

NEWS &NOTES

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National Aeronautics and
Space Administration



FROM THE CHIEF HISTORIAN



While there are many positive developments in the world of NASA history, as we head into this summer two things weigh heavily upon me. The first is the mixed blessing of chief archivist Jane Odom's retirement. Jane's remarkable contributions have certainly earned her a long and happy retirement. (See the article to your right.) But, finding a person to carry on her legacy will be a significant challenge. With restrictions on hiring at Headquarters and the unique skill-set required of the chief archivist, I anticipate an extended gap in coverage of the chief archivist duties. Jane's delight at moving on to new challenges with vigor, health, and youthful energy is an inspiration to us all. So, I find myself greeting this news with very mixed emotions—and the realization that changes, even positive changes, are never without their drawbacks.

The more troubling topic on my mind is the decision by the leadership of the Johnson Space Center (JSC) to eliminate funding for the Center's history office. As with many

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FAREWELL CHIEF ARCHIVIST JANE ODOM

by Bill Barry

After 17 years of outstanding service as NASA's chief archivist, Jane Odom retired on 31 May 2016. Hired by then-NASA Chief Historian Roger Launius, Jane started work at NASA Headquarters on 6 June 1999. She came to NASA with a wealth of experience dealing with complex archival challenges and managing high-pressure situations.

Just prior to moving to 300 E Street SW (home of NASA Headquarters), Jane worked on Capitol Hill for 12 years. During that period, she worked for nine different senators and congressmen, usually taking on the job of preparing the historical collections of members who were retiring for submission to repositories in their home states. Some of her most memorable experiences were working for Senator Ted Stevens of Alaska, Senator Lloyd Bentsen of Texas, and Congressman Robert Michel of Illinois.

Jane's working career started at the University of North Carolina (UNC). Her love for "the oldest public university in the nation, established in 1789" (as she will be happy to tell you) was cemented during her first job after graduate school—working in the Southern

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NASA HISTORY PROGRAM OFFICE
OFFICE OF COMMUNICATIONS



From the Chief Historian (continued)

support functions at NASA, the Agency-wide history “program” is really more of a federation of individual Center-level efforts. While NASA Centers are encouraged to have both archival and history operations, there is no requirement to do so. Nor is there any one template for how such efforts should be organized. JSC leadership apparently now believes that history programs should be self-supporting and that they can still have an effective program on a pay-as-you-go, possibly part-time, basis. In my role as principal advisor to NASA leadership on historical matters I have been quite frank in my inputs about the problems with that approach. Of particular note is the impact on highly skilled history professionals whose long-standing contributions and well-honed expertise are effectively being denigrated as just another commodity. Ironically, under the leadership of Rebecca Wright, the JSC History Office has been NASA’s most creative in carving out a specialty (in oral history) and in marketing their services to other programs, offices, and Centers. Can that model be extended to cover the “overhead” of running a history office? I guess we will soon find out, but this seems an extremely risky approach—especially at a time when major human spaceflight anniversaries (like the upcoming 50th anniversary of the Apollo program) will be increasing public and media interest in the accomplishments of our storied predecessors at JSC. Moreover, it seems shameful to me that the bulk of the negative consequences of this kind of experiment will fall precisely on the people whose creativity and effort made the JSC History Office a nationally recognized program. It was a bitter pill to see the Organization of American Historians present the JSC History Office with the “2016 Friend of History” Award on 12 April, and the Office disappear on 30 April.

While the situation at JSC is especially troubling, the good news is that the trends across the rest of NASA are quite positive. This spring the Marshall Spaceflight Center hired Brian Odom as historian to replace the recently retired, and long-serving, Mike Wright. Brian had been serving as the contract archivist at Marshall and that position was quickly backfilled

with Jordan Whetstone. Both Brian and Jordan are bringing a lot of energy to the Marshall history program. Congratulations to them both, and welcome! As you know from previous newsletters, Goddard Spaceflight Center hired Holly McIntyre-Dewitt as the Center archivist last fall. Goddard had been the only Center without either a historian or an archivist. Thanks to the strong support of Goddard Center Director Chris Scolese, Goddard is now building a firm archival foundation (an essential precursor to any effective history program). The Glenn Research Center 75th anniversary this year, and the Langley Research Center centennial next year, have also raised the profile of history and archival programs in those locations. So, with the notable exception of JSC, I think that the overall trends for history and archival work across NASA are moving in a positive direction. The efforts by archivists and historians across the agency are making a very positive impact on preserving our history, stimulating the study of it, and communicating the lessons of our past to policymakers, current staff, and the public.

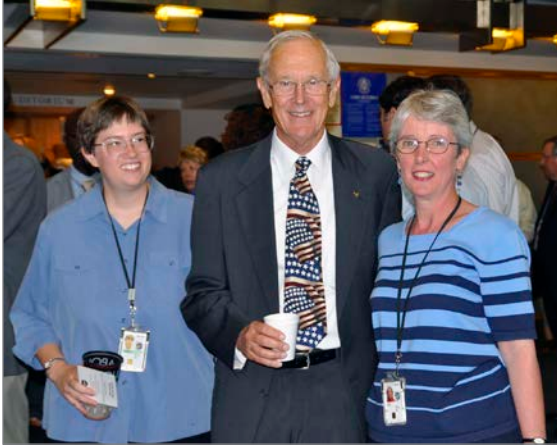
Another thing that lightens my spirits these days is the creativity and energy being brought to this newsletter by Andres Almeida, Yvette Smith, and the whole Media Fusion production team. When we first talked about the newsletter Andres had asked if I would be willing to consider some new types of content, and I happily agreed. Fortuitously, we heard from poet Terri Kirby Erickson on social media a few weeks later, and... well, when you get to the back of the newsletter you can enjoy her touching poem. Let us know what you think about it. And, if you have other suggestions for the newsletter, we’d love to hear them.

Godspeed,



William P. Barry
Chief Historian



Farewell Chief Archivist Jane Odom (continued)

Chief Archivist Jane Odom (right) is pictured here with Apollo 16 lunar module pilot Charles Duke and contract archivist Liz Suckow at the Apollo 40th anniversary in 2009.

Historical Collection at UNC. (She's an avid Tar Heel fan to this day and talks of retiring to the Chapel Hill, North Carolina, area.) But the lure of interesting work in the Washington area soon brought Jane a bit further north. In the mid-1980s, she took a job at the Archives Center at the Smithsonian's National Museum of American History. By the late 1980s, she was drawn to Capitol Hill and the historical collections of some of the longest-serving politicians in our nation's history.

Her skill and organizational abilities served her well when she inherited the NASA Historical Reference Collection (HRC) and the duties of chief archivist. A huge collection, the HRC was a wildly eclectic conglomeration of items stuffed into shelves and cabinets of various sorts and without a systematic finding aid. Jane's leadership of our amazing contract archival staff and focus on creating an electronic database and finding aid has made the HRC the first stop for almost any serious author researching the history of NASA (and its predecessor agency). Just check the acknowledgement section in most good space history books published in the last decade and a half—you'll see Jane's name there. She has also broadened the reach

of the chief archivist function by taking the initiative in creating a vibrant community of archivists across the Agency, mentoring new staff, and establishing best practices that have improved archival support across NASA. As she leaves NASA Headquarters, we have a fully functional, professionally staffed, neat, and modern HRC. This is a legacy that will return benefits for historians and NASA for generations to come.

Jane's contributions to NASA and the nation over her long and interesting career have certainly earned her a happy retirement. As she turns her energies toward volunteering, genealogy, and bicycling, all of us at NASA wish her a long, healthy, and fulfilling new chapter in her life. We know Jane won't miss commuting on the DC Metro, but we will miss her—a lot!



Contract archivist Colin Fries chats with former Chief Historian Steven J. Dick during the reopening of the newly redesigned space.





Jane Odom shares ribbon-cutting duties with Associate Administrator for the Office of Communications David Weaver. Chief Historian Bill Barry is on the left.

