Societal Impact of Spaceflight

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Flights of Fancy: Outer Space and the European Imagination, 1923–1969

Alexander C.T. Geppert

The only interplanetary voyages made by our species to date have been flights of fancy.

A.V. Cleaver
British Interplanetary Society
11 October 1947[1]

Historicizing the European Space Effort

"Historians need to explore . . . the cultural meaning of space exploration, and the space programs of other countries" besides those of the United States, American scholar Pamela E. Mack has suggested.[2] Since she made this statement in 1989, i.e., almost 20 years ago, the state of research in Europe has gradually, yet not absolutely, improved. The publication of the official history of the European Space Agency (ESA), on the occasion of its 25th anniversary in 2000, certainly marked a milestone in this process. In much detail and on more than 1,100 pages,

1. A.V. Cleaver, "The Interplanetary Project," *Journal of the British Interplanetary Society* 7, no. 1 (January 1948): pp. 21–39, here p. 21. This paper presents the first findings of a comprehensive research project on the cultural history of outer space, astrofuturism and extraterrestrial life in the European imagination of the twentieth century, approximately between the publication of Hermann Oberth's pioneering *Die Rakete zu den Planetenräumen* (1923) and the establishment of ESA a half-century later (1975). I would like to express my sincere gratitude to the editors of this volume for their kind invitation to me to discuss parts of my work at such an early stage, and to the Fritz Thyssen Stiftung for generously supporting this *Habilitationsprojekt*. Heartfelt thanks are also due to Dorothee Dehnicke, Rita Hortmann, Heinz Hermann Koelle, Tessa Mittelstaedt, and Paul Nolte.

2. Pamela E. Mack, "Space History," *Technology and Culture* 30, no. 3 (July 1989): pp. 657–665, here p. 658.

this multinational institution's complex beginnings and the development of its organizational structure were meticulously traced back to the formation of its two precursors, the European Launcher Development Organisation (ELDO) in 1962 and the European Space Research Organisation (ESRO) in 1964, while deliberately leaving aside broader social, cultural, and imaginative issues.[3] What is true for the history of Europe at large, however, is applicable here as well: European history and the history of Europe are not identical, but overlap at best. The in-depth analysis of a single European institution—thoroughly researched and, without the slightest doubt, enormously valuable as it now stands—should not be taken for a social and cultural history of European practices and representations of outer space per se. In other words: Because it lacks a direct equivalent to the NASA History Office and the Space History Division of the Smithsonian National Air and Space Museum—with their concerted activities and unparalleled research programs which effectively created and later shaped the entire field in the United States—in Europe, space history is a much smaller, more fragmentary, and by far less established area of historiographical research.[4]

In direct consequence, much research on the cultural history of the European space effort, its historical significance, and societal impact still remains to be done, especially with regard to the 12 years after Peenemünde and prior to Sputnik—a period which many consider the Golden Age of Space Travel *avant la lettre*. Therefore, the following tentative reflections are limited to presenting and discussing three broader issues and provisional hypotheses. They are intended to ask the right questions rather than to provide possibly premature answers. First, where do historians have to look in order to locate what kind of possible repercussions of spaceflight? Why is it so complex a task to identify and measure any kind of impact spaceflight might have had on culture and society in general? Second, how can Europe's role and position in this entire scenario be described and assessed? Has a distinctly European version of outer space evolved gradually, especially since 1945? Or were, for instance, the Apollo flights already subject to

3. John Krige, Arturo Russo, and Lorenza Sebesta, *A History of the European Space Agency*, 2 vols. (Noordwijk, The Netherlands: European Space Agency Publications, 2000). "Little has, in fact, been written on the European space effort," the authors conceded in their preface, and went on to ask for "more reflective and comparative studies" to contextualize their results and to relate them to other research in the field (vol. 1, p. xvi). Walter A. McDougall, "Space-Age Europe: Gaullism, Euro-Gaullism, and the American Dilemma," *Technology and Culture* 26, no. 1 (January 1985): pp. 179–203. For a recent fact-oriented summary of European activities in outer space, see Brian Harvey, *Europe's Space Programme: To* Ariane *and Beyond* (Chichester, U.K.: Springer-Praxis Publishing, 2003); see also ESA's own historical series, called History Studies Reports. The most recent of these more than 30 working paper-type publications are to be found at *http://www.esa.int/esapub/pi/hsrPI.htm* (accessed 17 January 2007).

4. W. D. Kay, "NASA and Space History," *Technology and Culture* 40, no. 1 (1999): pp. 120–127; Roger D. Launius, "NASA History and the Challenge of Keeping the Contemporary Past," *The Public Historian* 21, no. 3 (Summer 1999): pp. 63–81.

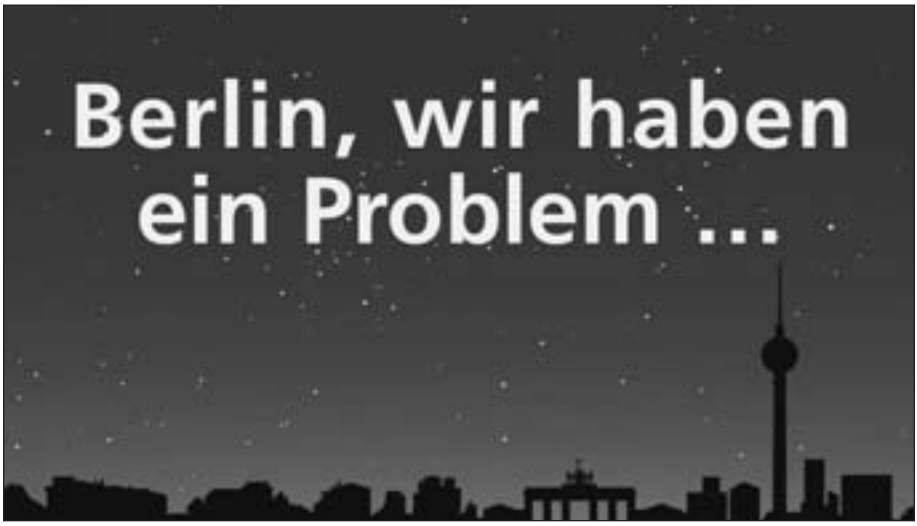

Figure 31.1—"Berlin, We Have a Problem." National advertising campaign, German space industry (2005).

such globalized, carefully orchestrated, and extensive media coverage that they subsequently gave rise to the same process of myth-making both in the United States *and* in Europe? And, third, while the persistence of the so-called American spacefaring vision has, time and again, been attributed to the deeply rooted frontier myth in popular culture and in the public imagination, is the European vision of outer space best characterized by the complete lack of such a key trope and the absence of a commonly shared belief system—or is there any equivalent?

