

Introduction

It was a most unusual sight, surreal and sublime all at once. Two space shuttle orbiters faced one another, nose to nose, on a tarmac at the Smithsonian National Air and Space Museum's Steven F. Udvar-Hazy Center, adjacent to Dulles International Airport in Chantilly, Virginia (see fig. I.1). One of the vehicles, *Enterprise*, was bright white against the nearby green foliage and the cloud-dotted, endless blue sky of that warm April day in 2012. After the National Aeronautics and Space Administration (NASA) had used the orbiter for atmospheric drop tests in the late 1970s, *Enterprise* led a sheltered existence as a tourist attraction before retiring into its own wing at the Smithsonian facility. The spacecraft facing it, *Discovery*, was faded and showed signs of wear, bearing the markings it had acquired as NASA's most active orbiter. One year earlier, it had completed the last of its thirty-nine missions to space, just as NASA closed down the shuttle program to free up funds for new human space flight initiatives. For just a few hours, the shuttles stood in this unique configuration. *Enterprise* had been pulled from the Udvar-Hazy Center, and the orbiter would soon journey, first strapped to the topside of a Boeing 747 and then by barge, to a new home in New York City's Intrepid Sea, Air and

Space Museum. The same 747 had carried *Discovery* from Kennedy Space Center in Florida two days earlier, and its cargo would retire by day's end into the hangar *Enterprise* had once occupied.

NASA and Smithsonian personnel, members of Congress, White House officials, astronauts, aerospace industry representatives, and interested individuals from the general public flocked to witness this rare changing of the guard. It was part of NASA's plan to find forever homes for its four decommissioned shuttle orbiters. A military band played patriotic tunes and bystanders waved American flags. Before the ceremony began, renowned opera singer Denyce Graves led the crowd in a moving rendition of "The Star-Spangled Banner." Against this backdrop, dignitaries offered fond words about *Discovery*'s accomplishments. NASA administrator Charles F. Bolden Jr., a former shuttle commander, recalled how "the space shuttle program gave this country many firsts and many proud moments."¹ Looking back over the program's forty-year history, Bolden celebrated the vital role the shuttle had played in deploying and repairing the Hubble Space Telescope and constructing the International Space Station. It allowed people to learn to live and work in space, he said, and motivated future generations of space explorers.

John R. "Jack" Dailey, director of the National Air and Space Museum and once a NASA associate deputy administrator, offered a more curious statement in his brief speech honoring the space shuttle. Like Bolden, he connected the shuttle with the notion of national pride. But Dailey focused momentarily not on the venerable spaceships behind him but on the enthusiastic crowd in his midst. "For every major milestone in space history," he said, "Americans have participated in the excitement, pride, and optimism of the occasion."² Indeed, the crowd on hand that day gave validity to Dailey's claim. So too did the multitudes who had set their sights on the skies to catch a glimpse of *Discovery* riding atop the 747 when it approached and circled the Washington, DC, area before landing at Dulles. Since the start of shuttle missions in 1981, Americans had cheered on NASA and the astronaut crews at launches and homecomings of the magnificent flying machine that no other nation in the world could boast. And millions had done the same with human space flight missions before the shuttle debuted, captivated by the landing of three of their



FIGURE I.2. Apollo 11 astronauts ride down the streets of New York City to cheering crowds following their return to Earth. Photograph from NASA.

countrymen on the moon's surface in 1969 (see fig. I.2). NASA is known for its strong commitment to sending people on journeys beyond Earth, and for sharing those profound experiences with ground-bound publics.³ Because of this, its human space flight efforts have ranked among the most highly visible undertakings of the US government. These sublime ventures into space have astounded people across the United States—and the world over—and have taken their place as a widely recognized American cultural trope.