CALL FOR PAPERS

NASA IN THE “LONG” CIVIL RIGHTS MOVEMENT SYMPOSIUM

University of Alabama in Huntsville

16–17 March 2017

The NASA Marshall Space Flight Center History Office and the University of Alabama in Huntsville’s History Department invite academics, graduate students, and independent scholars to submit proposals for papers to be presented at a 2-day symposium, 16–17 March 2017, at the University of Alabama in Huntsville. The purpose of the symposium is to address the role/relationship of NASA to the Long Civil Rights Movement, particularly, but not limited to, the Deep South (Huntsville, Florida, Houston, Mississippi, and New Orleans). The

conceptual framework for the symposium is provided by Jacquelyn Dowd Hall’s 2005 essay in the *Journal of American History*, “The Long Civil Rights Movement and the Political Uses of the Past,” which called upon historians to produce new “modes of writing and speaking that emphasize individual agency...while also dramatizing the hidden history of politics and institutions.” Along these lines, the conference welcomes papers addressing the Civil Rights experience across NASA that not only explore the experience of African Americans, but also of women, immigrants, and other politically and legally marginalized groups. The intention is to publish a subset of the papers as an anthology.



Possible topics for papers include, but are not limited to:

- Experience of African Americans, women, and minorities at NASA Centers
- Development/experience of NASA Centers during the Civil Rights Movement
- Role of Equal Employment Opportunity (EEO) at NASA Centers
- Biographies of minorities
- Impact of Southern politics on NASA's development
- Math and science education in the segregated South
- Role/involvement of historically black colleges and universities
- Integration of immigrant communities (including German, Hispanic, etc.) into the workforce
- Gender and sexual identities in the NASA workplace
- Issues of class and labor at NASA during that period
- NASA/Contractor workplace and communities as racialized space
- Impact of federal involvement in surrounding communities

- Civil rights activism in NASA communities
- Impact of the Cold War on NASA/Civil Rights
- Experience of international aerospace communities in the movement

Submission Procedures

If you wish to present a paper, please send an abstract of no more than 400 words and a short biography or curriculum vitae, including affiliation, by 31 July 2016 to Brian Odom at brian.c.odom@nasa.gov or Dr. Stephen Waring at warings@uah.edu. Decisions about acceptance will be made by 1 September 2016.

For more information, contact Brian Odom at brian.c.odom@nasa.gov.

Brian Odom
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 256-544-0034
brian.c.odom@nasa.gov



In November 1968, NASA Marshall Space Flight Center Director Wernher von Braun and Alabama Agricultural and Mechanical University president Richard Morrison signed a cooperative agreement.



CALIPSO CELEBRATES 10 YEARS OF ATMOSPHERIC DISCOVERIES

By Gail Langevin

On 28 April 2006 at 3:00 a.m. PDT, a Boeing Delta II rocket lifted off from Vandenberg Air Force Base in California. It carried two Earth-observing satellites, CALIPSO and CloudSat.

CALIPSO, or the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation, is the product of a pioneering mission and partnership between NASA's Langley Research Center and the French Space Agency *Centre National d'Etudes Spatiales* (CNES). Ball Aerospace and Technologies built the lidar, wide-field camera instrument, and communications equipment and integrated the payload.

Initially planned as a 3-year mission, 10 years later, CALIPSO is still in orbit. Part of the "A-Train" of satellites, CALIPSO flies in formation with the CloudSat, Aqua, Aura, Global Change Observation Mission-Water (GCOM-W), and Orbiting Carbon Observatory (OCO)-2 satellites. The A-Train constellation, flying in a Sun-synchronous orbit, delivers new insights into the connections between atmosphere, land, and oceans. They provide near-simultaneous measurements to study Earth's ever-changing systems, greatly improving our understanding of the planet's complex processes.

During its 10 years in orbit, CALIPSO has taken more than 5.7 billion lidar (light detection and ranging) measurements that probe the vertical structure of clouds. CALIPSO's lidar can detect tiny particles and distinguish between cloud particles and aerosols such as dust, sea salt, ash, and soot. Lidar, similar in principle to radar, uses reflected light to determine the characteristics of the target area.

CALIPSO's lidar uses pulses of laser light reflected from clouds and particles at different distances to produce a picture of the atmosphere below. With these first-ever global profile measurements, combined with CALIPSO's infrared and visible imagers, our understanding of how clouds and aerosols form, evolve, and affect weather and climate is being transformed. For the first time, whether a cloud is filled with ice crystals or water droplets can be revealed by satellite data, providing valuable new insight into how clouds warm or cool Earth's atmosphere and surface.

More than 1,500 scientific and technical reports and published research papers have used CALIPSO data. Many of those combine CALIPSO's lidar measurements with CloudSat's cloud profiling radar, as well as other A-Train instruments.



CALIPSO co-principal investigator Jacques Pelon of France's Institut Pierre Simon Laplace, at left, presents an overview with his CALIPSO collaborator, David Winker, NASA's principal investigator for the mission. Read about their visit to the Langley Research Center: <http://www.nasa.gov/feature/langley/calipso-celebrates-10-years-of-cloud-observations-from-space>. (Credits: NASA/David C. Bowman)



NEWS FROM HEADQUARTERS AND THE CENTERS

NASA HEADQUARTERS

Washington, DC

History Program Office

By Bill Barry

This spring has been an interesting time for the History Program Office—interesting, in the style of that old Chinese proverb/curse about living in interesting times. While we have been extremely busy with many internal issues, external factors have continued to grab our attention. For example, we started the month of March with an outstanding “brown bag” presentation by John Newcomb about his experiences with Lunar Orbiter and Viking. John contacted Yvette Smith out of the blue last year about his memoir, “A Bunch of Plumbers,” and was looking for an opportunity to talk with us about it. I’m glad we listened to Yvette’s advice on this, because John’s presentation was captivating, entertaining, and insightful. Sadly, just two days later, John passed away. (See the obituary elsewhere in this issue.) It was a sobering and powerful reminder of the time-sensitive nature of the work we all do.

On the internal issues side of the ledger, we’ve made great progress in standing up our new online system to manage the history publications process. While I predicted significant turbulence on this in the last newsletter, the excellent spadework done by Steve Garber with the software vendor has made our initial training extremely smooth. This new approach is one of the most important changes in the History Program Office in years and should dramatically improve our efficiency and ability to complete publication projects in a timely fashion.

Speaking of publications, with the backlog of projects under better control, we are now looking for new projects. Over the last five years, we have initiated only a handful of new publication projects—and the vast majority of those were low/no-cost efforts. But,

now, for each new publication that we complete, I hope to initiate a new project that will keep our workload at a sustainable level. So, if you have a great idea for a NASA History publication, please let me know about it. We already have a pretty long list of topics that we’d like to pursue, but I’d be delighted to know what topics you think deserve a thoroughly researched NASA history.

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By the time you read this, the annual NASA History Program Review will be over. But, as I write this, we are in the final throes of preparing for our gathering of NASA history and archival personnel at Goddard Space Flight Center, 10–12 May. As you can tell from the content of this newsletter, there is much that we have to talk about. But, in addition to important conversations about the future of history, we have also lined up a number of fascinating guest speakers and arranged for (optional) tours of both the National Archives and Records Administration facility in College Park, Maryland, and, of course, the Goddard Space Flight Center itself. Robin Dixon and Holly McIntyre-Dewitt have pulled out the stops in preparing things at Goddard, and Nadine Andreassen has (as always) been unrelenting in taking care of all the details from our end. We’ll tell you more about the Program Review in the next newsletter.



Our biggest challenge this summer, after we finish the Program Review, will be the search for a new chief archivist. As noted elsewhere in this newsletter, Jane Odom has made a revolutionary impact on our archival program, both here at Headquarters and across the Agency. She leaves an amazing legacy and some very big shoes to fill. The current restrictions on Headquarters hiring will complicate the already challenging prospect of finding a new chief archivist. There will be a gap. But, we are committed to keeping that gap as short as possible (if only for my own sanity), while finding someone who can carry forward Jane’s legacy.

Finally, while we are contemplating goodbyes and hellos, it doesn’t seem like it would be a newsletter if we weren’t also marking the handover of the history intern baton. This spring we only had one intern, and due to his busy senior year spring schedule, he was only with us three days per week. But, based on his output you would never guess that Anthony Buonomo was

only here part time. He not only kept our social media feeds full and lively, but he also created a new software tool that will radically improve the management of our social media database. As if that wasn’t enough, Anthony made a unique contribution to the work environment here at Headquarters this spring by initiating mindfulness meditation classes at our fitness center. As he graduates from Georgetown, we send him out into the work world with our appreciation for all he has done and an expectation that we’ll see him again. After about a three-week break, our summer interns start on 23 May. Cat Baldwin, a sophomore at St. John’s College in Annapolis, Maryland, and Christopher Rudeen, a junior at Yale University, will

both be with us until early August. You will be hearing more from them on social media, online, and when you get in touch with us.

