



FROM THE CHIEF HISTORIAN



Historians are particularly good at assessing where we have been, but in managing a federal history program, it is also good practice to assess where we are going. The goals of the NASA History Program are clear: to collect, preserve, analyze, and disseminate the Agency's history, consistent with the objectives of federal history programs as a whole. Specifically, NASA maintains an internal History Program for the following principal reasons:

- a. The publication of historical research on U.S. civilian aerospace activities sponsored by NASA is one of the ways NASA responds to the provision of the National Aeronautics and Space Act of 1958, as amended, that requires NASA to "provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof" [42 U.S.C. 2473 (a)(3)].
- b. Historical research also responds to NASA's mandate to study the societal impact of space exploration, namely "the establishment of long-range studies of the potential benefits to be gained from, the opportunities for, and the problems involved in the utilization of aeronautical and space activities for peaceful and scientific purposes" [42 U.S.C. 2451 (d)(4)].
- c. The thoughtful study of NASA history can assist Agency managers in accomplishing the missions that are assigned to the Agency. Understanding NASA's past promotes a more complete understanding of its present condition and illuminates possible future courses, including corrective measures to be taken. As the Columbia Accident

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CRITICAL ISSUES, SOCIETAL IMPACT

by Steven J. Dick

Almost fifty years ago, one month before the launch of Sputnik, historian of science Marshall Claggett convened a meeting at the University of Wisconsin on "Critical Problems in the History of Science." The resulting volume of the same name played a seminal role in the field of history of science, which was about to expand, partly as a result of the effects of Sputnik on the role of science in American society. Fifty years later, the field of space history faces a similar crossroads. There have been many books, monographs, articles, and conferences, some sponsored by this office. It is time to assess where the field of space history stands. And it is time to assess more systematically the societal impact of the space age.

The History Office is planning two meetings to address these issues. The "Critical Issues in the History of Space Exploration" meeting, to be held in spring 2005, will bring together historians and social science experts to address at least six overarching issues of perennial interest: 1) robotic vs. human spaceflight; 2) motivations for spaceflight, including the concepts of exploration and the frontier; 3) NASA's relationship with the outside world, including industry, the military, and universities; 4) access to space—the problem of reusable launch vehicles (RLVs) versus expendable launch vehicles (ELVs); 5) the successes and failures of international cooperation; and 6) historiographic considerations, including the relationship between space history and general history, as well as further opportunities for historical research. Each session will review the history and literature of its subject and offer an assessment based on the long view that history can provide.

The subject of societal implications of space exploration is a topic whose time has come. The new vision for space exploration states that "exploration of the solar system will be guided by compelling questions of scientific and societal

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From the Chief Historian (continued)

Investigation Board concluded in its Report, “History is not just a backdrop or a scene-setter. History is cause” (1:195).

In accordance with these goals, the History Office has set out an ambitious five-year strategic plan, culminating with the fiftieth anniversary of NASA in October 2008. This plan includes the following elements:

1. Maintain and accelerate the NASA History series of books and monographs. As we do this, our goal will be to seek out subjects with little research to date. Such subjects include the relations between NASA and DOD, international cooperation, and NASA programs that have received little attention, especially in the life sciences, Earth sciences, space sciences, and aeronautics. We solicit your ideas.
2. Maintain and improve the NASA Historical Reference Collection. Those of you who have used it know what a rich resource in NASA history this collection represents, and we aim to make it even more useful and accessible. It is currently used both by outside researchers and by History Office staff to answer specific requests for information by NASA officials and the general public.
3. Sponsor four conferences as follows: Critical Issues in the History of Spaceflight (spring 2005), Societal Implications of Space Exploration (spring 2006), the fiftieth anniversary of the space age (October 2007), and the fiftieth anniversary of NASA (October 2008). Plans for the first two are already underway, and I elaborate on them elsewhere in this newsletter.
4. Add study of the societal impact of space exploration to the portfolio of the History Office. In addition to being of historical interest, the importance of this element cannot be underestimated for the sustainability of NASA’s long-term goals.

Another goal of the strategic plan is to encourage substantive history programs at NASA’s ten Field Centers. We have drafted a NASA Policy Directive (NPD) that lays out the responsibilities of the Headquarters History Office, Headquarters officials, and Directors of the Field Centers with respect to history. We are hopeful that this will result in a strengthening of ongoing history programs, the institution of new history programs, and a more comprehensive and cohesive approach to history at NASA.

Finally, many thanks for your favorable comments on our newly revised and formatted newsletter. This is another element of the strategic plan—improved outreach—and it will also include a revamped Web site. Check out the current Web site at <http://history.nasa.gov/>. We welcome your comments and suggestions for improvement.

Steve

Critical Issues, Societal Impact (continued)

importance.” A forty-year space vision to take humans to the Moon and Mars requires that the public have a vested interest and that it understand the use of its taxpayer dollars. NASA hasn’t always done a good job of explaining the societal implications of space exploration in general, even though part of its charter has always been to study such implications. The National Aeronautics and Space Act of 1958 specifically charged NASA with eight objectives, including “the establishment of long-range studies of the potential benefits to be gained from, the opportunities for, and the problems involved in the utilization of aeronautical and space activities for peaceful and scientific purposes.” Although the Space Act has been amended, this provision has never changed, and it remains one of the main objectives of NASA. Accordingly, the NASA History Office has recently made societal implications of space exploration part of its portfolio.