"Berlin, wir haben ein Problem," ("Berlin, we have a problem") read one of the most popular slogans in a recent national advertising campaign, entitled "Deutschland braucht Raumfahrt" ("Germany needs spaceflight"). Financed by the German space industry, this campaign lamented the lack of government support and endeavored to raise public awareness of the industry's pecuniary needs and oft-formulated appeal for increased government funding (figure 31.1). It is more than remarkable that such a tribute to the famous Apollo 13 phrase "Houston, we've had a problem"—originally uttered by Commander James Lovell in April 1970 but popularized by Tom Hanks in the Oscar-winning Hollywood blockbuster 25 years later—did not require an explanation, even in a German context, proving to be sufficiently effective in an entirely different public sphere. Apparently, the responsible publicity agency had every reason to take for granted the existence of the necessary historical background information. The well-informed spectator would be rewarded with a smile for his successful knowledge transfer from one national context to another and applying it to quite a different problem. In the *present* academic context, however, this witty motif draws our attention to the potency of American popular culture myths far beyond national borders, where, in fact, they may be interpreted quite differently. In the end, "Berlin, wir haben ein

Problem" points to the far-reaching importance of international and crosscultural perspectives in analyzing both science fact and science fiction. It reminds us, in short, that the societal impact of spaceflight and its imaginative dimension cannot be properly historicized without considering transatlantic references, perceptual interdependencies, and transnational interrelations.

SPACEFLIGHT, THE IMPACT QUESTION, AND THE SPATIAL TURN: THREE HEURISTIC REMARKS

Without going into too much detail, the first heuristic remark consists of a fundamental conceptual question: How can we define—and then diagnose—the societal impact of spaceflight in an historical and international perspective? How do we describe, assess, and characterize it once such impact has been recognized? And what set of criteria do we employ in order to compare views and attitudes toward space and spaceflight across different cultures worldwide?

The challenging aspect of this question lies, of course, in the paradigmatic inversion and the complete change in historiographical perspectives it proposes. For a long time one of the most fundamental question in the field of space history was how spaceflight, in a comparatively short time, developed from science fiction into science fact. Who invented the necessary technologies, where, and in what circumstances? What kind of institutions were established, who financed them, and how did they produce, structure, and organize knowledge? Which scientific fictions became, at what point, predominant and were transformed into actual science—whereas others remained merely fictitious? Today, historians seem far less interested in compiling yet another, sometimes semi-hagiographical, often oversimplistic, yet almost always teleological genealogy of space travel thought, its pioneers, and its practitioners. The new perspective is diametrically reversed. It is also less prone to endorsing undercomplex master narratives. What was formerly the dependent variable now becomes the independent one. We take spacefaring as given, and then aim to understand and explain the impact and possible effects that outer space, space travel and space exploration have had on culture and society at large.

From the viewpoint of a cultural historian and recent newcomer to this field of historical research, such a general change of perspective seems more than overdue. Almost inevitably it should lead to less specialist and fewer internalist analyses, to the advantage of broader, more integrative perspectives, by paying greater attention to historical context and culturally ascribed meaning. Multifaceted links and manifold connections are conceivable if space history breaks with its self-chosen splendid isolation and decides to open itself up to different historiographical branches such as social, cultural and intellectual history, but also to less obviously related disciplines such as science studies, social and cultural geography, sociology of knowledge, literary criticism, art history, and contemporary archaeology. Most probably, such an extension will eventually lead to a complete transformation of the entire field and

enable space history to harmonize far better with presently "hot" historiographical debates on transnationality, globalization, and "entangled history" as the key features of a state-of-the-art *histoire du temps présent*.[5]

At the same time, space historians must remain cautious. "Impact" is a very broad and imprecise term that can denote many different aspects simultaneously. Space-related cultural artifacts, such as Hermann Oberth's seminal 1923 book *Die Rakete zu den Planetenräumen* and Frith Lang's 1929 film *Frau im Mond*, certainly had an immense public impact; so had Willy Ley's numerous public lectures and Wernher von Braun's countless media appearances, not even to mention the actual events such as the Sputnik launch in 1957, the first weather satellite launch three years later, the Mercury and Gemini flights, or the Apollo landings which, in many ways, marked the end of an epoch rather than the beginning. After defining and refining the original "impact question," space historians thus need to sharpen their analytical tools by differentiating carefully between different kinds of impact, and by endeavoring to categorize, classify, and contextualize. Whom or what was affected, when and where, immediately or on a long-term basis? And did this impact have a lasting effect or did it fizzle out soon after? Different notions such as "repercussions," "influence," "consequences," and "effects" on the one hand, and "perception," "reception," "consumption," and "appropriation" on the other, come to mind and could be considered possible alternatives.

Conceptual problems of an almost identical kind are by no means specific to this field of historical research. They have been discussed by neighboring disciplines and branches of research—such as reception aesthetics—at least since the 1970s, if not even earlier. Quite clearly, this constitutes another good reason why space history can only profit from widening its thematic focus and sharpening its analytical tools, including the incorporation of innovative methodological achievements made elsewhere.[6]

Moreover, in order to locate and specify societal and cultural impacts of spaceflight and space exploration, it might prove necessary to search elsewhere, in areas where effects, consequences, and repercussions are not readily expected and hence are

5. John M. Staudenmaier, "Recent Trends in the History of Technology," *American Historical Review* 95, no. 3 (June 1990): pp. 715–725; Michael Werner and Bénédicte Zimmermann, "Vergleich, Transfer, Verflechtung: Der Ansatz der *Histoire croisée* und die Herausforderung des Transnationalen," *Geschichte und Gesellschaft* 28, no. 4 (2002): pp. 607–636; Michael Werner and Bénédicte Zimmermann, "Penser l'histoire croisée: Entre empire et réflexivité," *Annales HSS* 58, no. 1 (2003): pp. 7–36; Michael Werner and Bénédicte Zimmermann, "Beyond Comparison: *Histoire croisée* and the Challenge of Reflexivity," *History and Theory* 45, no. 1 (February 2006): pp. 30–50. The numerous contributions to Jürgen Kocka's recent *Festschrift* (Gunilla Budde, Sebastian Conrad and Oliver Janz, eds., *Transnationale Geschichte: Themen, Tendenzen und Theorien* [Göttingen: Vandenhoeck & Ruprecht, 2006]) aim to make an interim stock-taking of these debates on the globalization of historiography itself through global and transnational history.

