

FROM THE CHIEF HISTORIAN



As discussed in the last Newsletter, 2009 will be especially notable for the Apollo anniversaries, including the first Moon landing on 20 July 1969. But another anniversary should not go unnoticed—the 50th anniversary of NASA’s history activities. It is no coincidence that this anniversary follows so closely NASA’s own 50th anniversary celebrations last year. NASA knew (or was convinced by others) from the beginning that its work would be historic. As Roger Launius describes in his excellent article “NASA History and the Challenge of Keeping the Contemporary Past” (*The Public Historian*, Summer 1999, online at <http://history.nasa.gov/launiuspharticle.pdf>), NASA’s first Administrator, T. Keith Glennan, had been president of Case Institute of Technology in Cleveland prior to coming to NASA. One of his faculty members was Melvin Kranzberg, a respected historian and one of the founders of the Society for the History of Technology (SHOT). It was Kranzberg who persuaded Glennan that NASA’s work required documentation, and who convinced him of the need for a NASA Historian. Accordingly, Glennan hired Eugene M. Emme on 9 November 1959 and established the History Office the following year. Emme remained on the job until 1978, and was the beginning of an unbroken line of NASA Chief Historians that included Monte D. Wright (1978–1982), Sylvia Fries (1983–1990), Roger D. Launius (1990–2002), and myself (2003 to the present). They also served as Directors of the History Office.

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THE HISTORY OF ATMOSPHERIC SCIENCE AT NASA

By Erik Conway, Historian, Jet Propulsion Laboratory

Author’s note: This essay is adapted from the introduction to *Atmospheric Science at NASA: A History*, newly published by Johns Hopkins University Press, 2008.

On 24 April 2004, the *New York Times* reported that NASA leaders had issued a gag order to Agency scientists barring them from discussing an upcoming film, *The Day After Tomorrow*.¹ The film’s plot revolved around the sudden onset of an Ice Age provoked by anthropogenic global warming. The idea was loosely based on a 1985 hypothesis by Wallace Broecker of the Lamont-Doherty Earth Observatory in New Jersey.² He postulated that gradual melting of the Arctic ice cap could cause deep ocean currents, which carry heat from the equator toward the poles, to slow or stop. This might result in cooling of western Europe and the northeast coast of North America. In popular culture, this regional cooling had been twisted into an Ice Age. Indeed, the Ice Age thesis had become so entrenched in the

¹ *The Day After Tomorrow*, Roland Emmerich, director, 20th Century Fox, 2004.

² Wallace S. Broecker, Dorothy M. Peteet, and David Rind, “Does the ocean-atmosphere system have more than one stable mode of operation?” *Nature* (2 May 1985), 21–26.

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History of Atmospheric Science (continued)

public mind that Donald Kennedy, editor of *Science*, the premier scientific journal in the United States, had decided to greet the movie by publishing an article setting out why an Ice Age was a highly unlikely outcome of global warming. The existence of the NASA order was “leaked” by an unspecified scientist who was unhappy about the overt censorship.³

The issue of global warming wasn’t the first time NASA had become involved in politically controversial science. NASA had also been involved in controversy around whether supersonic transports, or NASA’s Space Shuttle, or chlorofluorocarbons, would cause ozone depletion.⁴ But it had entered into such controversies indirectly, by developing technological capabilities relevant to the ozone and climate problems in its meteorological satellite and planetary science programs of the 1960s. While these issues hadn’t been politically controversial in the 1960s, both had been areas of active scientific interest. In the 1970s, the Agency substantially expanded its laboratory and instrument development efforts to foster new research into these areas.

During the 1980s, NASA advocated for, and finally won approval of, an Earth Observing System (EOS) to study global change, defined very broadly. Among many other things, EOS was to examine land use change, ocean circulation and heat storage, atmospheric temperature, chemistry, circulation, and radiative properties. At a projected \$17 billion cost in its first 10 years, it was to be the most expensive science program in American history, exceeding even the \$11 billion Superconducting Super Collider: the biggest of big science.⁵ But as political opposition to climate science mounted in the 1990s, NASA’s grand ambitions were cut severely, reducing EOS to a “mere” \$7 billion. By 2004, EOS had become an orphan, with NASA’s own leaders no longer supporting its continuation. Instead, they sought to transfer the politically contentious system, and its scientific responsibilities, to some other agency.

NASA and American Earth Science

Much of the history of 20th century American science to date has focused on physics and, more recently, biology. The field has also evolved as a history of laboratory science. There is only a small body of literature on 20th century field science.⁶ But in the geophysical sciences, field studies and expeditions are vital: these sciences are about understanding Earth. No laboratory can capture the complexity of Earth’s

3 Andrew C. Revkin, “NASA Curbs Comments on Ice Age Disaster Movie,” *the New York Times*, 25 April 2004, electronic edition; Andrew J. Weaver and Claude Hillaire-Marcel, “Global Warming and the Next Ice Age,” *Science* (16 April 2004), 400–402.

4 Erik M. Conway, *High Speed Dreams: The Technopolitics of Supersonic Transport Research* (Baltimore: Johns Hopkins University Press, 2005), 157–188.

5 The term “big science” was coined by Derek de Solla Price, *Little Science, Big Science* (NY: Columbia University Press, 1963). Recently, Catherine Westfall has argued that the concept is irrelevant: Westfall, “Rethinking Big Science: Modest, Mezzo, Grand Science and the Development of the Bevelac, 1971–1993,” *Isis* 94:1 (March 2003), 30–56. For a brief history of the demise of the Superconducting Super Collider, see Daniel J. Kevles, *The Physicists: The History of a Scientific Community in Modern America* (Cambridge: Harvard University Press, 1995, 2nd ed.), ix–xlii.

6 Gregory A. Good, ed. *The Earth, the Heavens, and the Carnegie Institute of Washington: Vol. 5, History of Geophysics*. Washington, DC: American Geophysical Union, 1994; in her study of continental drift, Oreskes discusses the relative decline of field studies in the face of new methodologies. Naomi Oreskes, *The Rejection of Continental Drift: Theory and Method in American Earth Science* (NY: Oxford University Press, 1999), 290; a new interest in oceanography seems to be developing: Helen M. Rozwadowski and David K. van Keuren, eds., *The Machine in Neptune’s Garden: Historical Perspectives on Technology and the Marine Environment* (NY: Science History Publications, 2004). Robert E. Kohler has done important work in exploring the relationship between laboratory and field biology: Robert E. Kohler, *Landscapes and Labscapes: Exploring the lab-field border in biology* (Chicago: University of Chicago Press, 2002).

processes, hence in Earth sciences one must go outside to study one's subject. While the satellite program of the International Geophysical Year (IGY) has drawn essentially all of the historical interest in that event, the IGY's purpose had been field science, and particularly polar exploration. Following this geophysical tradition of field science, NASA built field capabilities of its own.

In her history of plate tectonics, Naomi Oreskes discusses the effort to make geology a quantitative science in the early 20th century, through laboratory studies and the gradual abandonment of the primary 19th century geologic activity: mapping. Field studies became secondary, and indeed, derided as an avoidance of "serious scholarship."⁷ But NASA did the opposite in the second half of the 20th century. It not only embarked in field science, it sought to bring lab-quality measurements into the field. In other words, the Agency's science leaders tried to gain for Earth sciences the best of both worlds: quantitative measurements taken in the context of the real world, or several worlds once one considers that "planetary" sciences are merely the Earth sciences carried out elsewhere.

They did this for two reasons. NASA is the space agency, and parts of it are dedicated to the study of other planets. But scientists can't go there to measure things themselves. With the sole exception of Moon rocks returned from the lunar surface by the Apollo program between 1969 and 1972, they couldn't bring the rocks of other planets into the laboratory either. So they sought to send their laboratories off to the other planets instead. But understanding the data sent back by their robot laboratories often meant turning the instruments loose on Earth first. That way the planetary instruments' performance could be checked via comparison by other, better understood, instruments.