Space exploration has implications for the general public on at least three levels: 1) commercial spinoffs and educational impact, 2) applications satellites, and 3) philosophical impact. NASA seldom sells itself beyond level 1—beyond Teflon and Tang, which have become part of popular culture, are often ridiculed, and are myths anyway. There are real commercial benefits that are emphasized annually, in *SPINOFF* magazine, for example. The other level 1 component is education. Through NASA’s Code N, through programs such as the Education/Public Outreach effort funded by the Space Science Enterprise at the 1- to 3-percent level for each space science mission, and through programs such as the NASA Academy, the Agency has a considerable impact on education, an impact not always appreciated. Difficult to quantify, but nevertheless perhaps most important of all, is the inspiration of the young through the vicarious experience supplied by the Mars Rovers, the HST images, and other byproducts of space exploration.

At level 2, we now take for granted the applications satellites: those that provide weather and Earth resources data from space, as well as navigation and worldwide communications. Along with human and robotic missions, the late twentieth century will be remembered collectively as the time when humans began to utilize near-Earth space to study the planet’s resources, to provide essential information about climate, and to provide means for navigation that are life-saving and have enormous economic implications. The Earth Observing System (EOS) is bringing a revolution in the global understanding of our planet. Worldwide satellite communications brought the world closer together, a factor difficult to estimate from a cost-benefit analysis. Names like Landsat, Terra, Geostationary Operational Environmental Satellites (GOES), Intelsat, and Global Positioning System may not be household words, but nonetheless, they affect people in significant ways.

At level 3, the philosophical impact of space exploration is again difficult to quantify but, perhaps, most important of all. How does one measure the impact on humanity of seeing Earth as a blue marble, or of viewing Apollo 8’s image of Earthrise from the Moon, or of seeing the pale blue dot from Voyager 1’s vantage point at the edge of the solar system? True, such images haven’t exactly united the world yet, but in the long run, they can only have a positive effect. How does one measure the impact of our increasing knowledge of our place in the scheme of cosmic evolution? Cosmic evolution is the guiding principle of the Origins program and of astrobiology, and it has been one of the driving themes of NASA since its inception. The general public is greatly interested in the question of life in the universe, and NASA is leading the way. Whatever the answer, it is bound to affect our self-image.

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Critical Issues, Societal Impact (continued)

Finally, the most important word in the phrase “space exploration” is “exploration.” Some tend to ridicule the very idea of exploration as extravagant in a world full of problems. Far from extravagant, I believe history demonstrates that it is necessary for a healthy society, and it is certainly a part of the American character. Space exploration is an extension of Lewis and Clark’s land exploration, the U.S. South Seas Exploring Expedition recently described vividly in Nathaniel Philbrick’s *Sea of Glory*, and numerous other exploratory ventures that Americans have undertaken. More broadly, some tend to be skeptical about exploration’s being an important element of what it means to be human. In my view, it is true nevertheless.

All of these issues, and more, will be the subject of a conference on the “Societal Implications of Space Exploration,” to be held in spring 2006. We invite your comments about each of these meetings, both now in the planning stage.

NEWS FROM HEADQUARTERS AND THE CENTERS

Headquarters

The NASA Headquarters History Office staff continues to work on a variety of projects to preserve NASA’s rich history.

Nadine Andreassen continues to amend and monitor the History Office budget. She is also updating the internal history library with new volumes to add to the archives for use by staff and researchers. She was also instrumental in doing the background planning for the successful Goddard History Meeting held at the end of April.

Bonni Cermak is hard at work reading and editing several promising manuscripts that will soon be turned into new History Office monographs and books.

Steve Dick continues to implement the History Office five-year strategic plan, as described elsewhere in the newsletter. He put the finishing touches on his book, coauthored with James Strick, *The Living Universe: NASA and the Development of Astrobiology*, to be published by Rutgers University Press this summer. This comprehensive history covers NASA’s activity in exobiology since 1958 and the discipline’s transformation into astrobiology in the late 1990s. Steve also received the 2004 Pendleton Prize of the Society for History in the Federal Government for his latest book, *Sky and Ocean Joined: The U.S. Naval Observatory, 1830–2000* (Cambridge University Press, 2003). The prize is awarded for an outstanding contribution to furthering history of the federal government.

Colin Fries continues to work on completing abstracts for the White House/President Clinton files. He is also scanning Office of Biological and Physical Research chronology files for inclusion in the History Office database. In addition, he continues to compile data for the monthly chronologies that are posted on the Web site.

Steve Garber was profiled in the latest issue of NASA's *ASK* magazine for project management. In March, he attended meetings sponsored by several groups: the Society for History in the Federal Government, the Organization of American Historians, the American Astronautical Society, and NASA's Academy of Program and Project Leadership. He is also helping to shepherd a number of manuscripts through the publication process, serving as the office intern coordinator, and helping to oversee the Educator Astronaut Program history function.

John Hargenrader is adding information on various Headquarters office files to the History Office database. He is also scanning Office of Public Affairs files and creating electronic documents; he then adds these to the database.

Eli Margolis is collaborating with Claire Rojstaczer on several projects, including reviewing the upcoming edition of *Wind and Beyond, Vol. 2*, and redesigning the Headquarters History Office Web page with Jennifer Troxell and Steve Garber. He is also updating reference resource letters and has helped Nadine Andreassen with matters relating to the Goddard History Meeting. In addition, he is researching and writing a paper about the history of aircraft-borne astronomy.