6. See, for example, Martyn P. Thompson, "Reception Theory and the Interpretation of Historical Meaning," *History and Theory* 32, no. 3 (1993): pp. 248–272; Marian Füssel, "Die Kunst der Schwachen: Zum Begriff der 'Aneignung' in der Geschichtswissenschaft," *Sozial. Geschichte* 21, no. 3 (2006): pp. 7–28; Jennifer Wallace, *Digging the Dirt: The Archaeological Imagination* (London: Gerald Duckworth, 2004).

less obvious than, say, in utopian literature, pop culture, or science fiction TV shows and movies. If the implicit assumption of this volume is correct—that spaceflight was, at least for several decades during the twentieth century, an emblematic and absolutely central element to the project of Western modernity—historians should be able to locate evidence for its lasting effectiveness far *beyond* the established circles of the international spaceflight community and their widespread activities, and as independently of its historical and contemporaneous advocates as possible.

Last but not least, it is somewhat surprising to observe that the notion of "space" itself has hardly been problematized and how little theoretical attention it seems to have received, despite the classic works by geographers, philosophers, sociologists, and ethnographers such as Gaston Bachelard, Henri Lefebvre, Yi-Fu Tuan, Pierre Nora, Marc Augé, and numerous others.[7] How can we explain that the current upsurge of interest in space as a specific category of historical analysis—which is frequently labeled *topographical* or *spatial turn*—and the historiographical field of space history have not at all been seen in relation to each other so far? "What are you buying when you go to outer space?" someone asked rhetorically during the conference which inspired the present volume, and then replied to his own question, seemingly surprised, by exclaiming in despair: "There is simply nothing there!" Yet, outer space is by no means a spatial vacuum; it changes constantly and is always formed and refashioned. It is precisely this static and ahistorical notion of space that must be problematized by asking questions such as: "Where" and "what" was outer space at which point in time? How was it represented and imagined? Has the perception of space changed over time? And in what way were changing conceptions in turn affected by the continuous and ongoing exploration of outer space? Even if it may sound paradoxical, it would seem high time to apply the so-called spatial turn to space history, and to write a social and cultural history of outer space with special emphasis on: space.[8]

EUROPE'S OUTER SPACE IN THE POSTWAR PERIOD: 1945 AND 1968/69 AS GLOBAL TURNING POINTS

Is there a genuinely European variant of outer space? In fact, is there a specific perspective on outer space which could be called European? Is there a set of commonly shared assumptions about space and the specific role of Europe in the history

7. Gaston Bachelard, *La Poétique de l'espace* (Paris: Presses Universitaires de France, 1957); Henri Lefebvre, *La Production de l'espace* (Paris: Éditions anthropos, 1974); Yi-Fu Tuan, *Space and Place: The Perspective of Experience* (London: Edward Arnold, 1977); Pierre Nora, ed., *Les Lieux de mémoire*, 3 vols. (Paris: Gallimard, 1984–1992); Marc Augé, *Non-Lieux: Introduction à une anthropologie de la surmodernité* (Paris: Éditions du Seuil, 1992).

8. Alexander C. T. Geppert, Uffa Jensen, and Jörn Weinhold, "Verräumlichung: Kommunikative Praktiken in historischer Perspektive, 1840–1930," in *Ortsgespräche: Raum und Kommunikation im 19. und 20. Jahrhundert*, Alexander C. T. Geppert, Uffa Jensen, and Jörn Weinhold, eds. (Bielefeld: Transcript, 2005), pp. 9–49, 361–371, with numerous suggestions for further reading.

of spaceflight? For the period prior to 1945 at least, these questions are not highly problematic. Historians agree as to the fundamental significance of the various European space fads of the 1920s, notably in Germany and Russia, and, in consequence, the far-reaching effects of the slow yet steady formation of various interconnected networks of international space experts. Also in other European nations, such as Great Britain or France, transnational personal contacts among rocket scientists and space experts frequently preceded the establishment of the various amateur societies.[9]

Yet, by the time the Golden Space Age was in full swing in the 1950s—with actual space travel remaining far from a reality—Europe's position was secondary at best. Hence, the crucial question in this context is precisely when and through which unilateral transfer processes such cultural hegemony was lost in the aftermath of World War II, not least as a concomitant of the rapidly emerging U.S.–USSR polarization. Analytically, the problem is further complicated by the fact that many of the new key players then residing in the United States, such as the engineer and rocket scientist Wernher von Braun (1912–1977), the writer and space science popularizer Willy Ley (1906–1969), and the technician Krafft Arnold Ehricke (1917–1984), were clearly of European origin, even if they may have gradually developed a somewhat different attitude concerning their own nationality. Von Braun, for instance, did not participate in any of the early international congresses on astronautics which began in Europe annually after 1950, and did not (even temporarily) return to Germany prior to the autumn of 1957.[10] Be this as it may, with regard to Europe's (self-)positioning vis-à-vis outer space, the end of World War II was definitely the first decisive turning point whose long-lasting impact can still be felt today.

Indications of this fundamental displacement of cultural hegemony can, for instance, be observed in the realm of popular culture, especially with regard to imagery and iconography. More than 10 years after its 1929 premiere, film stills originally produced for Fritz Lang's epochal *Frau im Mond* were used time and again to illustrate numerous articles on rocketry and spaceflight appearing in a wide array of international journals and magazines, simply due to the lack of visual material otherwise available.[11] By the early 1950s, however, the situation had drastically changed.

9. Michael J. Neufeld, "Weimar Culture and Futuristic Technology: The Rocketry and Spaceflight Fad in Germany, 1923–1933," *Technology and Culture* 31, no. 4 (1990): pp. 725–752. See my forthcoming article "Space *Personae*: Scientific Networks of Remote Knowledge, 1923–1969," *Journal of Modern European History* 6, no. 1 (2008).

10. See, for instance, von Braun's letter to Frederick C. Durant III, 23 December 1953, Wernher von Braun Papers, Manuscript Division, Library of Congress, Washington, DC, 1/3.