Second, NASA scientific leaders sought to achieve credibility with the American science advisory community (dominated throughout this period by physicists and chemists), and to achieve credibility with policymakers as more and more of NASA's science establishment became involved in politically controversial areas. So NASA managers focused a great deal of attention on issues of calibration and intercomparison. They mounted large-scale field "experiments," as their expeditions were called, perhaps attempting to borrow some of the cultural glamour of physics or the credibility of experimental science more generally, in order to collect real-world data. The best known of these are the Agency's expeditions to Antarctica to study the ozone hole.⁸

Methodologically, the Agency's focus on large-scale data-collection, analysis, and emphasis on adequate calibration is recognizably what Susan Faye Cannon labeled "Humboldtian" science, after the efforts of 19th century explorer/scientist Alexander von Humboldt.⁹ Humboldt carried a huge variety of instruments on data collecting expeditions, along with mules and porters and other assistants to help him carry them. Calibration, intercomparison, and a quantitative understanding of errors were important parts of his method. He sought patterns in data that could be masked by such errors; he was also one of the pioneers of data visualization—isobaric maps, for example. Perhaps the most successful application of his methods in the 19th century

⁷ Quoted in Oreskes, 290.

⁸ Sharon Roan, *The Ozone Crisis* (NY: Wiley, 1989); Maureen Christie, *The Ozone Layer: A Philosophy of Science Perspective* (Cambridge: Cambridge University Press, 2000), 52–65; and W. Henry Lambright, *NASA and the Environment: The Case of Ozone Depletion*, NASA SP-2005-4538, May 2005.

⁹ Susan Faye Cannon, *Science in Culture: the Early Victorian Period* (NY: Science History Publications, 1978).

From the Chief Historian (continued)



NASA's first Chief Historian, Eugene M. Emme, established the NASA History Office under the direction of the first Administrator, T. Keith Glennan. Emme served in this role until his retirement in 1978. *NASA Historical Reference Collection*



Monte D. Wright, NASA's second Chief Historian and a former USAF Academy professor, succeeded Emme in 1978. Wright served in this position through 1982. *NASA Historical Reference Collection*



Sylvia Fries, Chief Historian 1983–1990. Fries previously served as a member of the NASA Advisory Council and Chair of the NASA History Advisory Committee. *NASA Historical Reference Collection*



Roger D. Launius, Chief Historian 1990–2002. Launius is the author of numerous publications on the history of spaceflight and currently serves as Senior Curator in the Division of Space History at the National Air and Space Museum. *NASA Historical Reference Collection*

Gene Emme (1919–1985) had been a Navy pilot in the Pacific theater during World War II, obtained his doctorate in history from the University of Iowa in 1949, and served in a variety of positions in the Air Force history program, including the faculty of the Air University at Maxwell Air Force Base in Montgomery, Alabama from 1949 to 1958. His book, *The Impact of Air Power: National Security and World Politics* (1959), was published just before he came to NASA. He began NASA's history program modeled on that of the Air Force, heavy on research, documentation and publication, and serving not only external audiences, but also to NASA executive leadership and other personnel. By 1967 he had hired NASA's first Chief Archivist, Lee Saegasser, who built the NASA Historical Reference Collection from almost nothing to 2,000 linear feet by the time of his departure in 1997. That collection, still widely used by scholars under the able direction of Chief Archivist Jane Odom, aided by Colin Fries, John Hargenrader, and Liz Suckow, holds a thick file testifying to Emme's many historical activities at NASA. On Emme's retirement in 1978, Thomas P. Hughes, an eminent historian and chairman of the NASA History Advisory Committee, wrote that Emme "was not only present at the creation of what is virtually a new discipline—space history—but he also played a central role in establishing sound institutional support for that discipline."

Since Emme, the NASA Chief Historians have each brought their own strengths to the position. Monte Wright had been an Air Force navigator and taught history at the USAF Academy; his history of aerial navigation to 1941, *Most Probable Position*, was well known before he came to the History Office in 1973, having retired as a Lt. Colonel in the Air Force. He took up the position of Chief Historian on Emme's retirement in 1978. Sylvia Fries had obtained her Ph.D. in history from Johns Hopkins University, had an academic career teaching American and European history at a number of universities, and served on the NASA Advisory Council and as Chair of the NASA History Advisory Committee before taking up duties as Chief Historian. She became an expert on science and technology policy and produced a volume on *NASA Engineers and the Age of Apollo*, an extensive aggregate biography of the engineers who took the United States to the Moon (NASA SP-4104, 1992). Roger Launius's Ph.D. was in history, with major fields in American frontier and military history. Prior to coming to NASA, he served in a variety of history positions in the Air Force, including Chief Historian for the Military Airlift Command. His books are well known and too numerous to mention, and he continues to produce them from his current position in the Division of Space History of the National Air and Space Museum. Finally, I came to NASA from the U.S. Naval Observatory with a background in astrophysics and history of science, which possibly accounts for my desire to improve NASA history in the areas of Earth and space sciences and the societal impact of spaceflight.

Over the last 50 years the History Office has come under several different organizational structures at NASA Headquarters. Emme came in as a special assistant to the Director of the Office of Public Information, but during his time the History Office came successively under office of Educational Programs (1960–1963), various forms of the Office of Policy Planning (1963–1970), and the Office of the Administrator (1971–1977). Since then, aside from brief stints in the Administrator's office in 1991–1992 and the office of Policy and Plans from 1995–2001, the History Office has come under the Office of External Relations, which is responsible for all of NASA's international and interagency interactions.

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From the Chief Historian (continued)

With more than 20,000 civil servants at NASA, tens of thousands more contractors, and a broad mission that encompasses aeronautics, Earth and space science, human spaceflight operations and the development of new systems for human spaceflight, all with huge national and international implications, NASA is a never-ending source of rich history. In addition to the staff of seven at Headquarters, the history and archive functions are therefore also undertaken at the NASA Centers. Some Centers have active historians, others have active archivists, and a few lucky ones have both. You can read about their activities in each of these newsletters. In order to discuss common issues and the latest research in NASA history, each year we gather at one of the Centers for our Annual History Review, which will be held this year at NASA Ames Research Center in Mountain View, California. You can see our latest annual report at <http://history.nasa.gov/2007.pdf>.

You will find a great deal more about NASA history at our ever-growing Web site <http://history.nasa.gov/program.html>. Readers can also check out “Thinking about NASA History” at <http://history.nasa.gov/thinkingindex.html>. Now in press is a new 50th anniversary edition of *Research in NASA History*, which will replace the old monograph from 1997 found at <http://history.nasa.gov/lhrhist.pdf>. This new edition details the historical and archival resources available for doing space history. You can access the NASA HQ Online Historical Reference Collection at <https://mira.hq.nasa.gov/history/>. And as usual, for more about our numerous publications and other services see our Web site at <http://history.nasa.gov/>.

NASA should be proud of its history program, and I expect Gene Emme would be pleased and perhaps amazed at what has developed from humble beginnings in 1959.

Steve Dick

NEWS FROM NASA HEADQUARTERS AND CENTERS

Headquarters

Jane Odom continues to evaluate and acquire new material for the Historical Reference Collection (HRC). As expected, she has been involved with the disposition of the official records and other historical materials of the former Administrator and Deputy Administrator, working with the records management staff to ensure that this history is captured and preserved. Additionally, Jane appraises material for historical value and directs the subsequent processing of collections, answers reference requests, and this quarter, participated in a mandatory declassification review.

Collectively, Colin Fries, John Hargenrader, and Liz Suckow all share reference duties, answering inquiries received by e-mail, assisting walk-in researchers, and helping Jane with Freedom of Information Act (FOIA) requests. They also recently assisted Jane in reviewing several thousand PDFs in the database in an effort to resolve an ongoing search issue.

Colin has finished scanning a collection of life sciences materials dated 1993–2003, and a collection of records transmittal forms dated 1951–1985, that describe official

records transferred by Headquarters (HQ) to the Washington National Records Center. He has re-processed the HQ organization files and processed a small collection of congressional material. He is currently processing a collection of History series unpublished historical reports, monographs, and notes. Colin continues to maintain the History Division Web pages and recently finished updating the forecast of upcoming anniversaries pages.