Historical Reference Collection (HRC)

By Jane H. Odom

In the Headquarters Archives, I have begun to appraise my own collection, a 17-year accumulation of hardcopy and electronic files, before retiring on 31 May. By the time you read this, I will be off to new adventures and hopefully a much slower pace of

life. It has been a pleasure serving researchers and managing other archival projects during my tenure as Chief Archivist. My sincere hope is that I have left things in better shape than I found them, not just here at Headquarters, but across the Agency in the other History Archive Programs. To quote one of my favorite cartoonists, Brian Basset, who draws the “Red and Rover” strip, “What a Ride it’s Been!”

The cartoon shows an enthusiastic boy, with toy shuttle in hand, and his dog running beside the real Space Shuttle as it lands a few yards away.

Now to update you on our other Headquarters activities.... The staff continue to stay busy with reference requests and with the processing (arrangement and description) of collections. During the last several months, we hosted Headquarters staff as well as researchers from the Jet Propulsion Laboratory, the National Air and Space Museum, George Washington University, Massachusetts Institute of Technology, Princeton University, University of Mississippi, and the National Centre for Scientific Research in France.

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A major appraisal and acquisitions project has recently been completed. Begun nearly nine years ago, the project involved appraising hundreds of boxes (489 to be exact) of Headquarters History Office materials stored at the Washington National Records Center in Suitland, Maryland. The boxes contained documents dating from 1957 to 2005.

The bulk of the material was a series of collections of source files for histories of the Apollo program funded by the History Office. Other collections covered a variety of subjects, including the Viking Mars probes, NASA lunar probes, Space Station Freedom, and the Agency's international cooperation programs and projects. After the review of each set of boxes, the historically valuable correspondence was copied and added to existing HRC subject files, supplementing these files with even more pieces of official correspondence and memoranda. Also added to the files was a nearly complete set of speeches of George Mueller, Associate Administrator for the Office of Manned Space Flight from 1963 to 1969, as well as other officials' speeches and congressional witness statements. The speeches were scanned and made available in our public electronic documents collection (see URL below).

A small collection of formerly classified documents has now been processed and made available to researchers. Included in this collection are National Advisory Committee on Aeronautics correspondence on wind tunnels and Supersonic Research Center operations, 1945–1950, as well as correspondence from the International Affairs Office regarding proposed agreements for Space Shuttle emergency landing sites, 1984–1991.

If you are interested in visiting the Headquarters History Office to conduct research, please contact us at 202-358-0384 or at <http://history.nasa.gov/contact.html> to schedule an appointment. To search our electronic documents collection, please see <https://historydms.hq.nasa.gov/>.

AMES RESEARCH CENTER (ARC)

Moffett Field, California

By Glenn Bugos and Jack Boyd

At the invitation of Eugene Tu, the Ames Center Director, a group from the Owl Feathers Society visited to present thoughts on NASA at this moment in history. The Owls are a group of Ames retirees who began meeting in 1983 at quarterly lunches with technical presentations by current Ames researchers. They take their name from Harvey Allen's final research project, in which he moved owl feathers through a bathtub to discover that owls flew upon their prey so silently because of small protruding feathers on the leading edge of their wings. The Owls have no formal leader, though Tom Snyder and Vic Peterson these days send out most of the e-mails. As a 30-year employee at NASA Ames, Eugene appreciates the mentoring and advice that previous generations of Ames leaders provided to him.

Now that the Kepler spacecraft is well into its second life as the K2 mission, the Kepler team is devoting more time to mark what was so historic about this mission—beyond the obvious of showing that our galaxy is rife with exoplanets. Bill Borucki, principal investigator on Kepler, published an encyclopedic history of the evolution of the spacecraft and its cutting edge camera and data processing systems: “Kepler Mission: Development and Overview,” *Reports on Progress in Physics* 79 (2016). The artifact that stars in that 30-year march toward technology validation and Headquarter approval, the Kepler star-field demonstrator, is being disassembled to move out of the basement of the Ames Space Science Building and into a museum.

Sadly, we note the passing of Ken Souza, the driving force in Ames leadership in flying experimentation packages for gravitational and space biology. Ken worked at Ames for 50 years and his first experiment package, a frog egg experiment, was flown on Gemini 11. In 1992, his frog egg experiment on Spacelab-J provided the first evidence that a vertebrate species can





NASA Ames Center Director Eugene Tu (left) and Jack Boyd (right) congratulate Glenn Bugos (center) upon presentation of the plaque, on behalf of the NASA Headquarters History Office, for the 2015 NASA History Award.



The Owls meeting at NASA Ames on 22 March 2016. Around the table, from left, Ames Deputy Director Tom Edwards, Tom Gregory, Bill Berry, Ken Mort, Henry Lum, Victor LeBacqz, Vic Peterson, Glenn Bugos, Tom Snyder, Bob Yee, Irv Statler, Center Director Eugene Tu, and Jack Boyd



reproduce in the absence of gravity. From the 1970s through the 2000s, Ken quietly fostered collaboration between NASA and Russia, using the Foton and Bion spacecraft. Ken made it possible for more than 400 space biology experiments to fly aboard the Shuttle and International Space Station. He was a founder and later president of the American Society for Gravitational Space Research, and the scientists he trained are leading the recent resurgence of space biology experimentation. Much of what we know about the effects of spaceflight on living systems we learned in experiments conducted under his tutelage. Ken

was also a wealth of historical knowledge on the field and the lead editor of the two-volume encyclopedia on space biology, *Life Into Space* (NASA RP-1372 and SP-2000-534).

Reference Collection

By April Gage and Danielle Lopez

The History Office archives have been busy, as usual. In addition to responding to an increase in reference queries, assisting with collection emergencies in other repositories at the Center, in-processing a collection of Rick Guidice's recently exhibited space settlement paintings, and making progress on preservation and digitization tasks, we were able to carve out time to focus on a couple of noteworthy acquisitions.

The archivists are working with space scientist and Kepler mission mastermind Bill Borucki and his

assistant Mark Messersmith to preserve Borucki's personal papers. To our dismay, portions of his papers were found to be water-damaged due to poor storage conditions over the years. We also discovered inactive mold during our preliminary survey of a first installment of 3.5 cubic feet of material. We consulted the professional literature and Ames industrial hygienist Wai Kwong Kan to determine a course of action to safely clean the affected materials, designed a workflow, constructed cleaning screens, assembled equipment and basic protective gear, and got to work implementing stabilization measures. Once the process was clarified, applied, and refined, April produced detailed documentation of vacuum-cleaning procedures for paper-based documents. All of the damaged documents found in this acquisition have now been cleaned and rehoused in protective enclosures.

The Vestibular Research Facility (VRF) Multi-Axis Centrifuge, which was designed for use in the Life Sciences Division's Gravitational Research Branch within the Office of the Director of Space, was recently dismantled into its major component parts and transferred to the History Office Archives. Under the direction of Dr. David Tomko, who headed the Vestibular Research Facility from 1986 to 1997, the centrifuge was developed to perform cutting-edge neurovestibular research using small primates and rodents during the 1980s and 1990s. Built with seven axes of motion, the centrifuge consists of a main drive and base assembly serving as a primary support for two outer vessels, each of which contains specimen test containers. The

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FROM THE 1970s THROUGH THE 2000s, KEN QUIETLY FOSTERED COLLABORATION BETWEEN NASA AND RUSSIA, USING THE FOTON AND BION SPACECRAFT. KEN MADE IT POSSIBLE FOR MORE THAN 400 SPACE BIOLOGY EXPERIMENTS TO FLY ABOARD THE SHUTTLE AND INTERNATIONAL SPACE STATION.

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VRF Multi-Axis Centrifuge



Dr. Manning Correia of the University of Texas Medical Center in Galveston at the VRF centrifuge computer terminal conducting an experiment. Dr. Correia was one of the first visiting scientists to use the VRF facility.

bright orange metal drive and outer vessels held by black metal supports present a visually striking ensemble.

We continue to test, stabilize, describe, and convert historical audiovisual media in obsolete formats from analog to digital form for preservation and access purposes. Because this material comprises the most fragile and inaccessible formats housed in the archives, we are working hard to ensure that the content is not lost. The latest batch of material, comprising 12,300 feet of 16 mm film and 70 video and audiotapes, has now been digitized. Subject areas are broad, including television news coverage of Pioneer and Galileo missions from the 1970s through the 1990s as well as remote-sensing analysis of fires, pest infestations in California vineyards, and ozone-layer depletion during the 1980s and 1990s. Technical footage includes Galileo parachute tests in 1983 along with vapor screen vortex flow visualization and other tests in the 6-by-6-foot wind tunnel in 1975.