11. Willy Ley Collection, National Air and Space Museum Archives, Smithsonian Institution, Washington, DC, 33/9. Milton Fairman, "The Race to Explore," *Popular Mechanics* 53 (March 1930): pp. 286–289; Kenneth W. Gatland, "Development of Rocket Flight: A Review of the Film Shown to the British Interplanetary Society in London on February 14th, 1948," *Journal of the British Interplanetary Society* 7, no. 2 (March 1948): pp. 112–119; Kenneth W. Gatland, "History of Rocket Development: A Review of the Film Shown to Fellows of the British Interplanetary Society at the War Office, Whitehall, on July 16, 1949," *Journal of the British Interplanetary Society* 9, no. 2 (1950): pp. 64–70; Heinz Gartmann, "Rakete und Raumflug im Film," *Weltraumfahrt* 1, no. 3 (Juni 1950): pp. 86–91.

Figure 31.2—British Interplanetary Society Christmas Card (*Annual Report of the British Interplanetary Society/Journal of the British Interplanetary Society* 11 [1952]: p. 364).

At that time, a direct equivalent to the enormously successful *Collier's*/Disney complex simply did not exist in any European context. Popular iconography widely available in the European public sphere was far less elaborate, less futuristic, and by no means as imaginative as its American counterpart—just compare, for instance, the visual expressiveness of Chesley Bonestell's (1888–1986) famous illustrations for *Collier's* magazine with a number of European samples from the same period (figures 31.2 and 31.3). The first example, showing a spaceship on the Moon with its crew about to begin their exploration, was distributed by the British Interplanetary Society to its approximately 2,300 members as their official Christmas Card for 1952; the second stems from one of the numerous publications of Heinz Gartmann (1917–1960), a German engineer, author, and well-connected editor of *Weltraumfahrt: Beiträge zur Raketenentwicklung*, and was based on a painting by graphic artist Klaus Büergle (1926–). It is hardly surprising that these illustrations proved far less effective and by no means as trendsetting as their American counterparts.

On the other hand, the lavishly illustrated, large-format books into which the American *Collier's* series had swiftly

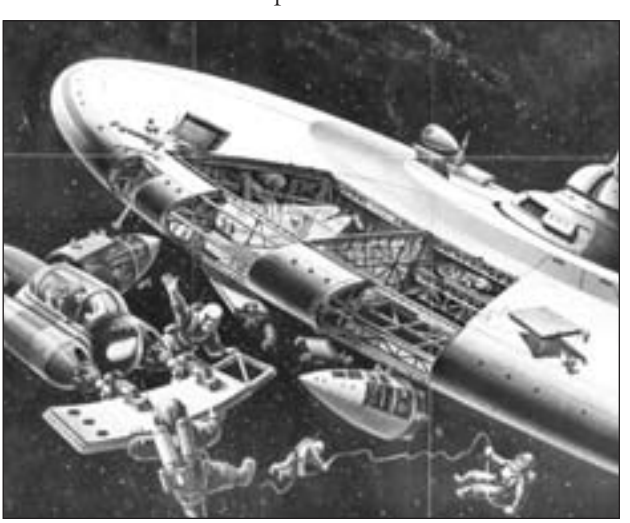

Figure 31.3—Frontispiece to a 1950 German magazine article. (Heinz Gartmann and Klaus Büergle, "Zwischenfall mit Heliopolis/Weltraumstation im Bau," *Das Neue Universum* 67 [1950]: pp. 173–191.)

been transformed were soon translated into numerous foreign languages, including Japanese, Italian, Dutch, Swedish, Finnish, German, French, and Spanish, and sold especially well in Europe.[12] In Germany, for instance, S. Fischer, one of the best-reputed publishing houses, soon acquired the copyrights and, before long, sold a considerable number of copies, running into several thousands. Thus, geopolitical and iconographical shifts went hand in hand. From a European perspective, the 1950s space race was accompanied by a new sociocultural space fad in the public imagination, although this time of transatlantic rather than domestic origin.

Ever since then, autonomy—or, rather, the quest for it—has been the predominant theme of the European space effort. Since the first "philosophical" reflections, undertaken by the Italian physicist Edoardo Amaldi (1908–1989) in April 1959, on the urgent need to establish an official and independent European space organization, "encouraging" or even "increasing" European unity "from without" has been the explicit political aim in all common activities in space. In the late 1980s five European research institutes came to the conclusion that a European "space spirit" had gradually developed, largely as a consequence of ESA's activities. They argued that to undertake such activities would give the European Union (EU) nothing less than a genuine chance to "consolidate a common identity." The EU, they concluded in their large-scale study, should hence have its "eyes and ears in space."[13] Steadily pursuing this goal has, at least at times, posed a considerable challenge to all plans of cooperation with third parties and possible partners such as the United States.

12 Chesley Bonestell and Willy Ley, *The Conquest of Space* (New York: Viking Press, 1949); Wernher von Braun, Joseph Kaplan, Heinz Haber, Oscar Schachter, Fred L. Whipple, and Cornelius Ryan, *Across the Space Frontier* (New York: Viking Press 1952); Cornelius Ryan, Wernher von Braun, Fred L. Whipple, and Willy Ley, *Conquest of the Moon* (New York: Viking Press, 1953); Willy Ley, Wernher von Braun, and Chesley Bonestell, *The Exploration of Mars* (New York: Viking Press, 1956). The German editions were Wernher von Braun, Joseph Kaplan, Heinz Haber, Oscar Schachter, Fred L. Whipple, and Cornelius Ryan, *Station im Weltraum: Die technischen, medizinischen und politischen Grundlagen des Raketenflugs in den Weltraum* (Frankfurt am Main: S. Fischer, 1953); Cornelius Ryan, Wernher von Braun, Fred L. Whipple, and Willy Ley, *Die Eroberung des Mondes* (Frankfurt am Main: S. Fischer, 1954); Willy Ley, Wernher von Braun, and Chesley Bonestell, *Die Erforschung des Planeten Mars* (Frankfurt am Main: S. Fisher, 1956); Wernher von Braun and Willy Ley, *Start in den Weltraum: Ein Buch über Raketen, Satelliten und Raumfahrzeuge* (Frankfurt am Main: S. Fischer, 1958).