Dailey's words acknowledged that even those who were not immediately connected with NASA had a place in the storied history of the nation's human space flight program. But their role, according to this characterization, was a passive and reactive one: to observe these spectacles, celebrate them, and feel inspired by the achievements made on their behalf. Indeed, historians and political scientists have typically

recognized NASA officials, large aerospace firms, US presidents and other White House officials, and members of Congress as the architects of the American space program. Those outside this sphere typically show up only in accounts explaining that the agency put its feats on display to project a robust US image to people around the globe during the space race with the Soviet Union and to “sell” its Mercury, Gemini, and Apollo human space projects to American citizens who footed the bill.⁴

Yet just ten years after Apollo 11 landed on the moon, an article in *Parade* magazine describing NASA’s plans for its new major human flight initiative, the space shuttle, presented a vastly different relationship between NASA and those outside of the government-industry nexus of space program developers. The article noted that the new space vehicle would provide “the first opportunity the public has had to get involved personally in a NASA project.”⁵ NASA associate deputy administrator Ann Bradley echoed that claim in a 1984 memo. The vehicle’s promise of providing routine and reliable access to space to reasonably healthy people with basic training meant that “no development has opened a greater prospect for direct citizen involvement in space flight than the Space Shuttle.”⁶ According to Hans Mark, NASA deputy administrator when the first shuttle missions began, “the Shuttle opened the door for a vast broadening of the human experience in space.”⁷ Looking back on the vehicle’s legacy, former shuttle manager Wayne Hale elegantly summarized it: “If the intent was to transform space and the opening of the frontier to more people, the shuttle accomplished this. . . . The shuttle truly became *the people’s spaceship*.”⁸

What a contrasting perspective these statements offer when compared to characterizations of NASA’s public relations activities during the Apollo era! While NASA never abandoned its determination to share the spectacle of human space flight widely, the agency approached public engagement with the shuttle in some new and different ways. Indeed, sustaining the shuttle prompted NASA to rethink how to involve people from across the globe, particularly in an era when other nations were developing capabilities to send humans and cargo to space. But above all, NASA poured tremendous energy into transforming its connections with the American citizenry, whose engagement the agency regarded as

paramount to the shuttle's viability.⁹ This book tells the story of why and how the agency aimed to involve them as it transitioned from the Apollo period of the 1960s and early 1970s to the space shuttle era that would span the next four decades.¹⁰ It casts a fresh light on the connections between NASA's human space flight initiatives and its public engagement activities, showing how Americans beyond the sphere of government and industry space program players figured in the shuttle program.

Indeed, characterizing the role of American citizens in human space flight solely as celebrants of NASA's achievements does not account fully for their significance in sustaining the endeavor. Doing so leaves us with an impoverished picture of efforts within NASA, even if imperfect, to reconfigure the agency's relationships with its constituents as it sought to move forward with human space activity after Apollo 11 landed astronauts on the moon. NASA saw as crucial to the legitimacy and national support of future human space flight the need to shift from regarding the American citizenry as a single body of unquestioning supporters to one comprising individuals and groups with distinct values, needs, interests, and capabilities and for whom the agency would strive to make the initiative accessible and meaningful. The viability and legacy of the space shuttle in large part depended on NASA's willingness and ability to regard the nation's people not just as potential advocates but as resources essential to the enterprise, even though agency officials constantly struggled with preserving this stance.

Evolution of NASA's Public Engagement Approaches

The commonly perceived connection between NASA and American citizens as witnesses to human space launches is rooted in the agency's mid-twentieth-century origins. After World War II, President Franklin D. Roosevelt's science advisor Vannevar Bush promoted the idea that the results of government-funded scientific research and development activities would ultimately serve the nation's people.¹¹ In the United States and around the world, government institutions began to consider how their choices to pursue particular science and technology projects could help achieve their visions of desirable futures for their nations, adopting and promoting what Sheila Jasanoff and Sang-Hyun Kim have called

sociotechnical imaginaries to propagate their ideals.¹² According to political scientist Yaron Ezrahi, conducting technoscientific activities in the open and with claimed commitments to serving the public interest allowed institutions in liberal democracies to gain the seeming approbation of their citizens—whom Ezrahi termed an *attestive public*—as a means to legitimize their actions and authority.¹³