Jane Odom is reviewing the NASA History Office information access policy with regard to the Freedom of Information Act (FOIA), Export Control, and other applicable laws. She is appraising two large collections of material for historical value: one containing Shuttle training materials; the other, chronological correspondence files of the Administrator's Office. She has recently been involved in budget meetings and annual history review planning meetings. Additionally, she serves on a Headquarters Library Revitalization Committee. Daily, she continues to answer reference requests, assist onsite researchers, and supervise the work of the interns on a variety of archival projects. In addition, Jane, Colin Fries, and John Hargenrader are currently studying the database access issue, examining the question of whether to release the NASA History Office database to the public or to release it only to history points of contact at the Centers.

Claire Rojstaczer is indexing and doing some final copyediting on *Exploring the Unknown, Vol. 6*. She is also fixing some of the History Office Web pages, as well as working on the redesign of the Web site. Furthermore, she is working on completing the Report on NASA's Historical Properties. In addition, Claire and Eli Margolis have been working on a major archival project this quarter involving the appraisal, arrangement, and description of unprocessed collections of materials from a variety of Headquarters offices.

Jennifer Troxell continues to compile and edit the NASA History Office *News and Notes* newsletter. She is coordinating the publication of the *Aeronautics and Space Report of the President* with internal NASA offices and outside agencies. She is also working on the redesign of the NASA History Office Web site, as well as doing some final copyediting on manuscripts. In addition, she is working on a Space Tourism study for the NASA History Office. She is looking forward to graduating this May with a master of arts degree in political science from American University.

Special thanks to students Eli Margolis, Claire Rojstaczer, and Jennifer Troxell, as well as Presidential Management Fellow Bonni Cermak, for all of their hard work. Their dedication and effort enabled the History Office staff to complete many different projects this quarter.

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News from Headquarters and the Centers (continued)

Ames Research Center

ENCODED ARCHIVAL DESCRIPTIONS FINDING AIDS

To improve access to NASA Ames records held by the National Archives and Records Administration (NARA) in San Bruno, the NASA Ames History Office converted the paper NARA finding aids into Encoded Archival Descriptions (EAD) four years ago. EAD is a form of electronic finding aid. EAD finding aids represent complete archival structures, including hierarchies and associations. Developed at the University of California, Berkeley, EAD is now maintained as a standard by the Library of Congress and sponsored by the Society of American Archivists. More information on EAD is available at <http://www.loc.gov/ead> on the Web.

Once marked-up into EAD, the NASA Ames finding aids were included in the Online Archive of California (OAC). The OAC is the archival component of the broader California Digital Library. OAC includes a single searchable database of finding aids for primary materials—manuscripts, photographs, and artifacts held in libraries, museums, and archives from a variety of governmental and nonprofit institutions across California. One advantage of EAD is that it starts at the top of the finding aid hierarchy. Thus, four years ago, most OAC collections were described at the record group level. Now, after years of work, most collections are described at the file level, and many include scans of individual items. More information on OAC is available at <http://www.oac.cdlib.org/> on the Web.

There are currently three NASA Ames finding aids available on the OAC. The Ames History Collection is housed at Ames and is essentially a historical reference collection of materials compiled during efforts to write histories of the Center. The other two finding aids are for Record Group 255.4.1, held at NARA, San Bruno. Most of the records in the National Advisory Committee for Aeronautics (NACA) Ames Aeronautical Laboratory series were generated prior to 1958. The NASA Ames Research Center series contains some materials generated prior to 1958 but declassified afterwards, as well as general records from 1958 through the early 1970s.

The NASA Ames History Office plans to continue converting its finding aids into EAD. A priority project is processing the papers of John W. (Jack) Boyd, now the NASA Ames Senior Advisor for History. Jack's career at NASA Ames began in 1947; since then, he has held a variety of key administrative posts. His papers will serve as a reference collection of primary materials on the history of Ames. As the Boyd papers are processed, and as other collections are processed by the History Office, we plan to encode the finding aids into EAD and include them in the OAC.

Nevertheless, we will continue to evaluate whether EAD is the best way to present our finding aids. Although almost every major academic or museum archive has adopted EAD, we appear to be the only federal agency that has presented finding aids in EAD. Instead of using EAD, NARA is building a database called ARC (for Archival Research Catalog), which is driven by a stand-alone database program and uses a unique set of field descriptors.

We invite the NASA history community to try out the NASA Ames EAD finding aids and to send us comments about how they can be made more useful.

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JOHN W. BOYD, NASA AMES SENIOR ADVISOR FOR HISTORY

John W. Boyd serves as both the Senior Advisor for History and the Center Ombuds, in which role he reports to the Director of NASA Ames Research Center.

Jack maintains his Virginia lilt. He is a graduate of George Washington High School in Danville, Virginia; of the aeronautical engineering program at Virginia Polytechnic Institute and State University (Virginia Tech); and the executive master of business administration program at Stanford University. Jack started at Ames in 1947, when it was still the NACA's Ames Aeronautical Laboratory. He first worked in Building N207, elbow to elbow with some of the greatest aerodynamicists of his generation. His own work as an aeronautical research engineer involved wind tunnel studies of supersonic and subsonic aircraft and included major contributions to theories of conical camber. He later did early research on the design of unpiloted planetary probes to explore Mars and Venus, and he helped develop early configurations for the Mercury, Gemini, and Apollo capsules.