13. Edoardo Amaldi: Introduction to the Discussion on Space Research in Europe, 30 April 1959, Historical Archives of the European Union (HAEU), Florence, Italy, COPERS 0001. Reimar Lüst, "Cooperation between Europe and the United States in Space," *ESA Bulletin* 50 (May 1987): pp. 98–104, here pp. 99, 104; Forschungsinstitut der Deutschen Gesellschaft für Auswärtige Politik (Bonn), Institut Français des Relations Internationales (Paris), Istituto Affari Internazionali (Rome), Nederlands Instituut voor Internationale Betrekkingen "Clingendael" (Den Haag), and Royal Institute of International Affairs (London), *Europas Zukunft im Weltraum: Ein gemeinsamer Bericht europäischer Institute* (Bonn: Europa Union Verlag, 1988), here pp. 1, 168: "Der Weltraum [ist, ACTG] ein wichtiger Bereich, in dem Europa eine gemeinsame Identität konsolidieren und seine Einheit verwirklichen kann . . . Europa muß seine eigenen Augen und Ohren im Weltraum haben."

Christmas 1968 marks the second, well-known turning point, with the epoch-making spaceflight of Apollo 8 and the first photographs of the entire Earth taken on this occasion. American writer Archibald MacLeish (1892–1982) and Austrian philosopher Günter Anders (1902–1992) were among the first to realize that the most profound consequence of the Apollo program was not at all the continued exploration of outer space, its scientific results, or the proof of the actual technical possibility for so doing. It was, rather, a radical change in self-perception on a genuinely global level, literally resulting in a new *Weltanschauung*, i.e., ways of viewing the world. For the first time ever, it was felt that the entire Earth could be seen—and see itself—from without and as a whole.[14]

Even if this argument, originally coined by MacLeish and Anders simultaneously but independently of each other, has been repeated and modified so many times since that it now might be considered trite, it is beyond doubt that the images originating from this particular mission (especially the famous photograph "Earthrise") produced enormous, hitherto entirely unforeseen effects. It is no exaggeration to state that these images fundamentally altered our contemporary geographical imagination. Thus, the major television event of the 1960s, the 1969 Apollo Moon landing, must, first and foremost, be seen as a carefully orchestrated, global media event. The fact, that it could be witnessed by approximately 600 million people, i.e., approximately a fifth of the world population, live on TV in 49 countries worldwide, symbolizes the central role of space exploration in the process of globalization. Taking place only seven months after Apollo 8, it was cause and effect at the same time: Technically only possible because of the recently set up Intelsat system, the Moon landing proved an event which, in itself, had considerable globalizing consequences difficult to overestimate in retrospect. Not only does this second turning point afford a perfect example of how the exploration of outer space substantially affects and alters conceptions of "inner," (i.e., Earthly) space, it also makes the question of Europeanness even more complex. [15]

14. Archibald MacLeish, "A Reflection: Riders on Earth Together, Brothers in Eternal Cold," *The New York Times,* 25 December 1968: p. 1; Günther Anders, *Blick vom Mond: Reflexionen über Weltraumflüge,* 2nd ed. (München: C. H. Beck, 1994), p. 12: "Das entscheidende Ereignis der Raumflüge besteht nicht in der Erreichung der fernen Regionen des Weltalls oder des fernen Mondgeländes, sondern darin, daß die Erde zum ersten Mal die Chance hat, sich selbst so zu sehen, sich selbst so zu begegnen, wie sich bisher nur der im Spiegel sich reflektierende Mensch hatte begegnen können."

15. See, for instance, Frank White, *The Overview Effect: Space Exploration and Human Evolution* (Boston: Houghton Mifflin, 1987); Wolfgang Sachs, "Satellitenblick: Die Ikone vom blauen Planeten und ihre Folgen für die Wissenschaft," in *Technik ohne Grenzen,* Ingo Braun and Bernward Joerges, eds. (Frankfurt am Main: Suhrkamp, 1994), pp. 305–346; Denis Cosgrove, "Contested Global Visions: 'One-World,' 'Whole-Earth,' and the Apollo Space Photographs," *Annals of the Association of American Geographers* 84, no. 2 (June 1994): pp. 270–294; Denis Cosgrove, *Apollo's Eye: A Cartographic Genealogy of the Earth in the Western Imagination* (Baltimore, MD: The Johns Hopkins University Press, 2001); Andreas Rosenfelder, "Medien auf dem Mond: Zur Reichweite des Weltraumfernsehens," in *Medienkultur der 60er Jahre: Diskursgeschichte der Medien nach 1945*, vol. 2, Irmela Schneider, Torsten Hahn, and Christina Bartz, eds. (Opladen: Westdeutscher Verlag, 2003), pp. 17–33.

The same tension—a certain form of nationalism or Europeanness on one hand, versus a specific variant of internationalism or globalism *avant la lettre* on the other—was already a central element in many of the programmatic self-descriptions of the early space advocates, often proving a highly problematic issue. Directly after its inception in 1934, members of the British Interplanetary Society, for instance, discussed their self-image as expressed in the Society's name on several occasions. Although it was at first disputed whether British Rocket Society would not be a more appropriate name than British Interplanetary Society if it was to harmonize better with its Continental and North American sister organizations, 17 years later, in 1951, the conflict had become whether the word "British" should not be omitted completely from the its title. Some of the Society's members strongly feared that it could be interpreted as an expression of just that kind of latent nationalism which they considered as contradictory to the Society's international character and detrimental to their common "vision of the coming of interplanetary communication." From their perspective, Europe was a state in between two different stages of development. Europe was to be preferred to any national context and something of a self-evident frame of reference, yet not the global society either, which they hoped eventually to create through their cosmic activities.[16]

Infinite Frontiers, Cosmic Visions, Futures Past

"The desire to explore and understand is part of our character," President George W. Bush declared on 14 January 2004, announcing his new "Vision for Space Exploration" initiative at NASA Headquarters in Washington, DC. "Mankind is drawn to the heavens for the same reason we were once drawn into unknown lands and across the open sea," he continued, in order to justify space travel by making bold psychological statements and indicating broad historical parallels: "We choose to explore space because doing so improves our lives, and lifts our national spirit. So let us continue the journey."[17] Thus Bush, in a few simple words, connected

16. P. E. Cleator, "What's in a Name?" *Journal of the British Interplanetary Society* 4, no. 1 (October 1934): p. 34: "The *raison d'être* of the Society—however remote it may seem at present—is to achieve the conquest of space, and thence interplanetary travel. There can be no question, therefore, but that the term 'interplanetary' is a fitting designation." H. E. Ross, "Gone with the Efflux," *Journal of the British Interplanetary Society* 9, no. 3 (May 1950): pp. 93–101, here p. 95; D. F. Martyn, "Correspondence: Change of the Society's Name?" *Journal of the British Interplanetary Society* 10, no. 2 (March 1951): p. 93f.