NASA was founded and molded according to these principles. President Dwight Eisenhower responded to the Soviet Union's deployment into Earth orbit of a basketball-sized sphere called *Sputnik* in 1957 by establishing NASA and authorizing it to embark on a program of space research. The White House and congressional drafters of the agency's originating legislation, the National Aeronautics and Space Act of 1958, believed that attaining legitimacy of their vision of America made stronger via a national space program depended on ensuring both global and national public awareness of the agency's activities. Accordingly, the legislation mandated that NASA "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."¹⁴

This seminal phrase guided NASA's relationship with those outside the government and the aerospace industry from the start. NASA personnel committed to using all available communications modes to showcase one successful advance in human space flight after another throughout the 1960s in pursuit of an eventual human moonshot—the ultimate display of the nation's prowess. The agency forged strong relations with the news media, welcomed public visitors to NASA facilities and launches, and conducted extensive public outreach and education campaigns. Like the Space Act's authors, NASA's public affairs officials believed that making information about space flight widely available could enhance the United States' image abroad and also garner Americans' appreciation of NASA's activities in support of the vision of national might. NASA officials also recognized that having the backing of the nation's people could serve as an endorsement and reminder of the agency's value to the government officials they elected and who held the treasury's purse strings.

During the 1960s and 1970s, it became clear to government institutions that many Americans would not accept unconditionally the legitimacy of a particular sociotechnical imaginary, policy, or program direction

advanced by expert and elite decision-makers. By that time, the use of chemical weapons, nuclear reactors, pesticides, and other contentious creations of research and development activities revealed that science and technology did not de facto benefit all segments of society or the environment. Social activists and scholars began to question the propriety of giving scientific experts and technocrats unchecked authority, with many demanding that all people be given the ability to participate in deciding the rightful place of science and technology within society.¹⁵

Though having managed to hover above the fray as it fulfilled President John F. Kennedy's national imperative, NASA found itself subjected to societal pressures by the late 1960s. While millions of Americans got caught up in the excitement of the space race, public approval of government expenditures to send people into space was far from unanimous even at the zenith of the Apollo program.¹⁶ Social and economic turmoil at home and a war in Vietnam were taking a toll on American lives and financial resources, leading many citizens to oppose space flight as a quest without clear benefits; meanwhile, the astronauts' homogeneity as white, male, military test pilots seemed out of touch with contemporary public pursuits of civil rights and equal opportunity. Staunch congressional Democrats agreed, and some called for an end to human space flight activities. Put simply, although Apollo 11's lunar landing had created a worldwide sensation, the technological triumph did not ensure widespread acceptance at home. As NASA entered the 1970s, neither the Cold War-era imaginary for human space flight as a pursuit to enhance the nation's global posture nor the idea of the citizenry as an attentive public seemed to hold.

NASA's top leadership was nonetheless enamored of the dream of space travel and saw the human program as essential to the agency's identity and reason for being. Securing political approval for an Apollo follow-on program, however, required a wholesale change in NASA's expectations. While NASA advocated for an ambitious Earth-orbiting space station and crewed trips to Mars, President Richard Nixon proved willing to invest only modestly in human space flight. As this fact became clear, NASA officials pressed for funds to develop just one element of their grand plan: the space shuttle. After originally envisioning the shuttle

as a ferry service for astronauts, experiments, and supplies between Earth and the space station, they set to building a case for the shuttle as a standalone program.

NASA's willingness to accommodate military payloads had a significant role in obtaining political support for the new vehicle. But legitimizing the shuttle also entailed finding a completely different sociotechnical imaginary fitting of the new era. While many Americans preferred federal investment in pursuits that would improve citizens' lives, others remained eager to see the nation continue to launch astronauts, and some aspired to be those space travelers. NASA deftly negotiated these varied concerns by constructing the shuttle as a utilitarian, democratic technology.¹⁷ NASA officials conceptualized the reusable new vehicle as a significant departure from the Mercury, Gemini, and Apollo space capsules in both looks and purpose. The shuttle would accommodate seven flyers at a time and operate as a "space truck" that would carry experiments and satellites into space that would benefit people and businesses on Earth. NASA contended that its reusability and projected ability to launch several dozen times annually would save the nation billions of dollars over expendable rockets used only once, while also supporting a multitude of industries and millions of jobs.