Prior to digitization, preliminary metadata were composed, and the materials were preserved in appropriate housing for long-term storage. In the next phase, each item will be carefully reviewed and fully described, and a new batch of material will be selected and prepared for digitization. In a parallel effort, Danielle migrated all legacy summary metadata for audiovisual material and adjusted it to fit the new standards-based metadata schema that April developed. As more of this material becomes “unlocked” through digitization, content descriptions of it will be expanded.



GLENN RESEARCH CENTER (GRC)

Cleveland, Ohio

By Anne Mills

NASA Glenn Research Center continues to mark its 75th anniversary with a number of special programs. “Research Rising,” an exhibit of original artwork and historic photographs, was officially opened at the Cleveland Hopkins International Airport on 24 March 2016. Ten original paintings, by technical illustrator Les Bossinas, depict conceptual images of crewed lunar and Martian outposts, asteroid mining, and futuristic space stations. Also on display are 26 photographs from the Center’s historic image archive. The photos represent a timeline of Center history and

a cross section of some of our most significant contributions. Images chosen also demonstrate the skills of NASA photographers and the duality of their work—creating images that are both technical and beautiful. The exhibit will be on display through late summer. If you are traveling through Cleveland, be sure to visit the gallery in Concourse A.

An exciting permanent historic exhibit will soon be complete at the Center. A Centaur G-Prime stage, formerly on display at the U.S. Space and Rocket Center in Huntsville, Alabama, will make its home in front of the Administration Building at Glenn. Centaur is perhaps one of the most important chapters in Glenn history. Glenn (then Lewis) pioneered the use



A Centaur G-Prime stage, formerly on display at the U.S. Space and Rocket Center in Huntsville, Alabama, is making its home in front of the Administration Building at Glenn.



of liquid hydrogen as a fuel in the 1950s and developed the Centaur upper-stage in the early 1960s. The Center was then tasked to manage the development the Shuttle-Centaur. This G-Prime Centaur stage was designed to fit into the Shuttle payload bay and launch probes and satellites directly from Earth orbit. In the wake of the Challenger accident, the program was cancelled after researchers determined that the liquid-fueled stage posed too great of a safety risk as a Shuttle payload. The artifact is the last existing of its kind and will be installed in time to be included in our 75th anniversary Open House in May. Glenn is proud to bring this piece of its history home, as it serves to represent our role in the larger Centaur story and success of the space program.

JOHNSON SPACE CENTER

Houston, Texas

By Rebecca Wright

The Organization of American Historians presented its 2016 Friend of History Award to the Johnson Space Center (JSC) History Office in Houston, Texas, for its extraordinary record in preserving and sharing the history of American space travel. Tiny in size, the JSC History Office archives the history of the nation's human spaceflight exploration program from the 1960s to the present. Collections vigorously assembled by its staff serve as a major resource for countless films; documentaries; television programs; exhibits; magazine and journal articles; and popular, professional, and academic histories that inform and excite an enormously inquisitive worldwide audience.

Not established until 1997, the JSC History Office demonstrates how a small organization can safeguard and effectively disseminate a recent past otherwise disappearing before our eyes. With a team seldom larger than three, the JSC History Office has conducted

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THE ORGANIZATION OF AMERICAN HISTORIANS PRESENTED ITS 2016 FRIEND OF HISTORY AWARD TO THE JOHNSON SPACE CENTER (JSC) HISTORY OFFICE IN HOUSTON, TEXAS, FOR ITS EXTRAORDINARY RECORD IN PRESERVING AND SHARING THE HISTORY OF AMERICAN SPACE TRAVEL.

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more than 1,100 interviews with astronauts, engineers, scientists, managers, and staff members, detailing the scientific, technological, and even political strategies employed to create and sustain America's space programs. This wide-ranging oral history collection along with its publications have provided an insight to otherwise unknown aspects, such as women's roles in the space agency and astronaut programs, the cooperation between NASA and the Russian space program following the collapse of the Soviet Union, and the first cargo transported to the International Space Station by commercial entities.

Users worldwide can easily access transcripts from the interviews and more than 7,000 searchable files from its Web site at <http://www.jsc.nasa.gov/history>. The JSC History Collection, publicly accessible at the University of Houston—Clear Lake, contains audio and visual files, unique materials from former JSC personnel, and major sets of at-risk audio data converted to digital formats.



MARSHALL SPACE FLIGHT CENTER

Huntsville, Alabama

By Brian Odom

Over the past quarter, the Marshall History Office has remained busy with research requests, Web site planning, and digitization projects. Major projects included providing historical input to the NASA Artifacts Working Group, assessing the Marshall Neutral Buoyancy Simulator (NBS) facility, and providing information in support of historical preservation efforts concerning Marshall's Administrative Complex.

At the 2016 joint annual meeting of the National Council on Public History (NCPH) and Society for History in the Federal Government (SHFG) in March, Brian organized and chaired a panel discussion entitled, "Transformative Archival Methods: Inclusivity, Partnerships, Human Rights, and Activism." The panel included Trudy Huskamp Peterson, Marla Ramirez, and Patrick Stawski. The panel examined how developing partnerships with marginalized communities and improving access to archives can become mutually transformative. Brian also delivered a talk at the 1 March 2016 meeting of the Federal Bar Association meeting entitled, "Dr. Wernher von Braun, Dream of the Space Age."

During February and March, Brian traveled to university archives at Alabama Agricultural and Mechanical University and Oakwood University in Huntsville, Alabama, as well as Miles College near Birmingham, Alabama. The purpose of these visits was to research the connection of these three Historically Black Colleges and Universities (HBCU) to the Marshall Center during the Civil Rights Movement. Upcoming activities in this area include trips to the Bentley Historical Library at the University of Michigan, Alabama State University, and Tuskegee University, researching the same topic.

If you are interested in researching historical topics related to the Marshall Space Flight Center or have questions about the symposium, please contact Brian Odom at 256-544-5670 or by e-mail at brian.c.odom@nasa.gov.



These images, taken 22 November 1964, are of Dr. Wernher von Braun at the groundbreaking of the Taggart Science Building at Miles College near Birmingham, Alabama. During the event, Dr. von Braun gave a speech entitled, "Scientific Knowledge, A Vital Resource." (Credit: Miles College Archive)



STENNIS SPACE CENTER (SSC)

Mississippi

By Daphne Alford

NASA successfully tested the first deep-space RS-25 rocket engine for 500 seconds 10 March, clearing a major milestone toward the next great era of space exploration. The next time rocket engine No. 2059 fires for that length of time, it is scheduled to be carrying humans on their first deep-space mission in more than 45 years.

“What a great moment for NASA and Stennis,” said Rick Gilbrech, director of NASA’s Stennis Space Center near Bay St. Louis, Mississippi. “We have exciting days ahead with a return to deep space and a journey to Mars, and this test is a very big step in that direction.”



THE HOT FIRE MARKED THE FIRST TEST OF AN RS-25 FLIGHT ENGINE FOR NASA'S NEW SPACE LAUNCH SYSTEM (SLS) BEING BUILT TO CARRY HUMANS ON FUTURE DEEP-SPACE MISSIONS, INCLUDING TO AN ASTEROID AND MARS. FOUR RS-25 ENGINES WILL HELP POWER THE SLS CORE STAGE.



The hot fire marked the first test of an RS-25 flight engine for NASA’s new Space Launch System (SLS) being built to carry humans on future deep-space missions, including to an asteroid and Mars. Four RS-25 engines will help power the SLS core stage.

RS-25 engine No. 2059 and two other flight engines, slated for testing at Stennis in the coming months, are scheduled to help launch SLS for the first Orion

crewed mission, known as Exploration Mission-2 (EM-2). (The fourth engine that will help power the flight has already flown into space and will not require additional testing.)

The EM-2 mission is expected to carry four astronauts into lunar orbit to test key elements of the spacecraft. It will mark the first American flight to carry humans beyond low-Earth orbit since Apollo 17 in 1972.