17. "President Bush Announces New Vision for Space Exploration Program: Remarks by the President on U.S. Space Policy, NASA Headquarters, Washington, DC," 14 January 2004, *http://www.whitehouse.gov/news/releases/2004/01/20040114-3.html* (accessed 3 January 2007).

individual with collective psychology, history with the future, and questions of the quality of life with the welfare of the entire nation. He also reintroduced one of the oldest and most frequently advanced arguments for investing extensive resources in human spaceflight: outer space as humankind's final frontier, as an enormous, quite natural task only to be undertaken by all concerned collectively, yet obviously and exclusively under his direction and leadership.

By no means was George W. Bush the first to envisage the exploration of outer space as a direct consequence of America's alleged predisposition to continuously open new frontiers and steadily seek new discoveries. Originally, this famous argument goes back to historian Frederick Jackson Turner (1861–1932) who, on the occasion of the epochal World's Columbian Exposition 1893 in Chicago, had tried to explain that many characteristic features of American society developed during the exploration of the American West and later persisted, even after the actual process of conquest and settlement was long completed. Turner's so-called frontier thesis has, ever since, been attacked by legions of professional historians who have severely and successfully criticized his argument from various angles, eventually debunking the thesis as a myth. It was, nevertheless, successfully politically exploited in the 1960s in order to strengthen unity and the nation's self-image by conjuring one great common task.[18] Thus, Bush did not add a new element to the debate but, rather, took over and gave fresh justification to exactly the same kind of frontier rhetoric that numerous other space advocates, including John F. Kennedy and John Glenn, had already used long before him, and in which current NASA Administrator Michael Griffin also seems willing to invest.[19]

Whether true or not, from the perspective of a professional historian it is quite remarkable how present a simplified and vulgarized version of Turner's original thesis still is in everyday public discourse, and what considerable influence it continues to have in the American public sphere. It might be best described as an historical argument of the second order, i.e., an argument that is historically far from accurate but is retrospectively *believed* to be true and, despite its original falseness, thus proves enormously effective (in this case, up to the present day). When applied within a European context, its shortcomings become even more obvious. Although Europe

18. Frederick Jackson Turner, "The Significance of the Frontier in American History," in Frederick Jackson Turner, *The Frontier in American History* (New York: Henry Holt, 1921), pp. 1–38; Janice Hocker Rushing, "Mythic Evolution of 'The New Frontier' in Mass Mediated Rhetoric," *Critical Studies in Mass Communication* 3, no. 3 (September 1986): pp. 265–296; Matthias Waechter, *Die Erfindung des amerikanischen Westens: Die Geschichte der Frontier-Debatte* (Freiburg im Breisgau: Rombach, 1996).

19. For instance, in a recent interview, Christian Schwägerl, "'Wir könnten längst unterwegs sein': Ein Gespräch mit dem Nasa-Chef Michael Griffin über unsere Zukunft im Weltraum," *Frankfurter Allgemeine Zeitung* 22 (26 January 2007): p. 44; Roger D. Launius, "Perfect Worlds, Perfect Societies: The Persistent Goal of Utopia in Human Spaceflight," *Journal of the British Interplanetary Society* 56 (September/October 2003): pp. 338–349.

has always had a variety of different and oft-changing frontiers and open spaces, both real and imagined (most of which were located overseas), a direct equivalent to the American frontier has never existed, neither in *Realgeschichte* nor in myth. Even more than in the United States, some time in the early 1970s the theme of "space" lost much of its popular and futuristic appeal, as did nuclear power and atomic energy.[20]

From the aftermath of World War II through the early 1970s, however, outer space clearly had constituted one of the "major sites of utopian thinking," not only in the United States but also in Europe.[21] During these three decades it was a widely shared assumption that the future would—literally—take place in outer space. While also fostering actual technological developments, scientists, technicians, and engineers drafted grand schemes of how the world would soon appear. They attempted to anticipate a future in space and at the same time tried to interpret and make this understandable from a philosophical perspective. Some of the main protagonists, such as the English science-fiction author Arthur C. Clarke (1917–), philosopher Olaf Stapledon (1886–1950), aeronautical engineer A. V. Cleaver (1917–1977), and the already mentioned technician Krafft A. Ehricke (1917–1984), considered themselves explicitly as agents of an ongoing spatial revolution—the "interplanetary project"—which would change humankind forever. Long before Sputnik they already declared the advent of the "Space Age" or the "orbital age," featuring an "interstellar" or "multi-planetary society" peopled by "*Homo extraterrestris*" or "interplanetary man," and diagnosed the dawn of a new "3-dimensional civilization." They discussed potential repercussions of spacefaring on the human psyche, demanded the establishment of a United Nations organization control, and debated with great verve not only whether "on Mars life (such as we know) has evolved to the human level" but also how communicative exchange with extraterrestrials might be made possible. Reflecting upon the necessity for a "common field of semantic reference (C.F.S.R.)" as a condition for any exchange between Earthlings and their "extra-terrestrial neighbours (E.T.N.)," under the heading of "Astraglossa" some enthusiasts even set out to take "first steps in celestial syntax," just in case genuine long-distance communication "with beings with whom we presumptively share no idiom of discourse" had to be initiated (figure 31.4).[22]

20. "European Interest in Apollo Dwindles," *The New York Times*, 10 February 1971: p. 24.