Taken together, these arguments allowed NASA to secure approval of the shuttle in 1972 and came to make up NASA's guiding imaginary for the shuttle's role and relationship with the American people.¹⁸ They also signaled that NASA would need to reconsider not only the value of human space flight to citizens but also the instrumentality of those citizens to the human space flight effort and its modes of connecting with them. This book explains how NASA's new vision for human space flight and its changed outlook on public engagement shaped one another throughout the shuttle program.

Chapter 1 opens with an explanation of the origins of NASA's commitment to human space flight and its original quest for an attentive American public. The agency faced substantial challenges in gaining support for a post-Apollo human program, and in chapter 2 I show how officials secured approval for the space shuttle and built a new sociotechnical imaginary to legitimize the project. The next several chapters delineate

the myriad ways in which NASA sought to engage various publics with the shuttle program. In chapter 3 I explain how NASA officials aimed to enlist specific groups as supporters—from community business leaders to *Star Trek* fans—by interacting directly with them and tailoring messages and opportunities to satisfy their interests. NASA also continued to engage different publics through display as it did with its human missions up through the early 1970s. In chapter 4 I reveal that the agency advanced its imaginary for the shuttle by leveraging the shuttle’s unique physical attributes and available communications technologies to aid all Americans in feeling connected to the vehicle.

The shuttle program’s success, however, depended on more than persuasive arguments and enhanced communications approaches. Rather, it would be crucial to *realize* the vision of a democratic human space flight program. In chapter 5 I show how NASA sought to prove the shuttle’s utility by inviting involvement by an eclectic variety of people. Human space flight officials suddenly found themselves soliciting satellite and experiment customers, from major companies to individual citizens. In chapter 6 I explore how the agency expanded the human space flight ranks to include new flyers aboard the new vehicle. From broadening the demographic and professional diversity of its astronaut corps to initiating a program to welcome flights by private citizens, NASA aimed to ensure that those who rode on the shuttle resembled America.

Just a few years after shuttle operations began, it was evident that NASA’s relations with American citizens were markedly different than they were two decades prior. According to many indicators, the agency’s approach bore fruit. Across the nation, the shuttle instilled a sense of national pride and common ownership. Even so, democratizing the shuttle was not easy for NASA: fostering the vehicle’s accessibility required the agency at times to navigate criticisms from the media, the commercial launch industry, and even some of NASA’s own scientists and astronauts. Moreover, the shuttle’s complexity kept flight rates to just a fraction of what the vehicle’s proponents had anticipated.

As I reveal in chapter 7, NASA’s commitment to opening the shuttle to more public involvement encountered even greater difficulties beginning in 1986. That year, the space shuttle *Challenger* launch disaster

killed seven astronauts, including NASA's first "citizen in space," teacher Christa McAuliffe. The accident also ripped asunder NASA's imaginary of a vehicle accessible to and capable of serving the nation's citizens as it revealed a technology fraught with risks and tarnished NASA's credibility and image of competency in the eyes of the media and many elected officials. Although NASA officials had for years regarded direct involvement of broad segments of the public as crucial to the shuttle's viability and legitimacy, they began to temper their enthusiasm for inviting new shuttle users and flyers as they revisited future direction in human space flight. I show in chapter 8 that by the time of the *Columbia* accident in 2003, NASA had moved away from adhering to the sociotechnical imaginary of a democratic shuttle yet celebrated the vehicle's legacy as the people's spaceship as the orbiters completed service and were sent to new homes in museums around the country.