John is continuing to scan the Office of Safety and Mission Assurance chronological correspondence files dated 1986–2001. He is working to preserve deteriorating newspaper clippings in the early Administrators' files and the Explorer spacecraft files. As he goes through the records, he is reorganizing the material chronologically and segregating the official NASA items from secondary source materials in an effort to facilitate research use.

Liz Suckow has completed the appraisal of a 67-cubic foot collection of Apollo program files and Office of Policy files borrowed from the Federal Records Center, copying historically significant items from this collection to add to the HRC. Her next collection, recalled from the Records Center, contains sources for a history of the Apollo program, circa 1963–1970. Liz is currently processing a collection of files on the Space Flight Participant Program, including information on the teacher, journalist, and educator-astronaut in space programs. Additionally, she is working on a preservation project of the old National Advisory Committee for Aeronautics (NACA) files, refolding material in acid-free folders and photocopying deteriorating materials; and she continues to enter descriptive information about our oral histories into the database.

Ames Research Center (ARC)

The ARC Hall of Fame inducted nine new members with its 70th anniversary class. Their selection followed a Center-wide nomination process, and reflects the diversity of scientific and technical work for which ARC is famous. The hall “recognizes those people whose contributions have had the most sustained and far-reaching influence on the direction and mission of NASA Ames, and/or whose work at NASA Ames has generated fundamental advancements in either a scientific or engineering field.” In a well-attended ceremony on 23 February 2008 the inductees thanked those friends and coworkers they collaborated with and reflected on the meaning of their careers.

John Billingham was chief of the ARC life sciences division in the 1980s and fostered the transdisciplinary foundation of the Search for Extraterrestrial Intelligence (SETI) and astrobiology. John W. Boyd is widely respected for his varied roles in NASA technical management and for making the Center's past relevant to its future. Estelle P. Condon—a science manager during the 1980s and 1990s—helped make ARC a leading Center for the Earth sciences. Alfred J. Eggers was a pioneer in aerothermodynamics in the 1950s and led ARC into space project management in the 1960s. Heinz Erzberger brought mathematical rigor to air traffic management, bringing greater efficiency and safety to air travel. Henry McDonald, as Director of ARC, provided exceptional leadership and keen technical insight as the Center reinvented itself in the 1990s. Emily Morey-Holton's research papers are among the most cited in NASA history, and are compelling examples of how basic research in space life sciences prove useful in medical research on Earth. Alvin Seiff pioneered the technology of entry probes, thereby creating an effective tool for understanding planetary atmospheres. Paul F. Yaggy forged a strong relationship between ARC

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News from Headquarters and the Centers (continued)

and the U.S. Army, and built a research group that made ARC a world leader in rotorcraft aeromechanics.

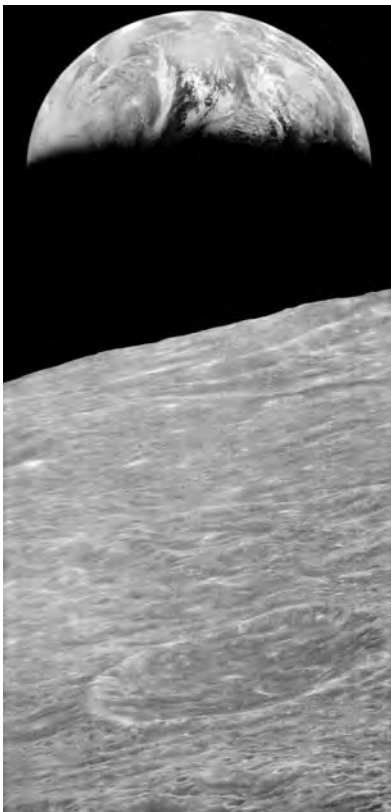
They join a class of 12 ARC notables inducted for the 60th anniversary of the Center: Smith DeFrance, Robert T. Jones, H. Julian Allen, Harvard Lomax, George Cooper, Dean Chapman, Hans Mark, Clarence Syvertson, Harold Klein, James Pollack, Charles Hall, and William Ballhaus.

ARC and Airship Ventures LLC celebrated the 75th anniversary of the commissioning of Moffett Field with a ceremony on the airfield. Airship Ventures, a partner of the NASA Research Park, recently began operations of a dirigible at Moffett Field out of Hangar Two. The dirigible is available for NASA's remote sensing and atmospheric research and, by providing provide sightseeing flights over the Bay Area, it gives insight into cleaner and more efficient vehicles for air tourism.



In addition to the usual ARC luminaries, included in the celebrations on 21 November 2008 were descendants of Admiral William Moffett and of Count Ferdinand Von Zeppelin, and representatives of the German government. Three of only 12 remaining airship hangars in the U.S. are at Moffett Field.

Another NASA Research Park partner, the Lunar Image Recovery Project Team, unveiled a newly restored image of Earth rising taken in 1966 by the Lunar Orbiter 1 spacecraft. At a press conference on 13 November 2008, Dennis Wingo and Greg Schmidt of the NASA Lunar Science Institute spoke on the process of refurbishing the machines required for a high-resolution print from the original data, and the value of the image in understanding the history of changes to the Moon's surface. Lunar Orbiter data still generate the highest resolution images taken of the lunar surface. The images can be seen at www.moonviews.com or searching "LOIRP" via Google.



The Research Institute for Advanced Computer Science (RIACS) celebrated its 25th anniversary in November 2008 with a gala at the Computer History Museum in Mountain View, California. RIACS was formed 1983 as a collaboration between NASA and Universities Space Research Association (USRA) to staff ARC's Numerical Aerodynamic Simulation facility. Founding RIACS director Peter Denning spoke on the history of the institute, joined by the current Directors of ARC, RIACS, and USRA. Denning noted the early work done at RIACS in pioneering the field of intelligent and autonomous systems, on code for computational fluid dynamics, using open-source systems, and adopting flexible network protocols. A 25th anniversary history of RIACS is available at history.arc.nasa.gov.

ARC is preparing to host the 2009 NASA History Training and Review. It will be held 28–30 April in Building 3 at ARC. The program will include updates on NASA history efforts throughout the Agency.

A stunning image of Earth rising, taken by the Lunar Orbiter 1 in 1966 and recently restored by the Lunar Image Recovery Project Team.

Recently, Jack Boyd and Glenn Bugos published “Accelerating Entrepreneurial Space: The Case for a NACA-Style Organization,” in *Space Policy* 24 (2008) 140–147.

The ARC archives enjoyed extended visits from two researchers: Janet Vertesi is studying the organization of the science teams managing robotic exploration; and Renee Rottner is studying extended innovation in research teams using the Spitzer telescope as her case study. We accessioned more than 30 cubic feet of documents and artifacts since the last newsletter, notably records of the joint U.S./Soviet biological satellite programs from the 1970s through the 1990s.

April Gage is preparing the archives for several months in mothballs while building N207 undergoes renovation. Researchers interested in using records should give April plenty of advance notice, and be aware that records may not be accessible.

Glenn Research Center (GRC)

A local television station has begun work on a piece to air next summer highlighting GRC contributions to the space program and its current Ares work. The History Office provided the producer with a synopsis of the Center’s achievements related to the space program and found historical films to highlight each section. The producers are viewing a number of our historic films for possible inclusion in the piece and hope to also interview local retirees about their experiences working on the Apollo program.

Demolition has begun on another of GRC’s historic buildings. The Propulsion Systems Laboratory (PSL) began operating in October of 1952 with two 24-foot diameter and 14-foot long altitude chambers. The chambers, which occupied two floors, could simulate altitudes up to 70,000 feet; however, only one chamber could be operated at a time. Its first tests were of the 18-inch ramjet that was to be used by the Navajo missile.