21. Constance Penley, *NASA/Trek: Popular Science and Sex in America* (New York: Verso, 1997), p. 22.

22. Arthur C. Clarke, "The Challenge of the Spaceship (Astronautics and Its Impact upon Human Society)," *Journal of the British Interplanetary Society* 6, no. 3 (December 1946): pp. 66–81; A.V. Cleaver, "The Interplanetary Project," *Journal of the British Interplanetary Society* 7, no. 1 (January 1948): pp. 21–39; Olaf Stapledon, "Interplanetary Man?" *Journal of the British Interplanetary Society* 7, no. 6 (November 1948): pp. 213–233; Krafft A. Ehricke, "The Anthropology of Astronautics," *Astronautics* 2, no. 4 (November 1957): pp. 26–29, 65–68; Siegfried Johannes Gerathewohl, "Zur Psychologie der Raumfahrt: Eine kleine Studie über unsere Vorstellung von Raum und Zeit," *Weltraumfahrt* 5, no. 3 (Juli 1954): pp. 65–68; A. W. B. Hester, "Some Political Implications of Space-Flight," *Journal of the British Interplanetary Society* 14, no. 6 (November/December 1955): pp. 314–319; Lancelot Hogben, "Astraglossa or First Steps in Celestial Syntax," *Journal of the British Interplanetary Society* 11, no. 6 (November 1952): pp. 258–274, here p. 259.

Figure 31.4—In the 1920s, it was suggested to communicate with the Martians by means of a newly-invented "light-telephone" which is here shown in action. The question of whether the inhabitants of planet Mars (if they existed) would understand the constitution of such a signal, set up a corresponding station of their own, and then respond in the same language, remained controversial. ("Communication with Martians," *Die Umschau: Illustrierte Wochenschrift über die Fortschritte in Wissenschaft und Technik* 28, no. 16 [19 April 1924]: p. 284).

Controversies on the existence of extraterrestrial life are by no means an epiphenomenon of postmodernity; they go back at least to the Copernican revolution.[23] Even if early experts such as Willy Ley, Wernher von Braun or the numerous members of the German *Gesellschaft für Weltraumforschung* (GfW), under the direction of engineer Heinz Hermann Koelle (1925–), often did their very best to steer clear of such muddy waters and preferred, mainly for tactical and strategic reasons, *not* to take an openly positive stand, the quest for extraterrestrial life has always been one of the most central, yet often hidden, motives behind many scientific debates and space-related enterprises; not surprisingly, it still is today. It is not a coincidence that so many contemporary space exploration projects are motivated by the search for water, believed to be a necessary precondition for extraterrestrial life-forms.

23. Karl S. Guthke, *Der Mythos der Neuzeit: Das Thema der Mehrheit der Welten in der Literatur- und Geistesgeschichte von der kopernikanischen Wende bis zur Science Fiction* (Bern/München: Francke, 1983); Lucian Boia, *L'Exploration imaginaire de l'espace* (Paris: La Découverte, 1987); Steven J. Dick, *The Biological Universe: The Twentieth-Century Extraterrestrial Life Debate and the Limits of Science* (Cambridge, U.K.: Cambridge University Press, 1996); Steven J. Dick, *Life on Other Worlds: The 20th-Century Extraterrestrial Life Debate* (Cambridge, U.K.: Cambridge University Press, 1998)

Ultimately, it can be argued that a vast number of the debates fought out during the twentieth century on the social and cultural rationale behind the space effort oscillated between two distinct poles—or, as it were, "discursive vanishing points"—other than the myth of the frontier. First, there is that entire argumentative strand for which literary scholar De Witt Douglas Kilgore has found the neat label "astrofuturism," i.e., the widely shared belief system that the future would necessarily take place in outer space and that it would entail an encounter with alien life-forms as the twentieth century's most radical version of imagined alterity but yet an "other" unlike any other before.[24] A German journalist summarized expectations for the future in 1951: "The steady progress of science and technology obscure the boundaries. More than ever the world of tomorrow is a concern of the present, and even to visit a secret laboratory can today become the beginning of an adventurous voyage of discovery into the future."[25]

Second, in addition to this utopian component there is a strong religious, spiritual, and/or mythical strand to be detected behind these numerous debates and activities. How did changing images and conceptions of outer space, "other worlds," and the entire cosmos impinge not only on competing versions of the future but also on religion and transcendental beliefs? As early as the late 1920s, contemporary critics spoke of the "religion of spacecraft," calling it a "technological ersatz religion." Although such an aspect continues into the present, it has hitherto not been adequately examined, sometimes quite dramatically so. Both factors—the utopian/futuristic strand and the spiritual/religious component—must be made central categories when historicizing outer space.[26] Last but not least, it is Archibald MacLeish and Günter Anders who deserve credit for drawing our attention to the anthropocentrism so deeply inherent in all variants of space exploration. They made us realize that the Copernican revolution never took place in the realm of the imaginary. The more elaborate and far-fetched our conceptions and images of outer space, of other worlds "out there," and extraterrestrial life-forms have become, the more anthropocentric they remain. Indeed, distinguishing between space exploration and its impact can only constitute a temporary analytical separation. In fact, spaceflight already affected European culture and society long before it ceased to be a mere "flight of fancy."

24. De Witt Douglas Kilgore, *Astrofuturism: Science, Race, and Visions of Utopia in Space* (Philadelphia: University of Pennsylvania Press, 2003); cf. in this context especially C. G. Jung, "Ein moderner Mythus: Von Dingen, die am Himmel gesehen werden [1958]," C. G. Jung, *Gesammelte Werke*, vol. 10: *Zivilisation im Übergang* (Düsseldorf: Walter, 1995), pp. 337–474.

25. Rosemarie Knittel, "Gesellschaftsreisen in die Zukunft," *Alles aus der Welt* (Mai 1951): pp. 33–38, here p. 38: "Die schnellen Fortschritte von Wissenschaft und Technik verwischen die Grenzen. Mehr denn je ist die Welt von morgen eine Angelegenheit der Gegenwart, und schon der Besuch eines geheimen Laboratoriums kann heute zu einer abenteuerlichen Entdeckungsreise in die Zukunft werden."

26. Walter Deubel, "Die Religion der Rakete," *Deutsche Rundschau* 55 (Oktober 1928): pp. 63–70.

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of Science in Europe (2006). During academic year 2004–2005, Krige was the Charles A. Lindbergh Professor in Aerospace History at the Smithsonian National Air and Space Museum, Washington, DC. He took this opportunity to initiate research on his next project, which will deal with the role of space technology as an instrument of U.S.–European relations in the 1960s and early 1970s. His preliminary findings were presented as "Technology, Foreign Policy, and International Cooperation in Space," in *Critical Issues in the History of Spaceflight*, ed. Steven J. Dick and Roger D. Launius (2006). This project was at the core of Krige's successful application for a fellowship at the Davis Center, Department of History, Princeton University. Krige was awarded the biennial Dickinson Medal by the (UK) Newcomen Society for the Study of the History of Engineering and Technology in London in May, 2005.