Beginning in the mid-1960s, Jack increasingly served in managerial positions. He served as Executive Assistant to the Ames Center Director, Deputy Director of Dryden Flight Research Center, Deputy and Associate Director of Ames Research Center, and Associate Administrator for Management at NASA Headquarters. Additionally, he has served as Chancellor for Research for the University of Texas System. He has also been an adjunct professor at the University of Texas (Austin, El Paso, and Pan American campuses) teaching courses in aerodynamics, introductions to engineering, and the history of spaceflight.

Jack has earned many awards, including the Stanford Sloan Fellowship, the NASA Exceptional Service Award, the NASA Outstanding Leadership Award, the NASA Equal Employment Opportunity Medal, the Presidential Rank of Meritorious Executive, the NASA Distinguished Service Medal, and the Army Command Medal. He is also a Fellow of the American Institute of Aeronautics and Astronautics (AIAA).

Following his eight years in the University of Texas System, Jack returned to Ames to establish its Aerospace Encounter, an educational program for middle school students. Last summer, Jack retired from the Ames Director's Office to two full-time jobs, both of which are essentially educational in nature. As Center Ombuds, Jack hears privately about problems and tries to illuminate how the problem can be solved within the Ames culture. As Senior Advisor for History, he continues to lecture frequently about the culture of Ames and how its leadership has evolved to fit the needs of the time. In addition, he has his own research and writing projects and ensures that the work of the Ames History Office continues to explore how the Center's past is relevant to its future.

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News from Headquarters and the Centers (continued)

Dryden Flight Research Center

The staff at the Dryden Flight Research Center History Office is currently working on a variety of projects.

Michael Gorn is expanding, editing, updating, and illustrating with new photographs *Flights of Discovery*, the popular history of Dryden Flight Research Center first published in 1996. This substantially revised edition will be published by a commercial press, and it will be released to coincide with the sixtieth anniversary of Dryden in 2006. Additionally, Michael continues to serve as Acting Chief of the Dryden Office of Public Affairs, Commercialization, and Public Outreach (of which History, Photo, Graphics, Video, and Technical Publications are part).

Christian Gelzer has edited and prepared for publication *A History of the Lunar Landing Research Vehicle*, written by Gene Matranga, Calvin Jarvis, and Wayne Ottinger. The book tells the story of the strange-looking vehicles on which the Apollo astronauts trained to land on the Moon. Well illustrated and highly detailed in recounting the development and the flight program of the Lunar Landing Research Vehicle, it is due for completion in summer 2004.

Christian also completed editorial work on *A History of Thrust Vectoring Research at NASA Dryden*, written by Lane E. Wallace. It is currently in the layout stage of production. This book describes flight research on three of the most prominent high-angle-of-attack airplanes: the F-18 High Angle-of-Attack Research Vehicle (HARV), the international X-31, and the F-15 Advanced Controls Technology for Integrated Vehicles (ACTIVE). The thrust vectoring book is due for completion in summer 2004.

He is also drafting a 2,000-word entry on the airplane for the *Berkshire World Encyclopedia*. Finally, Christian prepared a review of the book *Like Sex with Gods: An Unorthodox History of Flight* for the journal *Technology and Culture*.

Editor Peter Merlin completed *The Smell of Kerosene: A Test Pilot's Odyssey* by Donald L. Mallick, which is slated to be published in late spring 2004. It tells the dramatic story of a Dryden research pilot who logged over 11,000 flight hours in more than 125 types of aircraft. Mallick gives the reader fascinating first-hand descriptions of his naval, NACA, and NASA careers.

Peter also completed the narrative, captions, and picture selection for *A Place Like No Other: A Photographic History of NASA Dryden Flight Research Center*. This photo essay, with supporting text, will bring Dryden's rich legacy to life for a wide audience. The illustrations will show not only Dryden's historic aircraft, but also the Center's technicians, pilots, engineers, facilities, and terrain, from the early years of supersonic flight to the Center's continuing efforts to expand the envelope of aeronautical research in the twenty-first century. The book will be published in summer 2004.

Curtis Peebles edited a major memoir entitled *From Runway to Orbit: Reflections of a NASA Engineer*, by former Dryden chief scientist Dr. Kenneth W. Iliff, published in spring 2004. It recounts virtually every major flight research project undertaken by NASA from

1962 to 2002, including the X-15, the lifting bodies, the XB-70 bomber, the SR-71, and the fastest of all aircraft—the Shuttle orbiter. The book is adorned with original dust jacket art painted by Dryden pilot and artist Mark Pestana.

Curtis also wrote and researched two important staff papers. One involves Dryden Public Affairs activities in support of the early Shuttle landings at Edwards Air Force Base. It includes observations of participants in the landings; lessons learned about traffic, crowd control, and public first aid; and Air Force and media relations. The other paper concerns flight risk exemplified by the race to break Mach 2. It contrasts the NACA D-558-II team with that of the Air Force X-1A group and evaluates how they approached these historic but dangerous flights in November and December 1953.

Curtis has almost completed the first draft of a comprehensive history of reaction control systems pioneered at Dryden and its predecessor organizations. It should be published at the end of 2004.