PSL 1 was initially primarily used for turbojet studies. Later in the 1950s it was used for missile studies. PSL 2 was initially for ramjet and rocket studies. Later, it became involved in more complex rocket systems. PSL 1 and 2 were used to study the Centaur rocket’s RL-10 engine as well as tank insulation and pressurization during the early 1960s. PSL 1 and 2 were closed down in late 1979.

In 1967 work began on adding an additional two altitude chambers that were referred to as PSL 3 and 4. At 24 feet in diameter and 40 feet in length, these new chambers were longer than the original chambers. They were also both on ground level. PSL 3 and 4 had separate diffusers, but shared a plenum and cooler, which gave them a Y-shape. PSL 3 and 4 began operation in 1972. In 1990, a major rehab of PSL 3 and 4 began and the chambers could simulate altitudes up to 90,000 feet.

Archivist Bob Arrighi (Wyle) is undertaking a project to document this historic facility as part of NASA’s continuing commitment to cultural resource management. Photographic surveys of the facility were taken prior to demolition. Numerous construction photographs were identified and scanned. Extensive research was conducted on both the PSL’s physical composition and testing history through records and retiree interviews. A Web site documenting the history of the facility is nearly complete. A short manuscript on the facility and a large display panel are also underway.

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News from Headquarters and the Centers (continued)

The Society for History in the Federal Government recently announced that Bob Arrighi, GRC Archivist, has been awarded their John Wesley Powell Prize for excellence in historical preservation and display. His work, *Altitude Wind Tunnel at NASA Glenn Research Center. An Interactive History*, is an interactive, multimedia CD celebrating the history and engineering of this technological first. Along with its accompanying Web site: <http://awt.grc.nasa.gov/Interactive/awt.html>, the CD documents the design, history, and technological contributions of the Altitude Wind Tunnel through the inclusion of a timeline, photos, primary technical reports and diagrams, and interactive illustrations of its layout.

Kennedy Space Center (KSC)

A History of the Kennedy Space Center has won the 2009 Gardner-Lasser Aerospace History Literature Award of the American Institute of Aeronautics and Astronautics. This award recognizes the best nonfiction work in aero- or astronautical history addressing the science, technology, or societal impact of aero- or astronautics. Amy Harris, Exhibits, Awards, and Events Coordinator at the University Press of Florida, nominated the work which details the Center's history and the engineering and administration contributing to the successful construction and launch of hundreds of manned and unmanned rockets, shuttles, and other spacecraft. *A History of the Kennedy Space Center* was written by Kenneth Lipartito, Professor of history at Florida International University, and Orville Butler, Associate Historian at the American Institute of Physics.

RECENT PUBLICATIONS

NASA History Publications

Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume VII (NASA SP-2008-4407), edited by John M. Logsdon with Roger D. Launius. *Exploring the Unknown*, a collection of source documents that have helped shape the U.S. space program, provides primary access illuminating the major issues in American spaceflight. Volume VII addresses the beginnings of human spaceflight with the Mercury, Gemini, and Apollo projects, featuring official reports, internal memoranda, letters, and interviews on the subject, each with a short essay outlining its significance. *Exploring the Unknown* can be purchased for \$35 from the NASA Center for AeroSpace Information (CASI) at <http://ntrs.nasa.gov/search.jsp>, the NASA Information Center, the Government Printing Office, or private vendors.

William H. Pickering: America's Deep Space Pioneer (NASA SP-2008-4113), by Douglas J. Mudgway. As the first Director of the Jet Propulsion Laboratory, William Pickering led the U.S. effort to develop viable rocket propulsion systems and played an integral role in the American response to Sputnik through the launching of Explorer I. In this revised second edition, Mudgway, a former JPL engineer working under Pickering, captures the significance of Pickering's contribution to early astronautical development in the U.S. and the role he played at JPL in establishing America's presence in space. This edition can be purchased through the CASI for

\$25 or from the Government Printing Office, NASA Information Center, or from private vendors for \$39.

Remembering the Space Age: Proceedings of the 50th Anniversary Conference (NASA SP-2008-4703), Steven J. Dick, editor. There is no doubt that the last 50 years have brought numerous accomplishments in the “new ocean” of space, harkening back to a long tradition of exploration. After 50 years of robotic and human spaceflight, and as serious plans are being implemented to return humans to the Moon and continue on to Mars, it is a good time to step back and ask questions that those in the heat of battle have had little time to consider. What has the Space Age meant? What if the Space Age had never occurred? Has it been, and is it still, important for a creative society to explore space? How do we, and how should we, remember the Space Age? This book is an edited collection of 21 essays stemming from an October 2007 conference sponsored by the NASA History Division and the National Air and Space Museum to commemorate the 50th anniversary of Sputnik I and the dawn of the Space Age. This volume, with a number of full-color illustrations, may be purchased through GPO or *amazon.com* for \$54 or through CASI for \$55.

Other NASA Publications

Columbia Crew Survival Investigation Report (NASA SP-2008-565), available in electronic format only at http://www.nasa.gov/pdf/298870main_SP-2008-565.pdf. After the Columbia Accident Investigation Board’s (CAIB) inquiry regarding the cause of the accident was completed, further consideration produced the question of whether there were lessons to be learned about how to improve crew survival in the future. This investigation was performed with the belief that a comprehensive, respectful investigation could provide knowledge that can protect future crews in the worldwide community of human spaceflight. This report is the first comprehensive, publicly available accident investigation report addressing crew survival for a human spacecraft mishap; and it provides key information for future crew survival investigations. The results of this investigation are intended to add meaning to the sacrifice of the crew’s lives by making spaceflight safer for future generations.

NASA Publications Reprinted by Dover Publications

Project Vanguard: The NASA History, by Constance McLaughlin Green and Milton Lomask (Dover Publications, January 2009). This authoritative, illustrated history chronicles the Vanguard project, which placed the United States’ second satellite into Earth orbit. In addition to analysis of the program’s scientific and technical challenges, it surveys the influence of the launchings of the first Russian Sputniks and Vanguard’s impact on subsequent space missions. Originally published by NASA as SP-4202, 1970, the Dover edition features a new introduction by author Paul Dickson.

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Recent Publications (continued)

Commercially Published Works

Compiled by Chris Gamble.

Around the World in 84 Days: The Authorized Biography of Skylab Astronaut Jerry Carr, by David Shayler (Apogee Books Space Series/Collector's Guide Publishing, Inc., September 2008). For 84 days—from 16 November 1973, to 8 February 1974—mission commander Gerald P. Carr orbited Earth on board the American space station Skylab 4, setting a new record for time in space. Covering his record-setting time in space as well as his training in the U.S. Marine Corps, his career with NASA, and his retirement years, this biography brings the story of Jerry Carr to life.

Saturn IIB: The Complete Manufacturing and Test Records, by Alan Lawrie (Apogee Books Space Series/Collector's Guide Publishing, Inc., October 2008). A complete history of the life of each Saturn I/IB rocket stage that played a central role in the Apollo project, this book reviews the manufacturing process, reveals how the rockets were tested, and identifies the problems associated with them. Rarely published photographs of how the rockets were built and tested are included with statistical data—such as details of the engines attached to each stage and the transportation records of each stage—as well as information on the many manufacturing and test facilities used and the current status of each one.

Robotic Exploration of the Solar System: Part II: Hiatus and Renewal, 1983–1996, by Paolo Ulivi and David Harland (Praxis, November 2008). *Robotic Exploration of the Solar System* provides a detailed history of unmanned missions of exploration of our solar system. Technical descriptions of the spacecraft, of their mission designs, and of instrumentations are provided. Scientific results are discussed in considerable depth, together with details of mission management. It details planetary missions of the 1980s up to the Soviet Phobos mission; the flybys of Halley's comet; the “flagship” missions of the 1990s, including Magellan, Galileo, and Mars Observer; and planetary missions from the early 1990s up to 1996, including Ulysses, Clementine, NEAR, Mars Pathfinder, Mars Global Surveyor, Mars-96, and early proposals for a small Pluto probe.