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His interests in this regard lie as much with policy issues as with technical solutions. He is most well known as the editor of the volume *Lunar Bases and Space Activities of the 21st Century*, and he received the 1988 Space Pioneer Award for Science and Engineering from the National Space Society for this work. Currently, Dr. Mendell splits his time between communicating the principles of the human exploration of the solar system to both lay and technical audiences and working on lunar research. He is a member of the College of Teachers of the International Space University (ISU). At the ISU, he has led "Design Projects for an International Lunar Base" (1988); "International Mars Mission" (1991); "International Lunar Farside Observatory and Science Station" (1993); "Vision 20/20" (1995), a sampling of the future as seen by young space professionals; and "Space Tourism: From Dream to Reality" (2000). He belongs to several professional scientific and engineering societies. He is most active in the International Academy of Astronautics, where he has served as secretary of the Cosmic Study on International Human Exploration of Mars and is currently serving on Academic Commission III; and in the AIAA, where he has chaired the Space Science and Astronomy Technical Committee and sits on the International Activities Committee. He served on (and chaired) the Executive Committee of the Aerospace Division of the American Society of Civil Engineers. He has served as editor for nine technical volumes and has published more than 40 articles in professional journals and conference proceedings. He is also the author of numerous abstracts and short papers presented at technical conferences.

Ron Miller is the author/illustrator of some 40 books, most of them dealing with space exploration, astronomy, and other sciences. These include the award-winning Worlds Beyond series of astronomy books for young adults and *The Art of Chesley Bonestell* (2000), a biography of the grand master of astronomical art. He has also collaborated on five books with noted astronomer William K. Hartmann. These include *The Grand Tour, Cycles of Fire, In the Stream of Stars*, and *The History of Earth* (all published by Workman Publishing Co.). Considered an authority on Jules Verne, Miller has translated and illustrated new, definitive editions of Verne's *20,000 Leagues Under the Sea* and *Journey to the Center of the Earth*. A book published in July, 1993, *The Dream Machines* (a comprehensive, quarter-million-word, 744-page history of manned spacecraft) was nominated for the prestigious IAF Manuscript Award and won the Booklist Editor's Choice Award for 1994. He designed a set of 10 commemorative space exploration stamps for the U.S. Postal Service, one of which is on-board the New Horizons spacecraft bound for Pluto. A current project is the reprinting of classic and little-known space travel novels from the past 200 years.

Valerie Neal has been a space history curator at the Smithsonian National Air and Space Museum since 1989, where she engages in scholarly research, exhibit development, artifact collection, and public service. She has edited two books on space exploration and curated two major exhibitions on the space race and the challenges of future

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Jennifer Ross-Nazzal currently serves as the historian for the NASA Johnson Space Center (JSC) in Houston, Texas and is a member of the editorial board for *Quest: The History of Spaceflight Quarterly*. Ross-Nazzal began working for JSC in the summer of 2000 when she received an internship with the Johnson Space Center Oral History Project. In her position as historian, she has conducted more than 86 interviews for the Johnson Space Center Oral History Project and the NASA Headquarters History Office. From 2002 to 2004, she served as the oral history editor for *Quest*. Ross-Nazzal also participated in the *Columbia* Recovery Oral History project and later took the lead in a series of interviews to explore NASA's role in the development of microelectromechanical systems. In addition to her work for the JSC History Office, she works as an adjunct instructor for the University of Maryland University College, where she teaches U.S. and women's history. Ross-Nazzal received her M.A. in history from New Mexico State University in 1996 and her Ph.D. in history from Washington State University in May, 2004. Her dissertation, which was nominated for the David H. Stratton Award for the department's best dissertation, the Lerner-Scott Dissertation Prize, and the Phi Alpha Theta/Westerners International Dissertation Prize, focused on the life and times of suffragist Emma Smith DeVoe. Ross-Nazzal is currently revising her dissertation for publication. Two articles spun off from her dissertation have been published by the *Pacific Northwest Quarterly* and *South Dakota History*. Among her many honors and awards, she received a practicum grant from the Woodrow Wilson National Fellowship Foundation, and she is a former graduate fellow at the Thomas S. Foley Institute for Public Policy and Public Service. Most recently, she received the HRA New Professional Award from the National Council on Public History.

Philip Scranton is University Board of Governors Professor, History of Industry and Technology, at Rutgers University, where he directs the M.A. history program (Camden) and assisted in developing a Ph.D. field in the History of Technology, Environment and Health (New Brunswick). He served the Georgia Institute of Technology as Kranzberg Professor of the History of Technology and Science from

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Division. He held that position until the division was inactivated in 1991, at which time he moved to the Air Force Space Command History Office. Dr. Sturdevant has published extensively on the subject of military aerospace history in such periodicals as *Space Times*, *Journal of the British Interplanetary Society*, *Air & Space/Smithsonian*, *Quest: The History of Spaceflight Quarterly*, *Air Power History*, *Air Force Magazine*, *High Frontier: The Journal for Space & Missile Professionals*, and *Journal of the West*. He has authored or co-authored chapters or essays in *Beyond the Ionosphere: Fifty Years of Satellite Communication* (1997); *Organizing for the Use of Space: Historical Perspectives on a Persistent Issue* (1995); *Golden Legacy, Boundless Future: Essays on the United States Air Force and the Rise of Aerospace Power* (2000); *Air Warfare: An International Encyclopedia* (2002); *To Reach the High Frontier: A History of U.S. Launch Vehicles* (2002); *The Limitless Sky: Air Force Science and Technology Contributions to the Nation* (2004); and *Encyclopedia of 20th-Century Technology* (2005). A frequent lecturer on space history topics, he has taught Elderhostel and Pillar courses under the sponsorship of Pikes Peak Community College in Colorado Springs and was a guest speaker at the 2005 High Plains Chautauqua in Greeley, Colorado. Dr. Sturdevant is an active member of the American Institute of Aeronautics and Astronautics (AIAA), British Interplanetary Society (BIS), Air Force Space Operations Association (AFSOA), Society for the History of Technology (SHOT), and American Astronautical Society (AAS). Serving on the AAS History Committee, he has participated for nearly a decade in selecting the annual recipient of the Eugene M. Emme Astronautical Literature Award. He is a recipient of the Air Force Exemplary Civilian Service Award and the AAS President's Recognition Award.

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