The engines used on initial SLS missions are flight engines remaining from the Space Shuttle Program, workhorse engines that are among the most proven in the world, having powered 135 Space Shuttle missions from 1981 to 2011. For the SLS vehicle, the engines will fire at 109 percent thrust level and provide a combined 2 million pounds of thrust.

“Not only does this test mark an important step towards proving our existing design for SLS’s first flight,” said Steve Wofford, engines manager at NASA’s Marshall Space Flight Center in Huntsville, Alabama, where the SLS Program is managed for the Agency, “but it’s also a great feeling that this engine that has carried so many astronauts into space before is being prepared to take astronauts to space once again on SLS’s first crewed flight.”

NASA is developing the SLS rocket to carry humans deeper into space than ever before, including to an asteroid by 2025 and to Mars in the 2030s. The initial configuration of the rocket will have a minimum 70-metric-ton (77-ton) lift capability and be powered by the four RS-25 engines, operating in conjunction with a pair of solid rocket boosters.

NASA and Aerojet Rocketdyne, the prime contractor for RS-25 engine work, conducted a series of developmental tests on the RS-25 engine last year at Stennis, primarily to validate the capabilities of a new controller—or, “brain”—for the engine and to verify the different operating conditions needed for the SLS vehicle. Following the successful 10 March firing, Stennis and



Aerojet Rocketdyne conducted another development engine series to test new flight engine controllers and continues to test RS-25 flight engines.

In addition, the Agency is preparing the B-2 Test Stand at Stennis to test the SLS core stage that will be used on the rocket's first flight, Exploration Mission-1. Core stage testing will involve installing the flight core stage on the B-2 stand and firing its four RS-25 rocket engines simultaneously.

“One more powerful step forward accomplished on the SLS journey,” said Ronnie Rigney, RS-25 project manager at Stennis. “It really feels great to be part of such an important program in our nation.”

For additional information about NASA's journey to Mars, visit <http://www.nasa.gov/journeymars>.



NASA engineers conduct a successful test firing of RS-25 rocket engine No. 2059 on the A-1 Test Stand at Stennis. The hot fire marks the first test of an RS-25 flight engine for NASA's new Space Launch System (SLS) vehicle. Four RS-25 engines, in conjunction with a pair of solid rocket boosters, will power the SLS at launch. The March 10 test was conducted for a full-duration 500 seconds, the same amount of time the engines must fire during an actual launch.

UPCOMING EVENTS

The annual American Institute of Aeronautics and Astronautics Aviation and Aeronautics Forum and Exposition will be held **13–17 June** in Washington, DC. Visit <http://www.aiaa-aviation.org> for details.

The annual meeting of the Society for the History of Technology will be held **22–26 June** in Singapore. Visit <http://www.shot2016.org> for details.

The annual meeting of the Society for Historians of American Foreign Relations (SHAFR) will be held **23–25 June** in San Diego, California. Visit <https://www.shafr.org/conferences/annual/2016-annual-meeting> for details.

The annual Experimental Aircraft Association AirVenture air show will be held **25–31 July** in Oshkosh, Wisconsin. Visit <http://www.eaa.org/en/airventure> for details.

The annual meeting of the Society for American Archivists will be held **31 July–6 August** in Atlanta. Visit <http://www2.archivists.org> for more information.

The AIAA Space 2016 Forum will be held **13–16 September** in Long Beach, California. Visit <http://www.aiaa-space.org> for details.

The 67th International Astronautical Congress will be held **26–30 September** in Guadalajara, Mexico. Visit <http://www.iafastro.org/events/iaa/iaa2016/> for more details.

The Oral History Association Annual Meeting will be held **12–16 October** in Long Beach, California. Visit <http://www.oralhistory.org/annual-meeting/> for details.

The 32nd Annual Meeting of the American Society for Gravitational and Space Research will be held **26–29 October** in Cleveland, Ohio. Visit <https://www.asgr.org> for details.



OTHER AEROSPACE HISTORY NEWS

NATIONAL AIR AND SPACE MUSEUM

By Hunter Hollins

In January, Space History Department Chair Valerie Neal presented a lecture on space history and space policy at the National Defense University at Fort McNair. Matt Shindell spoke on “A Man of Peace in Times of War: Harold C. Urey, Pacifism, and National Service in the Two World Wars” in the History Seminar on Contemporary Science and Technology at the National Museum of American History. Tom Lassman presented “Government Science in Cold War America: Edward Condon and the Transformation of the National Bureau of Standards, 1945–1951,” at the National Institute of Standards and Technology Colloquium Series in Gaithersburg, Maryland. In February, Cathy Lewis presented a paper on the Soviet Buran Space Shuttle at the “Revealing the Cosmonaut” Symposium held at the Science Museum in London, England. In March, Michael Neufeld, Paul Ceruzzi, and Martin Collins participated in the “Futuring the Stars: Europe in the Age of Space” conference held at the Freie Universität in Berlin, Germany.

“**THEY ALL HELD THE AUDIENCE SPELLBOUND WITH THEIR PERSONAL TALES OF DERRING-DO AND THE ROLE STEM EDUCATION AND OPPORTUNITY PLAYED IN THEIR GETTING TO WHERE THEY ARE TODAY.**”

Jeanine Menze (the first female African American Coast Guard aviator), and Lieutenant La’Shanda Holmes (the first female African American Coast Guard helicopter pilot). They all held the audience spellbound with their personal tales of derring-do and the role STEM education and opportunity played in their getting to where they are today. Other Family Day activities included two “Ask an Expert” talks by NASM curators, a hands-on coding lab, a character performance, and a NASM Archives display on pioneering aviator Ruth Law, in addition to meet-and-greets with a range of STEM professionals and a variety of discovery and interactive stations.

The “Air and Space Mobile Missions” app was released on 3 December 2015 in the Apple store. This was a group effort by curatorial, external affairs, education, and other staff. The app may be downloaded via the landing page at <http://airandspace.si.edu/explore-and-learn/mobile-missions/>. It may also be downloaded in the Apple store (<https://itunes.apple.com/us/app/air-and-space-mobile-missions/id1060679179?mt=8>) or the Google Android store (<https://play.google.com/store/apps/details?id=edu.si.airandspace.mobilemissions&hl=en>).

On 12 March, NASM held the Women in Aviation and Space Heritage Family Day at the Udvar-Hazy Center. The day’s presentations were headlined by NASA Administrator Charles Bolden, who was introduced to the large crowd, many of whom were Girl Scouts, by NASM Director Jack Dailey. Additional speakers included astronaut Stephanie Wilson (introduced by General Bolden), Lieutenant Commander

The Smithsonian Institution Scholarly Press issued the paperback edition of *Spacefarers: Images of Astronauts and Cosmonauts in the Heroic Age of Spaceflight*, edited by Michael Neufeld. Among the authors in this collection are Margaret Weitekamp and Valerie Neal, also curators in Space History, and Matthew Hersch, a former NASM fellow. Aeronautics curator John D. Anderson, Jr., has just published the 8th edition of



his path-breaking aeronautical engineering textbook, *Introduction to Flight* (New York: McGraw-Hill, 2016). This book is standard reading for aeronautical engineering students at more than 150 colleges and universities in the United States. David DeVorkin published, "Utilizing Dibner Resources at the National Air and Space Museum," a chapter in L. Vekerdy, ed., *The Era of Experiments and the Age of Wonder*, (Washington DC: Smithsonian Institution Scholarly Press, 2015). Allan Needell published two blogs about the handwriting on the interior walls of the Apollo 11 Command Module *Columbia* that was discovered during the 3D scanning project. The blogs incorporate corroborating data from the Apollo Lunar Surface Journals to show how the handwritten notes and equations correspond to activities in the mission timeline. In February, Jennifer Levasseur marked the passing of Edgar Mitchell with a blog post, "A Most Interesting Man on the Moon: Remembering Edgar D. Mitchell." To read Needell and Levasseur's blogs, and many others related to air and space history, go to <http://blog.nasm.si.edu/>. Matt Shindell published "Geophysics," a chapter in *A Companion to the History of American Science*, Georgina M. Montgomery and Mark A. Largent, editors. Margaret Weitekamp published "Two Enterprises: Star Trek's Iconic Starship as Studio Model and Celebrity," in the *Journal of Popular Culture and Television*. Hunter Hollins coauthored an article in *The Affiliate*, a Smithsonian Affiliations newsletter, on the eight-month reconstruction of a Ranger spacecraft at the California Science Center in Los Angeles. Under the supervision of the California Science Center staff, three Jet Propulsion Laboratory veterans, Bill Weber, Arden Acord, and Bob Conover, constructed the spacecraft using 744 Ranger parts supplied by NASM, with assistance from University of Southern California engineering students.