The Hunt for Planet X: New Worlds and the Fate of Pluto, by Govert Schilling (Springer, November 2008). *The Hunt for Planet X: New Worlds and the Fate of Pluto* goes beyond a standard scientific read encompassing who and what is involved in the pursuit of planetary endeavors. Touching on over 300 years of debates, debacles, and discoveries, this book offers the reader insight into the minds and motives of planetary astronomers and their findings. The real-life characters presented in the book look for glimpses of light in the dark, from icy Kuiper Belt objects to full-fledged planets, in the process challenging how such worlds should be defined and ultimately describing the universe.

Radical Wings & Wind Tunnels: Advanced Concepts Tested at NASA Langley, by Joseph R. Chambers and Mark A. Chambers (Specialty Press, October 2008). *Radical Wings and Wind Tunnels* presents a behind the scenes look at how the NACA, and today's NASA, have used wind tunnels and flight testing in past and current projects to advance aeronautical science.

X-Plane Crashes: Exploring Experimental, Rocket Plane & Spycraft Incidents, Accidents & Crash Sites, by Peter W. Merlin and Tony Moore (Specialty Press, October

2008). Known as “The X-Hunters,” authors Peter W. Merlin and Tony Moore have located more than 100 crash sites of exotic aircraft from Edwards Air Force Base and Area 51. Together they have recovered parts of supersonic rocket planes, stealthy spy craft, and vehicles that have reached the edge of space. Each story in the book profiles an unusual aircraft and the brave men who flew them. The authors examine the contributing causes of each crash and use then-and-now photographs to illustrate their findings.

Mars: From Myth and Mystery to Recent Discoveries, by Markus Hotakainen (Springer, November 2008). Mars has always been shrouded in mystery. It is very difficult to resolve through a telescope; for many centuries it remained just a reddish blur in the sky. Even in ancient times, its blood-red color evoked fear and gave rise to myths and legends that are still with us today. Over the centuries, bits and pieces of data on Mars have accumulated, and as more probes have made their way to the Red Planet, its veil of mystery is falling away. Nearly every week we are seeing exciting new pictures of Mars and learning more about its geology, weather, and history. This book is a journey from myth to reality, finding out what we do know about Mars, and what is still a mystery.

Humans in Outer Space—Interdisciplinary Odysseys Series: Studies in Space Policy, Vol. 1, edited by Luca Codignola and Kai-Uwe Schrogl (Springer, November 2008). The spacefaring nations are heading for the human exploration of the Moon, Mars, and Near-Earth Objects. They might be soon prepared with regard to technology development. But they also need to benefit from the humanities (history, philosophy, anthropology), the arts as well as the social sciences (political science, economics, law) to implement their plans. This book is the first comprehensive transdisciplinary dialogue on humans in outer space. This dialogue goes further than regarding humans as better-than-robot tools for exploration. It investigates the human quest for odysseys beyond Earth’s atmosphere and reflects also on the implications of finding extraterrestrial life.

Earthcam: Watching the World from Orbit, by Terry Hope (David & Charles PLC; 2nd ed., October, 2008). For the past 40 years, satellites have been sent into space to look back at our amazing planet with ever more sophisticated imaging technology. *Earthcam* presents an amazing collection of these images, allowing us to view our planet from an extraordinarily revealing perspective. From the ice caps to deserts, cities, and landmarks to volcanoes and forest fires, *Earthcam* brings together the most spectacular images captured of our home planet into a remarkable visual spectacle. Images illustrate the incredibly minute details that modern satellites are able to capture. Fascinating models of phenomena such as temperature and moisture are presented in the form of graphic representations from the latest scanning technology. This title provides stark evidence as to how global warming is changing the environment and the face of the planet irreversibly.

Homesteading Space: The Skylab Story, by W. David Hitt, Owen K. Garriott, and Joe P. Kerwin (University of Nebraska Press, November 2008). As the United States and the Soviet Union went from exploring space to living in it, a space station was conceived as the logical successor to the Apollo Moon program. But between conception and execution, there was the vastness of space itself, to say nothing of monumental technological challenges. *Homesteading Space*, by two of Skylab’s own astronauts and a NASA journalist, tells the dramatic story of America’s first space station from beginning to fiery end.

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Recent Publications (continued)

Earthrise: How We First Saw Ourselves, by Robert Poole (Yale University Press, November 2008). *Earthrise* tells the remarkable story of the first photographs of Earth from space and the totally unexpected impact of those images. The Apollo “Earthrise” and “Blue Marble” photographs were beamed across the world some 40 years ago. They had an astounding effect, Robert Poole explains, and in fact transformed thinking about Earth and its environment in a way that echoed throughout religion, culture, and science. Gazing upon our whole planet for the first time, we saw ourselves and our place in the universe with new clarity.

Lunar Outpost: The Challenges of Establishing Human Settlements on the Moon, by Erik Seedhouse (Praxis, November 2008). *Lunar Outpost* provides a detailed account of the various technologies, mission architectures, medical requirements, and training needed to return humans to the Moon within the next decade. It focuses on the means by which a lunar outpost will be constructed and also addresses major topics such as the cost of the enterprise and the roles played by private companies and individual countries. *Lunar Outpost* also describes the human factors, communications, exploration activities, and life support constraints of the missions.

Planetology: How Earth Is Unlocking the Secrets of the Solar System, by Tom Jones and Ellen Stofan (National Geographic, November 2008). In a stunning and completely new view of the solar system, an astronaut and a geologist team up to investigate, through parallel views made possible by cutting-edge space technology, how Earth itself can help science unravel the mysteries of the heavens. This comprehensive new portrait of the solar system brings to light an array of important features never seen until today—and it highlights, for the first time, the similarities and contrasts between Earth and its neighbors in space.

Who Owns the Moon?, by Virgiliu G. Pop (Springer, December 2008). This work investigates the permissibility and viability of property rights on the celestial bodies, particularly the extraterrestrial aspects of land and mineral resources ownership. In lay terms, it aims to find an answer to the question “who owns the Moon?” After critically analyzing and dismantling with legal arguments the trivial issue of sale of extraterrestrial real estate, the book addresses the apparent silence of the law in the field of landed property in outer space, scrutinizing whether the factual situation on the extraterrestrial realms calls for legal regulations.

The First Jet Pilot: The Story of German Test Pilot Erich Warsitz, by Lutz Warsitz (Pen & Sword Aviation, November 2008). On 27 August 1939, Flugkapitan Erich Warsitz became the first man to fly a jet aircraft, the Heinkel He 178; in June of the same year he flew the first liquid-fuel rocket aircraft, the Heinkel He 176. His legendary flying skills enabled him to assist the pioneering German aircraft and engine design teams that included Wernher von Braun and Ernst Heinkel. He repeatedly risked his life extending the frontiers of aviation in speed, altitude, and technology and survived many life-threatening incidents.

How Spacecraft Fly: Spaceflight Without Formulae, by Graham Swinerd (Springer, October 2008). The aim of this popular science text is to explain aerodynamic and astrodynamic flight without the use of mathematics and in an informal style, for nontechnical readers who are interested in spaceflight and spacecraft.

Conquistadors of the Sky: A History of Aviation in Latin America, by Dan Hagedorn (University Press of Florida, December 2008). Coinciding with the opening of a new permanent exhibit, America by Air, at the Smithsonian Institution’s National Air

and Space Museum, *Conquistadors of the Sky* celebrates the aviation achievements of 21 Latin American nations over the last 100 years—making this chronicle of heroic ventures and epic flights the best reference available on the subject.

Mars 3-D: A Rover's-Eye View of the Red Planet, by Jim Bell (Sterling, November 2008). What would it be like to visit Mars—to explore the distinctive, untouched terrain that inspired astronomers and stirred so many sci-fi writers' imaginations? Two highly capable robotic geologists—Spirit and Opportunity—made that amazing voyage, and spent the last four years roaming the Red Planet's unique landscape. Thanks to 120 stunning 3-D and color images shot by these rovers, we can come along—and right now, it's the closest we can get to actually setting foot on Mars. These super-realistic pictures pop off the page, allowing us to see for ourselves the rocks, craters, valleys, and other geologic configurations that define the Martian terrain.