Glenn Research Center

A special ceremony celebrating the release of a history book on Centaur, entitled *Taming Liquid Hydrogen: The Centaur Upper Stage Rocket, 1958–2002*, will take place in early June 2004. The book chronicles the story of Centaur and focuses on the technical and political hurdles that Centaur faced over the three decades that it was managed by Lewis (Glenn) Research Center. Locally authored by Drs. Virginia Dawson and Mark Bowles and published by the NASA Headquarters History Office, this new book in the NASA History Series has won the 2004 AIAA Historic Manuscript Award. A representative from the AIAA will present the award at this time, and a book signing for those that worked on the Centaur project will also take place.

Glenn Research Center is planning an open house for the public during the weekend of 12–13 June to showcase our past, present, and future programs and projects. The Glenn Research Center History Office is planning a display area to highlight our rich past.

The production of a 60-minute documentary about Glenn's Plum Brook Nuclear Research Reactor, which is currently being decommissioned, is nearing completion. This documentary is produced and directed by Jim Polaczynski, InDyne, Inc., of Glenn's Imaging Technology Center. Narrated by Kate Mulgrew of *Star Trek: Voyager* (as well as other shows and theater productions), this documentary takes you from the days when Plum Brook was a rich farmland through the acquisition of the land by the Army prior to World War II, when it operated as a trinitrotoluene (TNT) manufacturing plant, to NASA's building of the reactor, where it conducted early tests of material that was proposed for use in nuclear airplanes and space vehicles. A premier is being planned in the local Sandusky, Ohio, area; it will be open to the public once completed.

Along with the documentary, Dr. Mark Bowles and Mr. Robert Arrighi are in the final stages of releasing their monograph, *NASA's Nuclear Frontier: The Plum Brook Test Reactor* (NASA SP-2004-4532). It is illustrated with rare and previously unpublished photos from NASA's archives, and it documents the history of the site from farmland to cutting-edge nuclear research to the present decommissioning efforts. The monograph is scheduled for release in spring 2004.

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News from Headquarters and the Centers (continued)

Kennedy Space Center

History activities at Kennedy Space Center (KSC) continue with oral history interviews with a variety of individuals who have contributed to the Center's history. Two have been completed to date: those of Virginia Whitehead, Launch Site Support Manager for Payloads, and Roy Johanson, Ground Support Engineer. A Web page that will permit access to the interview transcripts is currently in development and is expected to be launched in May 2004.

Historians Ken Lipartito and Orville Butler are continuing to write the KSC History text and are expected to complete the draft version later this year.

The KSC Archives facilitated a sizable donation of photographic prints to the Brevard County Historical Commission. The KSC Image Laboratory has begun to supply digital images and will no longer support print requests. The donation to the people of Brevard County totaled approximately 35,000 prints covering the Space Shuttle Program, beginning with STS-1. A set of these prints was also added to the Archives' holdings and are now being cataloged.

A quality and reliability monograph written by NASA retiree Frank Childers will be issued with a Kennedy Historical Report number and placed in library. A Portable Document Format (PDF) copy will be posted to the Historical Documents page that is linked from the KSC home page.

Johnson Space Center

The Johnson Space Center Oral History Project Team attended the recent Texas Oral History Association/Texas State Historical Association joint conference, where they learned that their proposal had been accepted for next year's session. They will be presenting a multimedia presentation entitled "Voices from the Earth and the Moon: The Community of the Moonwalkers." The discussion will include excerpts from oral history interviews, as well as photos that reflect the impact of Johnson Space Center (JSC) on the local communities during the 1960s. Plans are underway to publish the information as a NASA monograph.

The oral history team is preparing for the arrival of four student researchers soon to be employed by JSC. The graduate students spend approximately eleven weeks during the summer compiling research used by the team to prepare for the oral history interviews. This cooperation between the oral history project and student researchers has been ongoing since 1996.

JSC Oral History Project historian staff member Jennifer Ross-Nazzal received a Ph.D. in history from Washington State University in Pullman, Washington, during ceremonies in May. During the past four years, while completing her dissertation, she has served as historian for the project team. Her articles have been published in *South Dakota History* and the *Public Historian*, and she has a forthcoming article scheduled with the *Pacific Northwest Quarterly*. Also, for the last two years, she has been the oral history editor for *Quest: The History of Spaceflight Quarterly*. She is currently working with her team members on the community history monograph and transforming her dissertation into a book reflecting on the life of dedicated suffragist Emma Smith DeVoe.

NASA ARCHIVAL NEWS

Propulsion Files

By John Hargenrader

As President Bush's Constellation vehicle program moves from concept to design phase, propulsion technology will be a key component of its creation. Fortunately, the NASA History Office has recently completed the reorganization of our propulsion files (1949–present). Occupying two large file cabinets, this collection covers the historical origins, research, and development of many forms of air, rocket, missile, and spacecraft propulsion. The collection is organized by topic starting with chemical (solid, liquid, hybrid) and moving on to nuclear thermal fission (solid core and gaseous core) and fusion propulsion. Next are lower thrust but longer operating systems of propulsion such as elec-



The SL-2, one of NASA's large solid rocket motors, generated over 3.6 million pounds of thrust on 23 February 1966. The 22-foot-diameter, 80-foot-long rocket contained 1.7 million pounds of solid propellant.