New Perspectives on Public Engagement and Space History

NASA never described its interactions with its various publics during the early shuttle era as "public engagement," as this term entered the popular and scholarly lexicon later. Even so, as chronicled in this book, NASA's experience with the space shuttle reveals that many factors drive and constrain the visions, abilities, and approaches of a technoscientific agency within a democratic government to engage with its constituents. Democratic governments establish such agencies to contribute to a nation's welfare, and agency leaders must make decisions on an ongoing basis about the development, use, control, or stewardship of technologies. In doing so, they recognize the need to demonstrate value and accountability to the publics that, at least indirectly, sustain them.

NASA's efforts to involve disparate publics with the shuttle shows that it is incredibly challenging for a technoscientific agency to achieve these aims. Many NASA officials tried to make the shuttle as open and inclusive as they could but encountered resistance from some inside the agency or with longstanding relationships to the space program when they sought to invite others to participate, given that the shuttle was a limited resource. The agency thus had to prioritize how it served various publics through the shuttle while remaining cognizant of how its

choices would be received by congressional stakeholders who directly determined NASA funding levels. Indeed, when democratic government institutions are in principle obligated to “think” in the aggregate and serve millions of people, whose opinions are far from harmonious or evenly valued, it is virtually impossible for them to satisfy everyone or pursue a consensus direction. In some senses, it is rather remarkable that NASA was at all able to expand and maintain opportunities for more citizens to participate in the shuttle program.

This book also rebalances historical understanding of NASA’s public relations efforts with human space flight. Mapping the evolution of public relations during the shuttle era reveals the internal and external considerations that influenced NASA’s complex relationships with various publics and its public engagement strategy for four decades. It shows who mattered throughout the program and why. NASA operated for its first decade as if it had one big, attestive public—an undifferentiated citizenry who, dazzled by the spectacle and patriotism of space flight, would support it. But when overwhelming support did not materialize even after Apollo 11’s landing on the moon in 1969, the agency sought to involve segments of society that could help to make the shuttle a success substantively, culturally, and politically. To that end, this work is a departure from space histories that cast the American public in a passive and consumptive role.

This examination of NASA’s public engagement approaches during the shuttle era expands the historical narrative of the American space program in still other ways. While the agency’s outreach efforts during the shuttle era undoubtedly incorporated the support-seeking and image-building pursuits that were rife during the Apollo days, public engagement strategies around the shuttle can be seen more charitably as attempts to remain accountable to the American people in ways meaningful and suited to the times. Beginning in the early 1970s, NASA’s leadership believed that the agency could deliver on its sociotechnical vision and attain legitimacy for the shuttle only by enrolling Americans in the shuttle program, and this required engaging more people according to their varied interests. NASA’s external engagement approaches served many segments of society while they were supporting the agency’s continued

quest for public and political approval. This symbiotic relationship meant that the shuttle was, in at least one respect, truly shared.

Some pundits have considered the shuttle to be a mistake for the American space program. Political scientist John Logsdon has called the shuttle a policy failure, stating that budget constraints imposed by the Nixon administration pushed NASA down a path of making overzealous promises that the shuttle would reduce the cost of space flight and become self-sustaining financially, and that the White House's choice of NASA's shuttle design precluded other space program directions.¹⁹ Former NASA administrator Michael Griffin lamented shortly after taking office in 2005 that the shuttle's design was "extremely aggressive and just barely possible" and had left the nation with a flawed human space flight system.²⁰ While the shuttle had its share of imperfections, its inclusion of and service to diverse publics in ways that earlier human space flight initiatives had not provides yet another figure of merit by which the program's evolution ought to be understood and its success judged.

Those within NASA who saw the value of a democratic space shuttle program overcame hurdles as best they could to create opportunities for more people to participate in space flight activities. Looking at NASA's aims and approaches to engage disparate publics with the shuttle in ways meaningful to them over the vehicle's four decades can help the agency determine how it can best evolve its program plans, public engagement mechanisms, and performance measures to connect with various publics as it pursues human exploration of the moon and beyond. The public relations issues NASA encountered during the long shuttle era are indicative of at least some of the challenges the agency will need to address.