A Place in Space: The History of Swiss Participation in European Space Programmes 1960–1987, by Stephan Zellmeyer (Paris: Beauchesne Editeur, November 2008). Small, neutral Switzerland was one of the driving forces in setting up the first Europe-wide space agency, the European Space Research Organisation (ESRO). Following that, Switzerland went on to become an active member of the European Space Agency (ESA). This book explains how and why Switzerland came to play such a role.

Spain and the European Space Effort, by José María Dorado Gutiérrez (Paris: Beauchesne Editeur, November 2008). This book contains nine historical monographs that present important aspects of the Spanish participation in ESRO and ESA programs. The authors are persons with direct experience of the matters they describe and have obtained industry-wide support to obtain the information used. A list of Spain's major achievements in space and a series of tables presenting the details of Spanish investments and participation in all major ESA projects are also included as well as photographs of hardware delivered to ESA.

The Sun from Space, by Kenneth R. Lang (Springer, 2nd edition, December 2008). The first edition of *The Sun From Space*, completed in 1999, focused on the early accomplishments of three solar spacecraft, Solar and Heliospheric Observatory (SOHO), Ulysses, and Yohkoh, primarily during a minimum in the Sun's 11-year cycle of magnetic activity. This comprehensive second edition includes the main findings of these three spacecraft over an entire activity cycle, including two minima and a maximum, and discusses the significant results of six further solar missions. After describing the scientific objectives of the nine solar missions and a historical perspective on studies of the Sun and heliosphere, the author presents key advances in our understanding of the solar interior; the heating of the million-degree outer atmosphere of the Sun, known as the solar corona; the origin and nature of the solar winds; the cause, prediction, and propagation of explosive solar flares and coronal mass ejections; and all aspects of space-weather interactions of the Sun with Earth, with unprotected astronauts on the Moon or Mars, and with spacecraft in outer space.

The Greatest Comets in History: Broom Stars and Celestial Scimitars, by David Seargent (Springer, November 2008). *The Greatest Comets in History* is a detailed descriptive account—in non-technical language—of what are deemed to have been the most spectacular and notable comets ever recorded beginning with “Aristotle's Comet” of 372 BC and ending with McNaught's Comet of 2007. Halley's Comet is

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Recent Publications (continued)

given a separate chapter and there is an introductory chapter on comets in general, explaining in lay terms what they are and correcting a few popular misconceptions.

Spaceplanes: From Airport to Spaceport, by Matthew A. Bentley (Springer, December 2008). *Spaceplanes* presents a vision of the near future in which space vehicles can take off from an international airport, refuel in space, and fly regularly between Earth and the Moon. In a few years it will be possible to board a spaceplane and fly into Earth orbit, and perhaps visit a space station. Later development could include refueling in orbit to take a tour of cislunar space. As the latest news has shown, the successful flight of SpaceShipOne and the imminent inauguration of Virgin Galactic's suborbital rides from the New Mexico desert have already begun this process. This book explains the technical details of precisely how all this can be accomplished within the next few decades.

Space Rescue: Ensuring the Safety of Manned Spacecraft, by David J. Shayler (Praxis, January 2009). In *Space Rescue*, author David J. Shayler reviews the development of crew survival and escape methods from the earliest designs of manned spacecraft to the current discussions of systems for the International Space Station and on to the future prospect of sending men and women out toward Mars. The author reviews the numerous proposed systems of crew rescue and also analyzes the adopted systems of ejection seats, escape towers, and abort profiles during the ascent from Earth to space, including the safety requirements and contingency procedures available during various mission profiles to get the crew safely back to Earth. He also examines the various wilderness training programs and abort simulations used to help prepare the crews for almost any unplanned and emergency contingency they may face during their mission.

The First Soviet Cosmonaut Team: Their Lives and Legacies, by Colin Burgess and Rex Hall (Praxis, December 2008). *The First Soviet Cosmonaut Team* relates who these men were and offers far more extensive background stories on them in addition to those of the more familiar names of early Soviet space explorers from that group. Many previously unpublished photographs of these "missing" candidates are included for the first time in this book. It is a detailed but highly readable and balanced account of the history, training, and experiences of the first group of 20 cosmonauts of the USSR. A covert recruitment and selection process was set in motion throughout the Soviet military in August 1959, just prior to the naming of America's Mercury astronauts. Those selected were ordered to report for training at a special camp outside of Moscow in the spring of 1960. Just a year later, Senior Lieutenant Yuri Gagarin of the Soviet Air Force (promoted in flight to the rank of major) was launched aboard a Vostok spacecraft and became the first person ever to achieve spaceflight and orbit Earth.

Eyes on the Skies: 400 Years of Telescopic Discovery, by Govert Schilling and Lars Lindberg Christensen (Wiley-VCH, February 2009). Adopted as the official book of the International Year of Astronomy (IYA) 2009, this stunningly illustrated history of telescopic discovery spans the range from the first telescopes via the Hubble Space Telescope to next generation platforms, and how they have changed and continue to change our view of the universe, our place in it, and where it all came from. The book features numerous full-page photographs and is printed in high-quality color throughout. Also includes the official IYA DVD with 59 minutes of narrated text, expert comments and interviews, animations, computer simulations, and science results, plus footage from observatories.

1969, The Year Everything Changed, by Rob Kirkpatrick (Skyhorse Publishing, January 2009). For the 40th anniversary of 1969, Rob Kirkpatrick takes a look back at a year when America witnessed many of the biggest landmark achievements, cataclysmic episodes, and generation-defining events in recent history, including the Apollo 11 Moon landing. The book chronicles the year through all its ups and downs, in culture and society, sports, music, film, politics, and technology.

ONLINE RESOURCES

<http://www.sdfo.org/stl/>

The Space Technology Laboratories (STL) Online Archive features a collection of articles on the STL, the NASA facility used to test propulsion systems and the Space Shuttle main engines; and NASA's early, unmanned Pioneer, Atlas, and Explorer programs. Gideon Marcus, the site administrator, includes original space history articles written for *Quest Magazine* as well as primary reports, photos, and technical documents regarding the missions' results.

http://www.nasa.gov/mission_pages/apollo/index.html

A comprehensive collection of images, audio, source documents, and interactive media, this official NASA site commemorates the 40th anniversary of the Apollo program. As new material is being added until 2012 to correspond to each mission's anniversary, this site is a valuable resource for primary materials and reflective pieces on the program's significance.

<http://www.shfg.org/SHFGv3JournalIssues.html>

The Society for History in the Federal Government annually produces an online journal, *Federal History*, focusing on the workings and trends in federal government as they influence the American people. The first issue, published in January, includes articles on science policy of the New Deal and the cultural effects of Roosevelt's program, the financing of the Civil War and the establishment of the Bureau of Engraving and Printing, and the National Negro Republican Assembly during the 1964 election.

OTHER NEWS IN AEROSPACE HISTORY

News from the American Astronautical Society (AAS) History Committee

Nominations Sought for 2008 Emme Award

The AAS History Committee is soliciting nominations for the 2008 Emme Award for astronautical literature. This annual award recognizes an outstanding book that advances public understanding of astronautics. It rewards originality, scholarship,

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Other News in Aerospace History (continued)

and readability. Please send nominations (including title, author, publisher, and publisher contact information) to aas@astronautical.org.

Newsletter and Distribution List

Explorer, the periodic newsletter of the AAS History Committee, is available on the AAS Web site at www.astronautical.org/committees/history/. If you would like to directly receive each issue, as well as an occasional bit of information related to spaceflight history, send an e-mail with your request to the Chair of the History Committee, Michael Ciancone, at michael.l.ciancone@nasa.gov.