Bruce Campbell of NASM's Center for Earth and Planetary Studies concluded his study of the Moon using high-resolution S-Band (12.6-cm wavelength) radar images. These data, collected over the past 10 years using the Arecibo and Green Bank Telescopes, cover about two-thirds of the Moon's near side at 80-meter resolution. Radar signals at this wavelength probe a few meters into the lunar dust, revealing fine details of impact crater deposits and lava flows. Campbell delivered his study to the NASA Planetary Data System.

The exhibition, "A New Moon Rises: Views from the Lunar Reconnaissance Orbiter Camera," opened to

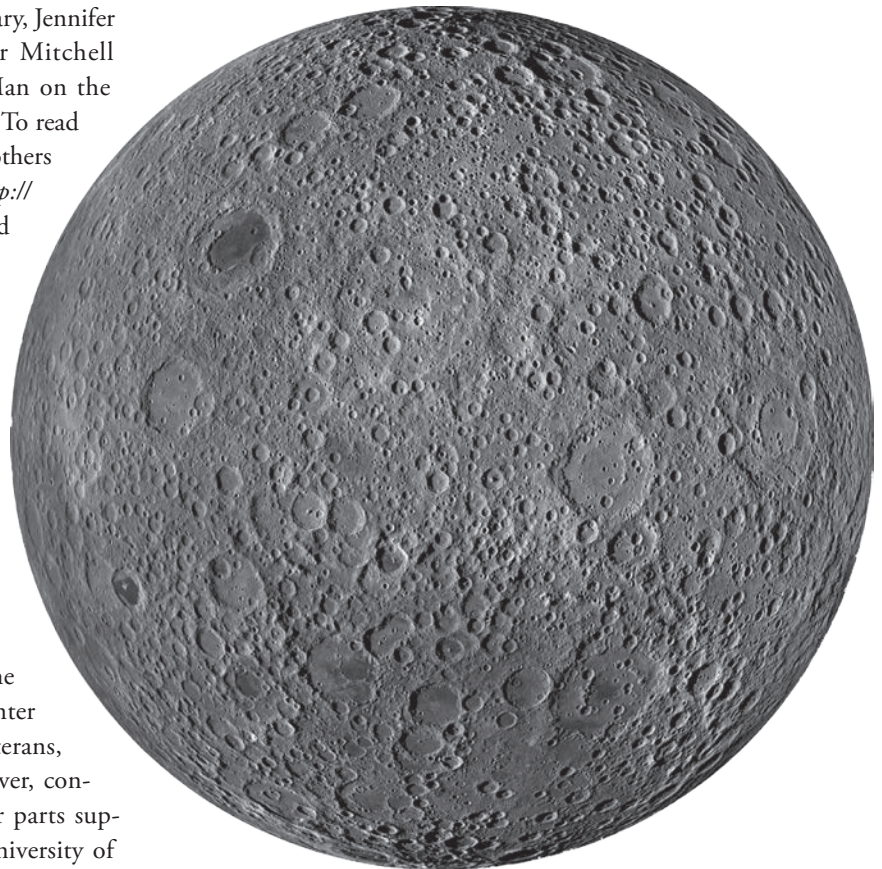


Image from the "A New Moon Rises: Views from the Lunar Reconnaissance Orbiter Camera" exhibition at the National Air and Space Museum. This mosaic of the far side of the Moon was made with 1,686 images, most of which were acquired during two weeks in 2011. The Sun remained low over the horizon during this time, which emphasizes landform relief. (Image: LRO Wide Angle Camera mosaic)



the public on 26 February. The Lunar Reconnaissance Orbiter Camera (LROC), mounted on the spacecraft designed and constructed at Goddard Space Flight Center, has captured dramatic landscapes of the Moon for more than six years. “A New Moon Rises” showcases those breathtaking images from Apollo landing sites to majestic mountains that rise out of the darkness of the lunar poles. The 61 large prints from Arizona State University presented in this exhibition reveal a celestial neighbor that is surprisingly dynamic, full of grandeur and wonder. The exhibition was curated by Tom Watters of NASM’s Center for Earth and Planetary Studies with Mark Robinson of Arizona State University. The exhibition includes the backup flight unit Lunar Reconnaissance Orbiter wide angle and narrow angle cameras recently added to the NASM collection by Matt Shindell.

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NASM HAS ESTABLISHED 20 EXHIBITION TEAMS TO DEVELOP PLANS FOR EXHIBITS AS THE MALL MUSEUM WORKS THROUGH REVITALIZATION IN THE YEARS AHEAD, DIVIDING THE MUSEUM INTO A SERIES OF SUITES FOCUSED ON KEY THEMES/TIME FRAMES/TECHNOLOGIES THAT TELL THE STORY OF FLIGHT.”

This exhibition will be open through February 2017, and negotiations are under way regarding the possibility of developing a traveling version of the exhibition.

NASM has established 20 exhibition teams to develop plans for exhibits as the mall museum works through revitalization in the years ahead, dividing the museum into a series of suites focused on key themes/time frames/technologies that tell the story of flight. These thematic suites include a “Space Exploration Suite,” a “Revolutions in the Sky Suite,” and a “Military Aviation Suite,” as well as

several standalone exhibitions on topics ranging from “Speed” to “Pioneers of Flight.”

Progress on the *Boeing Milestones of Flight Hall* has continued in preparation for the grand opening on 1 July 2016.

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RECENT PUBLICATIONS AND ONLINE RESOURCES

COMMERCIALY PUBLISHED WORKS

By Chris Gamble

John Glenn, Jr.—*Debriefed: First Thoughts and Pilot's Debriefing of His Historic Friendship 7 Flight*, by John H. Glenn, Jr., and edited by Scott Sacknoff (SpaceHistory101.com Press, December 2015). On 20 February 1962, John Glenn, Jr., became the first American to orbit the Earth. Back on Earth, while onboard the USS Noa and over the next two days on Grand Turk, Glenn recorded his thoughts and answered questions during a NASA debriefing. Glenn relates his experiences during his three-orbit flight as well as his training and the design of his pressure suit and capsule. These ultimately would be used to aid in the writing of the official NASA post-launch report. Inside is his story, told to us in his own words. Includes a number of rare photos, including from the USS Noa. [Note: Originally published in *Quest Magazine*]

The Hubble Space Telescope: From Concept to Success, by David J. Shayler and David M. Harland (Springer-Praxis, November 2015). Drawing upon firsthand interviews with those closely involved in the project over 30 years ago, this story explains the development of the servicing mission concept and the hurdles that had to be overcome to not only launch the telescope but also to mount the first servicing mission—a mission that restored the telescope to full working order three years after its launch, saved the reputation of NASA, and truly opened a new age in understanding of our place in space. This is not just a tale of space age technology, astronauts, and astronomy. It is also a story of an audacious scientific vision and the human ingenuity and determination to overcome all obstacles to make it possible. This book is a story of an international partnership, dedicated teamwork, and a perfect blend of human and robotic space operations that will inspire people of all ages.

Near-Earth Objects: Identifying and Mitigating Potential Threats from Space, edited by Leon Sinclair (Nova Science Publishers, Inc., December 2015). Scientists classify comets and asteroids that pass within 28 million miles of Earth's orbit as near-Earth objects (NEOs). Asteroids that collide and break into smaller fragments are the source of most NEOs, and the resulting fragments bombard Earth at the rate of more than 100 tons a day. Although the vast majority of NEOs that enter Earth's atmosphere disintegrate before reaching the surface, those larger than 328 feet (100 meters) may survive the descent, causing destruction in their wake; even smaller objects that disintegrate before reaching Earth's surface can cause significant damage. This book examines NASA's NEO Program and assesses the Agency's allocation and use of resources and plans for the future of the program.

History of Rocketry and Astronautics, vol. 45, edited by Andrew S. Erickson, AAS History Series, vol. 45, IAA History Symposia, Vol. 33 (AAS/Univelt, Inc., December 2015). This book is a compendium of the proceedings of the Forty-Seventh History Symposium of the International Academy of Astronautics held in Beijing, China, 2013.

Optical Payloads for Space Missions, by Shen-En Qian (Wiley, January 2016). This reference covers optical payloads in space missions, including Earth observation, communications, navigation, weather, and science satellites, as well as deep space exploration.