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NASA Archival News (continued)

tric, solar, and plasma that rely on solar or nuclear power to sustain their performance. A number of file drawers are devoted to the slow but steadfast development and increasing attractiveness of these technologies. Information about many forms of space power (batteries, solar cells, fuel cells, and nuclear) is also included in the propulsion files. At the end of this collection are the more theoretical futuristic ideas that are continually presented for comment and criticism. Some basic preliminary testing has been done on these ideas, and articles in scientific and technical journals have been written to air the ideas throughout the propulsion community. At some point in the future, these ideas will translate into quicker and more economical journeys to Mars, as well as the possibility of trips beyond our solar system. Some potential interstellar propulsion methods include nuclear pulse detonation, antimatter, solar sails, and antigravity, to mention a few.

The propulsion collection is primarily composed of news clippings, magazine articles, reports, correspondence, brochures, photographs, and contractor studies on all forms of propulsion and space power systems. Although not complete, it is a good place to start serious research on this topic. A researcher can then employ our diverse collection of aircraft, launch vehicle, and spacecraft files to deepen and flesh out the propulsion or space power systems story.

With the end of the Cold War, the United States has had a valuable look inside once highly secret design bureaus in the former Soviet Union. The engineering culture of this former mil-



The Phobos 1B nuclear thermal rocket engine test reactor was created to further redefine the engineering aspects of a nuclear propulsion system. This particular unit was successfully tested in 1967.

itary and space competitor has enlightened NASA and its contractors on the strengths and success of their liquid propulsion work. The Soviet Union's reliance on higher pressure, higher thrust, more compact liquid propulsion units has definitely benefited the present and future direction of space travel. Already U.S. launch vehicles have incorporated some Russian propulsion units on the Atlas 3 and Atlas 5 (RD-180) rockets. The emphasis on simplicity, ease of assembly, and reliability in performance has given a new focus on future design direction. In the liquid hydrocarbon, higher pressure, and higher thrust engine area, the Russians have successfully solved the problem of choking on internal engine components that had been a persistent problem for U.S. engineers. This knowledge has redounded to our favor. How ironic that the post-World War II V-2 experience has come full circle and that a melding of United States and Russian expertise has advanced propulsion techniques. This is just one of the interesting insights to be found in this collection.

Other interesting items in the propulsion files are Franklin Thistle's obscure and hard-to-find corporate history, *Rocketdyne: The First 25 Years . . .*, and two large binders devoted to liquid-propellant engines and fuels. Although highly technical, the engine manuals give thorough design and performance parameters on all liquid engines extant at the time of publication (1983). Some of the correspondence in various files documents relationships among the various participants in the race to the Moon and deals with propulsion issues and the development of J-2, F-1, and M-1 engines. Appointments to conduct research in the propulsion files or any other collections in the NASA History Office should be phoned in to 202-358-0384 or e-mailed to histinfo@hq.nasa.gov.

OTHER HISTORY NEWS

Department of Homeland Security Historian

Priscilla Dale Jones, Ph.D., was appointed Historian of the Department of Homeland Security.

Air Force History Jobs

The Air Force has chosen to replace active-duty historians with civil-servant historians. Applicants should be able to pass a basic medical physical because they will deploy during contingency or training exercises. For more information about current openings, please e-mail the Air Force History and Museums Civilian Career Program Manager at john.kuborn@randolph.af.mil or call 210-556-4508.

Marian Koshland Science Museum

The new Marian Koshland Science Museum, part of the National Academy of Sciences, scheduled to open in late spring 2004. Dedicated to the exhibition of current scientific issues and discoveries, the museum is located on the corner of 6th and E Streets NW and features one permanent exhibit and two temporary exhibits. The museum is named for

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Other History News (continued)

immunologist and molecular biologist Marian Koshland (1921–1997), who is famous for her groundbreaking research in antibody behavior.

“Wonders of Science” is the only permanent exhibit at the museum; it features a film that explores science and research. Additional information about the various topics in the film is located at interactive kiosks around the exhibit.

Through hands-on activities, “Global Warming Facts & Our Future” explores background information about climate change and speculates on what may happen to Earth’s ecosystems in the future. The exhibit also details potential action that might be taken to reduce global warming.

The final exhibit, “Putting DNA to Work,” examines the complex world of DNA sequencing. The ways in which this breakthrough technology are used, including identifying health problems, fighting crime, improving crops, and improving public health, are also detailed.⁷

The museum is open daily from 10 A.M. to 6 P.M., except on Tuesdays, Thanksgiving, Christmas, and New Year’s Day. Admission is \$5 for adults and \$3 dollars for seniors (age 65+), active-duty military, students (ages 5 to 18) and college students with ID. For more information on the museum, please see <http://www.koshland-science-museum.org> on the Web.

PUBLICATIONS

Forthcoming NASA Publications

NASA’s Nuclear Frontier: The Plum Brook Research Reactor (NASA SP-2003-4532), by Mark Bowles, is a short, heavily illustrated monograph about this unique Glenn Research Center facility. It is scheduled for distribution in summer 2004.

Runway to Orbit: Reflections of a NASA Engineer, by Dr. Kenneth Iliff, ushers the reader through some of the pivotal aerospace projects undertaken by NASA since the early 1960s. Iliff has made critical contributions to research on the X-15 aircraft, the lifting bodies, the XB-70 bomber, high-angle-of-attack aircraft, and the Space Shuttle, among others. His highly personal and thoughtful narrative describes these, as well as his seminal contributions to parameter estimation. *Runway to Orbit* is scheduled for publication in summer 2004.