News from the National Air and Space Museum

Division of Space History (DSH) curators are at work on a new exhibition with the working title of *Moving Beyond Earth* that focuses on U.S. human spaceflight since the Moon landings. Through artifacts, electronic and mechanical interactives, and a high-definition television presentation center, this new exhibition will focus both on the experience of spaceflight as evidenced in the Space Shuttle and International Space Station (ISS) programs and on possible futures envisioned for human exploration beyond Earth. It will open in two parts, with the presentation center and minimal artifacts in September 2009 and the exhibition's full build-out by September 2011. *Moving Beyond Earth* accents the extreme nature of human spaceflight where risk is high and margin for error is slight, highlighting the people involved in the endeavor, creating an immersive environment that simulates a spaceflight setting, providing visitor activities to make more real the experience of human spaceflight, and displaying artifacts from various efforts that relate the challenges of becoming a spacefaring people. By experiencing what spaceflight is like and identifying with the people who make it possible, visitors will discover the challenges and opportunities of human spaceflight. Stay tuned for more details in the future.

During 2008 DSH curators were active in a broad range of historical research and writing projects. Members of the division published seven books, as follows:

- Ceruzzi, Paul E. *Internet Alley: High Technology in Tysons Corner, 1945–2005*. Cambridge, MA: MIT Press, 2008.
- Ceruzzi, Paul E. *The Internet and American Business*. Cambridge, MA: MIT Press, 2008. Edited with William Aspray.
- DeVorkin, David H. *Hubble: Imaging Space and Time*. Washington, DC: National Geographic Society, 2008. With Robert Smith and Elizabeth Kessler. Enlarged and expanded version of *The Hubble Space Telescope: New Views of the Universe* (2004).
- Lassman, Thomas. *Sources of Weapon Systems Innovation in the Department of Defense: The Role of In-House Research and Development, 1945–2000*. Washington, DC: U.S. Army Center of Military History, 2008.
- Launius, Roger D. *Robots in Space: Technology, Evolution, and Interplanetary Travel*. Baltimore, MD: Johns Hopkins University Press, 2008. With Howard E. McCurdy.
- Launius, Roger D. *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume VII, Human Spaceflight: Projects Mercury, Gemini, and Apollo*. Washington, DC: NASA SP-2008-4407. With John M. Logsdon, General Editor.

- Neufeld, Michael J. *Von Braun: Dreamer of Space, Engineer of War*. Paperback edition. New York, NY: Vintage, 2008.

In addition, members of the division staff recently published 22 articles and a large number of book reviews and made numerous historical presentations to professional audiences. Notably, the just-published NASA History book edited by Steve Dick, *Remembering the Space Age*, features articles by Michael Neufeld, Martin Collins, Cathleen Lewis, and Roger Launius, as well as former Fellow Monique Laney.

Roger Launius and Margaret Weitekamp published articles in a special Fall 2008 issue of the *Florida Historical Quarterly* on NASA's 50th anniversary in Florida. Launius published "Heroes in a Vacuum: The Apollo Astronaut as Cultural Icon," *Florida Historical Quarterly* 87 (Fall 2008): 174–209, and Weitekamp published "Selling Education in the Shape of a Shuttle," *Florida Historical Quarterly* 87 (Fall 2008): 210–234.

Finally, Roger Launius has won the Trask Award of the Society of Historians in the Federal Government, honoring him for his services to federal history. The award will be presented at the SHFG meeting in March.

OTHER ARCHIVAL NEWS

Historic Documents Archived

The family of Dr. William H. Pickering, Director of the Jet Propulsion Laboratory from 1954 to 1976, has donated a collection of his speeches, papers, and other memorabilia to the Museum of History in Pasadena, California. Following Dr. Pickering's death in 2004, the collection was initially used by Douglas Mudgway in research for his book *William H. Pickering, America's Deep Space Pioneer*, published in 2007 by the NASA History Division (NASA SP-2007-4113). The collection also includes photographs, pamphlets, correspondence, and news clippings from Dr. Pickering's career, as well as recorded transcripts of interviews conducted by Mudgway in preparation of his book. In accepting the collection, Executive Director Jeannette O'Malley expressed her appreciation to Dr. Pickering's family for making these historic documents available for further research on NASA's origins and early activities. Inquires regarding the collection can be addressed to Laura Verlaque, Museum archivist, at lverlaque@pasadenahistory.org.

Neil Armstrong Pledges Papers to Purdue University

This fall Neil Armstrong announced his decision to donate a collection of personal papers and other resources to Purdue University, where he earned a bachelor's degree in aerospace engineering in 1955. The papers will complement Purdue's current collection of flight history materials, including the papers of Amelia Earhart, who worked at Purdue prior to her circumnavigation attempt, and are accompanied by a donation of 55 hours of personal interviews by Armstrong biographer James R. Hansen. The archive will reside in the newly built Virginia Kelly Karnes Archives and Special Collections Research Center, which will open this spring. For more information, please see <http://www.spaceflightnow.com/news/0810/31armstrong/>.

CALLS FOR PAPERS AND UPCOMING MEETINGS

Calls for Papers

The History of Science Society

The History of Science Society (HSS) will hold its 2009 Annual Meeting in Phoenix, Arizona in the Hyatt Hotel in downtown Phoenix (the weekend before Thanksgiving). Proposals for sessions, contributed papers, and posters must be submitted by **1 April 2009** to the History of Science Society's Executive Office. Papers that are part of a session (i.e., sessions with an organizer) are due no later than **8 April 2009**. Poster proposals must describe the visual material that will make up the poster. The HSS encourages precirculated papers. Submissions on all topics are requested via the HSS Web site (<http://www.hssonline.org>) or on the annual meeting proposal forms that are available from the HSS Executive Office. HSS members are asked to circulate this announcement to non-HSS colleagues who may be interested in presenting a paper or poster at the annual meeting. You do not need to be a member to participate, but all participants must register for the meeting. Before sending a proposal to the HSS office, please read the Committee on Meetings and Programs' "Guidelines for Selecting Papers, Posters, and Sessions" on the HSS Web site. The 2009 program cochairs are Cathryn Carson (University of California, Berkeley) and Jessica Riskin (Stanford University).

United States Air Force Academy Eisenhower Center for Space and Defense Studies

Space and Defense seeks contributions that further inquiry and intelligently inform space policy issues. The journal welcomes submissions of scholarly, independent research articles and viewpoint essays. There is no standard length for articles, but 7,500 to 10,000 words, including notes and references, is a useful target for research articles, and viewpoint essays should be in the range of 2,500 to 5,000 words. All articles are required to have a separate abstract of up to 250 words that describes the main arguments and conclusions of the article. Details of the authors' institutional affiliation, full address, and other contact information should be included in a separate file or cover sheet. Contributors are required to submit all articles electronically by e-mail attachment as a .doc (or .docx) file. Contributors should not submit PDF files. Manuscripts and all correspondence should be e-mailed to Eligar Sadeh at eligar.sadeh@usafa.edu.

Upcoming Meetings

The 2009 Annual Meeting of the Organization of American Historians will be held **26–29 March 2009** in Seattle, Washington at the Seattle Sheraton Hotel and Washington State Convention Center. Please see <http://www.oah.org/meetings/2009/> for more details.

The second 2009 Biannual Meeting of the American Astronomical Society will be held **7–11 June 2009** in Pasadena, California. Please see http://laas.org/meetings/meetings_future.php for more details.

The 2009 Annual Meeting of the Society of American Archivists will be held **11–16 August 2009** in Austin, Texas at the Austin Hilton. Please see <http://www.archivists.org/conference/index.asp> for more details.

The 2009 Annual Meeting of the Society for the History of Technology will be held **15–19 October 2009** in Pittsburgh, Pennsylvania. Please see http://www.historyoftechnology.org/annual_meeting.html#future_mtgs for more details.

The 2009 Annual Meeting of the History of Science Society will be held **18–22 November 2009** in Phoenix, Arizona. For more details, please see <http://www.hssonline.org/>.

The AAS History Committee will host its 2009 Annual Meeting on **19 November 2009** in conjunction with the AAS National Conference at the Pasadena Hilton in Pasadena, California. Please see <http://www.astronautical.org/events/> for more details.