The Palgrave Handbook of Society, Culture and Outer Space, edited by Peter Dickens and James S. Ormrod (Palgrave Macmillan, February 2016). Bringing together scholarship from across the social sciences and humanities, this handbook critically examines the relationship between society and outer space, exploring the history, present, and future of outer space and the place of humans within it.



Lunar and Interplanetary Trajectories, by Robin Biesbroek (Springer, March 2016). Readers are provided a clear description of the types of lunar and interplanetary trajectories and how they influence satellite-system design. The description follows an engineering rather than a mathematical approach and includes many examples of lunar trajectories based on real missions. The book aims to provide an understanding of the driving subsystems of interplanetary and lunar satellites with easily understandable tables and graphs showing features of trajectories.

North American X-15 Manual, by David Baker (Haynes Publishing UK, January 2016). This manual provides fascinating technical insight into the development and use of rocket planes, focusing on the iconic X-15, which carried out much of the development work for the Apollo and Space Shuttle space programs. The text is extensively illustrated with period photographs and technical illustrations; it also explains how the vehicle worked, what it pioneered for future applications in more conventional aircraft and crewed spacecraft developed by NASA from 1958, and what it was like to fly.

NASA Kennedy Space Center (Images of Modern America), by Mark A. Chambers (Arcadia Publishing, February 2016). NASA's Kennedy Space Center has served as the nation's portal to outer space for over 60 years. This book provides a look at the evolution of spacecraft technology and vintage images of Florida's scenic Merritt Island, known as the "Space Coast." This photographic history of the nation's premier spaceport looks at the United States' past in space exploration and ahead to its future.

Yearbook on Space Policy 2014: The Governance of Space, edited by Cenani Al-Ekabi, Blandina Baranes, Peter Hulsroj, and Arne Lahcen (Springer, December 2015). This book, edited by the European Space Policy Institute (ESPI), is the reference publication analyzing space policy developments. Each year it presents issues and trends in space policy and the space sector as a whole. Its scope is global and its perspective is European.

Space Weather: National Strategy, Action Plan, and Observing Systems for Preparedness, edited by Peter Burton (Nova Science Publishers, Inc., February 2016). Space weather refers to variations in the space environment between the Sun and Earth—and throughout the solar system—that can affect technologies in space and on Earth. This book outlines objectives for enhancing the nation's space-weather readiness in three key areas: national preparedness, forecasting, and understanding. It also describes the study process, the study requirements, and their relevance and importance and offers an assessment and accounting of current and planned space weather observing systems, an analysis of gaps between the observing systems' capabilities and their ability to meet documented requirements, and a summary of key findings.

Under Desert Skies: How Tucson Mapped the Way to the Moon and Planets, by Melissa Lamberton Sevigny (Sentinel Peak Books, February 2016). This book tells the story of how a small corner of Arizona became Earth's ambassador to space. Founded by Gerard P. Kuiper in 1960, the Lunar and Planetary Laboratory (LPL) at the University of Arizona broke from traditional astronomical techniques to embrace a wide range of disciplines necessary to the study of planets, including geology, atmospheric sciences, and the elegant emerging technology of spacecraft. From early efforts to reach the Moon to the first glimpses of Mars's bleak horizons and Titan's swirling atmosphere to the latest ambitious plans to touch an asteroid, LPL's history encompasses humanity's unfolding knowledge about our place in the universe.

Ask the Astronaut: A Galaxy of Astonishing Answers to Your Questions on Spaceflight, by Tom Jones (Smithsonian Books, March 2016). Ever wondered what space is really like? In his 25 years of training for, flying in, consulting on, and writing and speaking about space, astronaut and spacewalker Tom Jones can answer that question and many others. Jones covers everything from the training process for astronaut candidates and the physical sensations and challenges



of rocketing into orbit to what it's like to live, work, and walk in space. Jones also explores the future of spaceflight, both professional and commercial.

Abandoned in Place: Preserving America's Space History, by Roland Miller (University of New Mexico Press, March 2016). Stenciled on many of the deactivated facilities at Cape Canaveral Air Force Station, the evocative phrase “abandoned in place” indicates the structures that have been deserted. Some structures, too solid for any known method of demolition, stand empty and unused. Roland Miller's color photographs document the NASA, Air Force, and Army facilities across the nation that once played a crucial role in the space race. Rapidly succumbing to the elements and demolition, most of the blockhouses, launch towers, tunnels, test stands, and control rooms featured in *Abandoned in Place* are located at secure military or NASA facilities with little or no public access. Some have been repurposed, but over half of the facilities photographed no longer exist. The haunting images collected here impart artistic insight while preserving an important period in history.

Project Gemini, by Eugen Reichl (Schiffer, February 2016). In just two and a half years, beginning in 1964, two uncrewed and 10 crewed flights took place in the Gemini program. This program was the turning point in the space race with the USSR. Flights lasting two weeks, travel into the Van Allen Belt, the first extravehicular activities, rendezvous maneuvers, and docking with other spacecraft—all of this was achieved by Gemini, paving the way for the Apollo Program. It was not all success, however. Like almost every significant undertaking, Project Gemini also had its dramas and tragedies.

Project Mercury, by Eugen Reichl (Schiffer, February 2016). Project Mercury was America's entry into crewed spaceflight and was the foundation for NASA's later success in the race to the Moon. This book provides details on all craft and the astronauts involved.

Color, archival images, cutaways, and plans are also included.

TIME A Year in Space: Inside Scott Kelly's Historic Mission – Is Travel to Mars Next? by Jeffrey Kluger (TIME, March 2016). This book chronicles astronaut Scott Kelly's 340 days aboard the International Space Station as part of NASA's exploration of the challenges of extended spaceflight. The most pressing question: Could humans endure the two-and-a-half-year trip to Mars and back?

The Big Book of X-Bombers & X-Fighters: USAF Jet-Powered Experimental Aircraft and Their Propulsive Systems, by Steve Pace (Zenith Press, March 2016). This book showcases all of the USAF jet-powered X-bombers and X-fighters that have flown since 1942—more than 90 in all, including the alphabet soup of their variants. From experimental to prototype service bombers and fighters—the XB-43 to the B-2A and the XP-59A to the F-35A—they're all here, with their inside stories revealed. Some of these aircraft were further developed. Others were canceled. All stretched the performance and design envelopes. More than 250 photos illustrate all of these experimental aircrafts' cutting-edge features and zeroes in on histories of their design, flight testing, and weapons testing. Specification tables detailing performance, design, and armaments help round out this compendium of information on truly groundbreaking aviation designs.

Going The Extra Mile: Stories From the History of Aviation Medicine, by Gordon Sharp (Mereo Books, February 2016). The history of the development of space medicine is one of breathtaking courage, foolhardy experiments, and terrifying gambles with death, some won, some lost. Dr. Gordon Sharp, who for years was one of our most prominent aerospace doctors, tells the story from the inside by focusing on the fearless individuals from the past who helped to make modern flying safe by daily risking their lives.



OBITUARIES

REMEMBERING LANGLEY ENGINEER AND AUTHOR JOHN NEWCOMB

An engineer at NASA's Langley Research Center during the critical Apollo years and those that successfully landed Viking on Mars, John Foster Newcomb passed away 10 March 2016.

Newcomb graduated from Virginia Tech with a degree in engineering mechanics, and as part of the university's cooperative education program, Newcomb worked at Langley, where he was hired as a permanent employee after graduation. His first assignment as a newly minted engineer was at Langley's rocket launching area, Wallops Island.

In the early heady days of space exploration, Newcomb worked on the Lunar Orbiter Project which placed

five Lunar Orbiters around the moon, a mission critical to the success of the Apollo Project. The Lunar Orbiters photographed and mapped the moon, giving researchers insight into the best potential landing sites for the crewed Apollo missions.

After Apollo, Newcomb worked on the Viking Project which placed two landers on the surface of Mars in 1976. As gifted a storyteller as an engineer, Newcomb gives an insider's view of these two extraordinary missions in an autobiographical work entitled, *A Bunch of Plumbers*.

After Viking, Newcomb headed the agency's Physics and Chemistry Experiments in Space (PACE) Program, which developed experiments for the free fall environment of space and became the core of NASA's microgravity research program.



John Newcomb talks about his book, *A Bunch of Plumbers*, at NASA Headquarters on 9 March 2016. (Image courtesy of Nadine Andreassen)

Over the course of his career Newcomb authored or co-authored over 35 technical papers. After he retired from NASA, he continued to consult and teach and had a number of speaking engagements related to his autobiography.