The Smell of Kerosene: A Test Pilot’s Odyssey, by Donald Mallick, chronicles his career as a naval aviator, as well as his 30 years as an NACA and a NASA research pilot. In total, Mallick flew over 11,000 flight hours in 125 different aircraft, including general aviation craft; sailplanes; the SR-71; the lifting bodies; the Lunar Landing Research Vehicle; and many fighter, bomber, and transport vehicles. This articulate, well-told story is due to be published in summer 2004.

Taming Liquid Hydrogen: The Centaur Upper Stage Rocket, 1958–2002 (NASA SP-2003-4230, 2004), by Virginia P. Dawson and Mark D. Bowles, is a project history that uses the Centaur as a case study in how technological knowledge has advanced over the history of NASA, discusses the nature and development of technological research and development, and analyzes the role of technology transfer in the aerospace arena. This book also features an accompanying DVD, full of interesting and relevant media on the Centaur. The Centaur is an upper stage rocket fueled by liquid hydrogen and oxygen and maintains its shape through pressurization. This book should be published in summer 2004.

New Non-NASA Publications

The recently released *The Simple Universe*, by Ian Brewster and Ken Shiwram, published by CG Publishing, reviews the historical discoveries and theories about the universe in understandable terms. For more information about this book, please see <http://www.cgpublishing.com/simple.htm> on the Web.

Gemini 12: The NASA Mission Reports, published by CG Publishing, is now available. This book reviews Jim Lovell and Buzz Aldrin's Gemini 12 flight. For more information, please see <http://www.cgpublishing.com/gemini12.htm> on the Web.

Light This Candle, the Life and Times of Alan Shepard, by Neal Thompson and published by Crown Books/Random House, is a biography of the first American man in space. For more information about this book, please visit <http://www.randomhouse.com/catalog/display.pperl?0609610015> on the Web.

Forthcoming Non-NASA Publications

MARS: The NASA Mission Reports: Volume Two will be published by CG Publishing in late spring 2004. The volume includes results from the Spirit and Opportunity Mars Exploration Rovers and reports from Mars Global Surveyor and Mars Odyssey missions. For more information, please see <http://www.cgpublishing.com/mars2.htm> on the Web.

New Moon Rising: The Making of the Bush Space Vision, by Frank Sietzen, Jr., and Keith Cowing, will be available from Apogee Books in summer 2004. This book will discuss the planning and policy discussions that culminated in President George W. Bush's historic 14 January 2004 announcement. For more information on this book, please visit <http://www.apogeebooks.com/newmoon.htm> on the Web.

Highlights of the History Office Web Site

The NASA History Office maintains and continually updates hundreds of pages of online material on the history of aerospace. For those looking to brush up on their general NASA history, <http://history.nasa.gov/timeline.html> offers numerous timelines that chart U.S. government involvement in aerospace from the founding of the NACA to the present. The Mars Exploration Chronology at <http://history.nasa.gov/marschro.htm> may be of particular interest in light of the current missions. A collection of key American space policy documents appears at <http://history.nasa.gov/spdocs.html> on the Web. This collection ends

continued on next page

Publications (continued)

with information on the most recent space policy proposed by President George W. Bush, available at <http://history.nasa.gov/sep.htm> on the Web. Or, for a pictorial glimpse into NASA's history, visit the Great Images in NASA (GRIN) database at <http://grin.hq.nasa.gov> on the Web.

Call for Papers

The American Astronautical Society's bimonthly *Space Times* magazine welcomes feature-length and opinion/editorial articles that offer fresh perspective and insight on topics of current and historical relevance in space science, technology, exploration, and policy. The magazine also includes reviews of recently published space-related books. For more information or to submit an abstract, please contact Amy Kaminski, editor, at amykaminski@yahoo.com. Contents of previous issues are posted on the Society's site, <http://www.astronautical.org>.

UPCOMING MEETINGS/EVENTS

On 5 May 2004, Martin Collins will give a short lecture on "The Satellite Telephone in War: Iridium in Afghanistan and Iraq" at the "Beyond the Limits" exhibit at the National Air and Space Museum. For more information, please visit <http://www.nasm.si.edu> on the Web.

From 5 to 9 May 2004, the Council on America's Military Past will hold its thirty-eighth Annual Conference at the Eastland Park Hotel in Portland, Maine. For more information, please e-mail Colonel Herbert M. Hart, United States Marine Corps (ret.) at camphart@aol.com or call 703-912-6124.

From 7 to 8 May 2004, the Society of Air Racing Historians will hold its twentieth annual meeting in Cleveland, Ohio. For more information, please e-mail Herb Schaub at herman@airrace.com, visit <http://www.airrace.com>, or call 440-234-2301.

On 12 May 2004, Paul Ceruzzi will give a short lecture on "The Minuteman II Missile and the Invention of the Silicon Chip" at the "Space Race/Space Hall" exhibit at the National Air and Space Museum. For more information, please visit <http://www.nasm.si.edu> on the Web.

