NASA was to win the race for the moon against the Soviets in less than ten years and thereby deter the dangerous ambitions of their leaders, who at times appeared to be intoxicated by breakthroughs and records in rocketry. This interpretation of the space race as a surrogate for war, as it was propagated by the Kennedy and Johnson administrations, remained dominant in public discourse during the first decade of human spaceflight. Later, a more critical view of the space race as being a mere fight for prestige gained ground. Opponents called Apollo a part of a giant international advertising campaign, a form of "impression management," in which the government used modern technology and enormously expensive projects to demonstrate the superiority of the American way of life, while neglecting social ills at home. Only after the struggle for space supremacy had clearly been won did the cosmos tend to be described more as a source of inspiration and human self-discovery. It became an arena that allowed international cooperation and created a chance for détente and a lasting peace.

Public discussion of the goals of U.S. space initiatives changed over time. The space age began with a strong sense of actual preparation for war. With the advent of manned spaceflights in the early 1960s, the American effort was then predominantly perceived as a surrogate war. By the end of the 1960s—in the light of the overwhelming success of Project Apollo—the notion of peaceful competition, and possible cooperation, between the superpowers was often voiced. Even Lewis Mumford, one of America's most respected social critics and vocal Apollo opponents, grudgingly accepted it as a "moral equivalent of war."[97] In the years since the lunar landings, Apollo has been described as a technological project of the twentieth century, a monument to the human urge to explore, an emblem of American potency or a senseless waste of resources. Undeniably, as William E. Burrows wrote, "the result of that effort was not the conquest of another country or the creation of an awesome weapon, but the greatest human voyage in history; the *Odyssey* of the new age."[98]

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[97] Lewis Mumford, *The Myth of the Machine*, Vol. 2, *The Pentagon of Power* (New York: Harcourt, 1970) 307.

[98] William E. Burrows, *This New Ocean: The Story of the First Space Age* (New York: Random House, 1998) 383.