OBITUARIES

Nick A. Komons, 79

Nick A. Komons, an aviation historian, died in Potomac, Maryland, on 12 August following a long illness. Dr. Komons was Agency Historian of the Federal Aviation Administration (FAA) until his retirement in 1991. He then received a fellowship with the National Air and Space Museum, and continued his lifelong interest in historical writing. Prior to joining the FAA, Dr. Komons was a historian with the U.S. Air Force. His many published works include: *Science and the Air Force*; *Bonfires to Beacons*, the first volume of the FAA history series; and *The Third Man*, a study of an airline labor issue.

Born on the Greek island of Leros, Dr. Komons served in a U.S. Army airborne division from 1951–1953 and became a U.S. citizen in 1953. He attended Big Creek High School in Welch, West Virginia. He graduated from Marshall College and received his doctoral degree from George Washington University. Dr. Komons is survived by his wife, Cris Komons; by two sons, Alex and Ben; by a daughter, Jennifer Roussos; and by eight grandchildren.

Dr. Wilhelm Raithel, 95

Dr. Wilhelm Raithel, one of the members of Dr. Wernher von Braun's team of German rocket engineers, died 15 November 2008 at his home in Chevy Chase, Maryland at the age of 95. Raithel was born in Hoechst an der Nidder in Germany and later worked as a civil engineer in Munich. In World War II, a civilian draft order assigned him to Peenemunde and work with von Braun on the V2 rocket. After the war, he rejoined the von Braun team in Texas in 1947 and came with them to Huntsville in 1950. He became director of the Structures and Mechanics Laboratory at Redstone Arsenal and worked on the Army's Redstone and Jupiter missiles, among other projects. One of Raithel's most important contributions was the "ablation concept" of dealing with the extreme heat on nose cones or other areas of a vehicle reentering Earth's atmosphere from space, Lucas said. Instead of a heavy

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heat sink or shield material that might be able to take the temperatures, ablation used layers of protection that burned up and peeled away during reentry.

Raithel began work with General Electric (GE) in 1956. During his years with GE, Raithel worked on Atlas and Titan intercontinental ballistic missile reentry systems, the Thor intermediate range missile for the Air Force and on projects involving satellites, possible lunar and Earth orbiting space stations and a lunar base. In 1970, he moved to Maryland and became director of Bus and Para-transit Technology for the U.S. Department of Transportation, working on automated driverless transport and alternative fuel programs, among other projects. He retired in 1980 but served as a consultant for a few years afterward.

He is survived by his wife of 58 years, Ingeborg Raithel; son Thomas Raithel of Washington, DC; daughter Doris King of Bethesda, Maryland; four grandchildren; and a sister, Gretel Schnedler of Altenstadt, Germany.

FELLOWSHIP OPPORTUNITIES

The NASA Fellowship in the History of Space Technology, offered by SHOT and supported by the NASA History Division, will fund one predoctoral or postdoctoral Fellow for up to one academic year to undertake a research project related to the history of space technology. The fellowship may support advanced research related to all aspects of space history, leading to publications on the history of space technology broadly considered, including cultural and intellectual history, institutional history, economic history, history of law and public policy, and history of engineering and management. Applications are due **1 April 2009** and are available at <http://www.historyoftechnology.org/awards/nasa.html>.

The History of Science Society Fellowship in the History of Space Science, supported by the NASA History Division, funds a nine-month research project that is related to any aspect of the history of space science, from the earliest human interest in space to the present. The program is broadly conceived and includes the social, cultural, institutional, and personal context of space science history. The fellowship is open to applicants who hold a doctoral degree in history or a closely related field, or students who have completed all requirements for the Ph.D., except the dissertation, in history of science or a related field. Applications are due **3 April 2009** and are available at http://www.hssonline.org/about/society_NASAFellowship.html.

PHOTOS FROM THE *EXPLORING THE UNKNOWN: VOLUME VII* BOOK SIGNING, HELD AT NASA HEADQUARTERS, 4 DECEMBER 2008

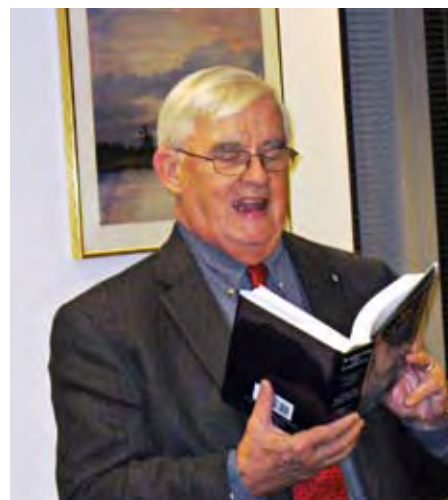
All photos by Steven Dick.



NASA Administrator Michael Griffin (left) looks on during remarks by Chief Historian Steven Dick.



NASA Administrator Michael Griffin addresses reception attendees.



Editor John M. Logsdon admires the completed volume.



Editors Roger Launius (left) and John Logsdon (right) sign copies of their book.



Al Condes, Lynn Cline, and Kathy Dakon enjoying the reception.



Members of the CSSC Team (from left): Gail Carter-Kane, Ann-Marie Wildman, Shelley Kilmer-Gaul, and Tamara McCaughey, during the reception.



Lori Garver, of the Obama Transition Team, talks with NASA Administrator Michael Griffin during the reception.



Asif Siddiqi, assistant professor at Fordham University and series editor for the four-volume Boris Chertok memoirs.



Michael Neufeld (left), Chair of the Division of Space History at the National Air and Space Museum, with David Mindell, Science, Technology and Society Department Head at MIT.

History of Atmospheric Science (continued)

was to the study of tides, leading eventually to useful tide charts. Whether they knew it or not, NASA leaders replicated Humboldt's methods, although one suspects Humboldt would miss the mules and porters that NASA's airplanes have replaced.

Humboldt was also very interested in Earth's and humanity's place in the universe, and the spacecraft the Jet Propulsion Laboratory (JPL) sent to Mars and Venus radically altered scientists' understanding of that subject.¹⁰ These two worlds, Earth's nearest neighbors, were largely expected by the scientific community of the 1950s to be roughly Earth-like, with Mars assumed to have at least plant life.¹¹ But both turned out to be enormously inhospitable. This fact forced planetary scientists to think about the relationship between *chemistry* and *climate*. Mars and Venus had not started out much differently than Earth, sharing the same basic elemental composition and receiving only slightly different amounts of energy from the Sun. How did they become so alien?

This question proved their entry to one of the great scientific controversies of the late 20th century: global warming. It was already well known by the late 1960s that human activities were changing the chemistry of Earth's atmosphere; as planetary exploration largely ended in the late 1970s and early planetary scientists turned their interests to Earth. What would anthropogenic changes to atmospheric chemistry do to Earth?

Asking this question, and many others related to it caused NASA to embark on a deliberate program of scientific reconstruction. Its leaders of the middle 1980s wanted to reshape the Earth sciences into a new, integrated discipline. They perceived that during the first half of the century, barriers between various components of what had once been the discipline of natural history had grown high enough to impede understanding of how Earth really worked. There were complex interactions between the oceans, land surface, atmosphere, and (perhaps most importantly) between and among the life forms inhabiting Earth. Earth was a *living* system, not a dead one with a thin "green scum" on its surface. This planetary view of Earth was not immediately welcome in the Earth sciences. Hence NASA set out on a radical agenda in 1986. It created "Earth Systems Science," built up around a holistic, and Humboldtian, view of Earth.

The political controversies in which NASA found itself embroiled were a direct legacy of its scientific program. Agency scientists developed a view of the world that put them at odds with American political culture, and even at times with various communities of the Earth sciences. Their response was to try to reconstruct their sciences in the hope of resolving both the scientific questions and political controversies with the methodological tools of modern science.

¹⁰ Aaron Sachs, *The Humboldt Current: Nineteenth-Century Exploration and the Roots of American Environmentalism* (NY: Viking, 2006), 73–79.

¹¹ Steven J. Dick, *The Biological Universe: The Twentieth-Century Extraterrestrial Life Debate and the Limits of Science* (Cambridge: Cambridge University Press, 1996), 120–126.

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