On 12 May 2004, the National Air and Space Museum will hold a lecture on "New Strategies for Detecting Life in the Universe: Astrobiology of the Early Earth and Its Life" in the Einstein Planetarium. For more information, please visit <http://www.nasm.si.edu> on the Web.

On 19 May 2004, Andrew Johnston will give a short lecture on "Observing Earth from Space: New Directions in Remote Sensing" at the "Looking at Earth" exhibit at the National Air and Space Museum. For more information, please visit <http://www.nasm.si.edu> on the Web.

On 26 May 2004, Tom Dietz will give a short lecture on “Mitsubishi A6M5 Zero: Fighter of the Rising Sun” at the “World War II Aviation” exhibit at the National Air and Space Museum. For more information, please visit <http://www.nasm.si.edu> on the Web.

On 27 May 2004, David Courtwright will give a lecture on the “Impact of Aerospace Technology on the U.S.” at the National Air and Space Museum. For more information, please see <http://www.nasm.si.edu/events/lectures/> on the Web.

From 30 May through 2 June 2004, the American Astronomical Society will hold a meeting in Denver, Colorado. For more information, please see http://www.aas.org/meetings/meeting_dates.html on the Web.

On 7 June 2004, the National Air and Space Museum will hold a lecture on “New Strategies for Detecting Life in the Universe: The Search for Habitable Planets Around Other Stars (Kepler Mission)” in the Einstein Planetarium. For more information, please visit <http://www.nasm.si.edu> on the Web.

From 7 to 10 June 2004, the American Helicopter Society will host its sixtieth annual forum and technology display at the Inner Harbor Convention Center in Baltimore, Maryland. For more information, please e-mail kim@vtol.org, visit <http://www.vtol.org>, or call 703-684-6777.

From 22 to 27 June 2004, the American Society of Aviation Artists will host its Annual Aviation Art Forum at the Air Force Museum, located adjacent to Wright-Patterson Air Force Base in Dayton, Ohio. For more information, please e-mail John Sarsfield at ASAAcontact@asaa-avart.org, visit <http://www.asaa-avart.org>, or call 303-702-0707.

From 3 to 5 August 2004, the Association of Unmanned Vehicle Systems International will host its annual symposium and exhibition at the Anaheim Convention Center in Anaheim, California. For more information, please e-mail info@auvsi.org, visit <http://www.auvsi.org>, or call 703-920-2720.

From 19 to 22 August 2004, the American Institute of Aeronautics and Astronautics will host its fifth International Airship Convention and Exhibition in Oxford, England. For more information, please visit <http://www.aiaa.org> or call 703-264-7551.

From 19 to 22 August 2004, the Mars Society will hold its annual convention in the Palmer House Hilton in Chicago, Illinois. For more information, please visit <http://www.MarsSociety.org> on the Web.

From 29 August through 2 September 2004, the ninth International Conference on the Commercialization of Micro and Nano Systems will be held in Edmonton, Alberta, Canada. For more information, please visit <http://www.mancef-coms2004.org/> on the Web.

From 15 to 16 October 2004, the German Historical Institute will host the “Science and Technology in the 20th Century: Cultures of Innovation in Germany and the United States” conference at the German Historical Institute in Washington, DC. For more information, please e-mail either Professor Helmuth Trischler at H.Trischler@deutsches-museum.de or Dr. Christoph Strupp at strupp@ghi-dc.org.



IMAGES FROM SPACE HISTORY

Dr. Robert H. Goddard's rocket is pictured here after a flight in New Mexico on 19 April 1932. Carrying the rocket, from left to right, are Nils Ljungquist, machinist; (probably) Charles Mansur, welder; Albert Kisk, Goddard's brother-in-law and machinist; and Robert Goddard. The rocket had new guiding vanes controlled by a gyroscope that assisted stabilization.

In 1930, with a grant from the Guggenheim Foundation, Goddard and his crew moved from Massachusetts to Roswell, New Mexico, to conduct research and perform rocket test flights away from the public eye. This rocket was one of many that he launched in Roswell from 1930 to 1932 and from 1934 to 1941.

Dr. Goddard has been recognized as the father of American rocketry and one of the pioneers in the theoretical exploration of space. His dream was the conquest of the upper atmosphere and, ultimately, space through the use of rocket propulsion. When the United States began to prepare for the conquest of space in the 1950s, American rocket scientists began to recognize the debt owed to Goddard. It is virtually impossible to construct a rocket or launch a satellite without acknowledging the work of Dr. Goddard. This image may be downloaded in various sizes from the Great Images in NASA (GRIN) site located at <http://grin.hq.nasa.gov/ABSTRACTS/GPN-2002-000129.html> on the Web.

CONTACT INFORMATION AND CREDITS

The NASA History Office, Code IQ under the Office of External Relations, NASA Headquarters, Washington, DC 20546 publishes *News and Notes* quarterly.

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Do you have more questions about NASA history in general? Please check out our NASA History Office Home Page at <http://history.nasa.gov> on the Web. For information about doing research in the NASA History Office, please e-mail us at histinfo@hq.nasa.gov or call 202-358-0384.

We also welcome comments about the content and format of this newsletter. Please send comments to Jennifer Troxell, newsletter editor and compiler, at Jennifer.L.Troxell@nasa.gov or call 202-358-0724.

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Vision

To improve life here,
To extend life to there,
To find life beyond.

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To understand and protect our home planet,
To explore the universe and search for life,
To inspire the next generation of explorers

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