Newcomb was also an avid sailor and he came in second in the 1964 Olympic trials, sailing in the Flying Dutchman class. He then won the US National Championships in 1965 and competed in the world championships in Alassio, Italy.

He is survived by his wife Peggy of 50 years and three daughters.

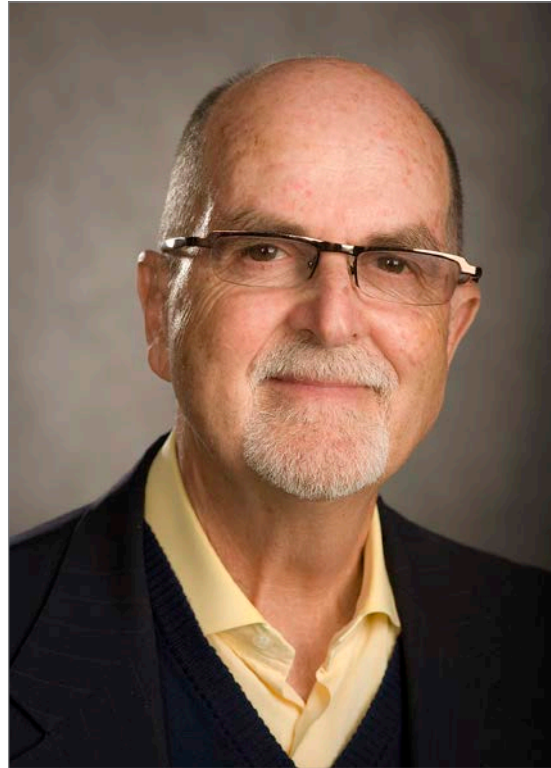


REMEMBERING KENNETH SOUZA

by Kevin Sato and Sidney Sun

A leader and pioneer in space life sciences, Ken Souza, passed away suddenly on 22 March 2016. Over his 50 years at NASA's Ames Research Center in Moffett Field, California, Souza was an exemplary leader and visionary in the advancement of gravitational and space biology as a research scientist, administrator, and mentor. His NASA science career started in 1966, conducting one of the center's earliest life science spaceflight experiments on Gemini 11. In 1992, his frog-egg experiment on Spacelab-J provided the first evidence that a vertebrate species can reproduce in the absence of gravity. In addition to his scientific discoveries, Souza provided the leadership that led to the establishment of space life sciences as a field of research both nationally and internationally. From the 1970s through the 2000s, Souza fostered U.S./Russian collaborative scientific missions on Russian Foton and Bion spacecraft, which established fruitful research ties between scientists from the two countries. Within NASA, he took on growing leadership roles, culminating with him becoming the acting director of Astrobiology and Space Research in 2001. In this role, he was responsible for all Earth, space, and life sciences research at NASA Ames.

Souza made it possible so that hundreds of space biology experiments would be performed on the Space Shuttle, Shuttle-Mir, and the International Space



Ken Souza

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SOUZA PROVIDED THE LEADERSHIP THAT LED TO THE ESTABLISHMENT OF SPACE LIFE SCIENCES AS A FIELD OF RESEARCH BOTH NATIONALLY AND INTERNATIONALLY.

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Station. When NASA biological research was curtailed due to cuts in funding in the mid-2000s, Souza worked tirelessly to maintain a small flight science program to continue space biology flights on the space shuttle. The recent resurgence of space biology as a research discipline is due in no small part from Souza's many contributions. Souza was a lifetime active member of the American Society for Gravitational and Space Biology (now called the American Society for Gravitational and Space Research) from its inception and served as its president in 2007. He remained active in the field of in space biology up to his passing, including developing new programs to study life in deep space and at altered gravity levels; additionally he provided training and mentorship to the next generation of space biology scientists and administrators.



NASA AMES SCIENTIST THORA HALSTEAD DIES

Former NASA Ames scientist Thora Halstead peacefully departed life at age 87 at her home on 9 March 2016 after a long illness. She retired from NASA Life Sciences in 1994, where she was the manager of the Space Biology Program; Life and Biomedical Sciences and Applications Division. She was the program scientist for the Space Shuttle launched in September 1992. Her numerous experiments and published research articles (more than 40) focused on the study of how the cells of living organisms respond to a low-gravity environment. She is also the author of *Space Biologist*.

In posting about Halstead, NASA’s Deputy Administrator Dava Newman and Chief Technologist Ellen Stofan said:

Female pioneers from the entire history of aviation and space history have helped us get to the point where we are now on a journey to Mars and with many capabilities to help us search for life elsewhere in the solar system and beyond ... Thora was a mentor to many, and her work benefited thousands. She’s been credited with helping to establish the field of space biology before there was such a discipline, and the mentors of many of today’s scientists working in the field can credit Thora with direct mentorship or inspiration.

**“
THORA WAS A MENTOR TO
MANY, AND HER WORK
BENEFITED THOUSANDS.
”**

She was a founding member and past president of the American Society for Gravitational and Space Biology (ASGSB), a 500-plus member society with a membership that spans the globe. In 1994, the ASGSB instituted the Thora W. Halstead Young Investigator’s



Dr. Thora Halstead

Award to honor a young scientist “who exemplifies Thora’s drive and enthusiasm for science, and who has made significant contributions to the field of gravitational and space research. The award is dedicated to Dr. Thora Halstead in recognition of the years she spent encouraging young scientists to enter gravitational and space research.”

She earned her undergraduate degree in microbiology from Washington State University, her master’s degree from the University of Texas at Austin, and her doctorate from the University of Maryland, College Park.

After retiring from NASA, in addition to consulting for the biosciences in space community, she enjoyed traveling, cooking, painting and making ceramics. Most of all, she enjoyed spending time with her grandchildren who called her, “Sweetie.” She is survived by her husband of 60 years, Colonel Warren W. Halstead (retired); daughter, Gail H. Capp; son-in-law, David J. Capp and three grandchildren, Paul Douglas Capp, Kathryn Lillian Capp, and Kimberlee Lynne Capp. She was preceded in death by her son, Douglas Clay Halstead, age 19, in 1976. A viewing was held 18 March 18 at Murphy Funeral Home, in Falls Church, Virginia. The interment will be held at Arlington National Cemetery.



IMAGE IN NASA HISTORY AND POETRY BY TERRI KIRBY ERICKSON

MOON WALK

for my brother

by Terri Kirby Erickson

Sunburned, bellies full of fried pompano, sweet corn, and garden tomatoes purchased at a roadside stand manned by a farmer with more fingers than teeth—my family huddled around a rented black and white TV set the shape and size of a two-slot toaster, watching Neil Armstrong and Buzz Aldrin hop like bunnies on the rough surface of the same waxing moon that shone through our beach cottage windows. I was eleven years old, buck-toothed and long-legged—my brother a year younger and most days, followed his big sister like Mercury orbiting the sun. Mom and Dad sat side by side on the faux-leather, sand-dusted couch and Grandma, never one to hold still for long, stood by her grandson's hard-backed chair, her hair a nimbus of silver from the soft glow of a television screen where a miracle unfolded before our eyes. But grown men wearing fishbowls on their heads, bouncing from one crater to the next, seemed less real to my brother and me than Saturday morning cartoons. And all the while, we could hear waves slapping the surf and wind whipping across the dunes—and the taste on every tongue was salt and more salt. So when I picture the summer of '69 at Long Beach, North Carolina, as history rolled out the red carpet leading to a future none of us could foresee, my heart breaks like an egg against the rim of what comes next. But let's pretend for the length of this poem, that my brother's blood remains safe inside his veins, Grandma's darkening mole as benign as a monastery full of monks, and our parents, unable to imagine the depth and breadth of grief. Here, there is only goodness and mercy, the light of a million stars, and the moon close enough now, for anyone to touch.



The launch of Apollo 11 as it looked from the Launch Complex 39A Press Stand.

Terri Kirby Erickson is the award-winning author of four collections of poetry. Her work appears in Garrison Keillor's *The Writer's Almanac*, Ted Kooser's *American Life in Poetry*, *Asheville Poetry Review*, *Atlanta Review*, *Christian Science Monitor*, *JAMA*, *storySouth*, *2013 Poet's Market*, and many others. Her awards include the Joy Harjo Poetry Prize and a Nautilus Book Award.



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