NEWS &NOTES

National Aeronautics and Space Administration

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FROM THE CHIEF HISTORIAN

In last quarter's issue, I made some fairly pointed comments on decisions being made regarding the history office at Johnson Space Center (JSC). As I write this, the situation is still in flux, but I am considerably more inclined to expect a positive outcome. This is in part due to my impressions from some very frank discussions between senior officials at JSC and Headquarters. It is clear from those discussions that JSC leadership has a strong commitment to an effective history program. However, it was equally clear that JSC is feeling the squeeze in their Center Management and Operations (CMO) budget. We've felt the same bite of CMO cuts here at Headquarters this year, when the history operating budget took a 30 percent hit. JSC faces stark choices between making critical repairs to essential infrastructure (like air-conditioning systems) and keeping contracts for key support functions (like the history office) funded. It is a very difficult situation that has called for creative thinking while under tremendous pressure. While we aren't out of the woods yet, I am greatly encouraged by the dedication and

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IF YOU GIVE A NASA HISTORY INTERN SOME APPLE JUICE

By Cat Baldwin and Chris Rudeen

As the NASA History summer interns, there's a special place in our hearts for the Smithsonian National Air and Space Museum (NASM). We have dragged many people into the Apollo exhibit, stopping them at every artifact along the way and telling stories over their loud complaints. "That's the lunar ranging retroreflector! It's a mirror on the Moon and they shoot lasers at it. How cool is that?" "Yes, that's duct tape on that bumper. Gene Cernan literally had to duct-tape the bumper back on the LRV [lunar roving vehicle]. Gene Cernan is an artist." Our friends don't want to go anywhere with us anymore. So imagine our delight when we found out we would be in town for the museum's 40th birthday.

The Boeing Milestones of Flight Hall reopened to the public for the museum's 40th birthday on 1 July 2016. Three days prior, we (as official NASA History interns, we proudly told the security guards) attended the press preview with the intention of live-tweeting the event (with the dashing Andres Almeida from the History Division to keep us in line). It was a good thing he was there; our first tweet was almost about the apple juice they served with the complimentary breakfast. Though, to be honest, it was really good apple juice. It was pink! Can

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NASA HISTORY DIVISION
OFFICE OF COMMUNICATIONS

From the Chief Historian (continued)

sincere commitment of our colleagues in Houston. We are equally committed to working with them to make sure that JSC maintains the award-winning professional history office that has served us all so well.

Another development that gives me great hope—both for a positive outcome at JSC and for history programs across NASA—is the outpouring of support for history that has followed the news of the situation at JSC. Supporters of history from outside NASA have flooded my inbox with questions about the situation and offers of support. From giants in the field of aerospace history and policy, to professional societies, to citizens from across the country (I was particularly touched by an actual letter from a supporter in Oregon), the alarm and concern have been a potent reminder to me of the value of the work of the history program. My thanks to all of you for your support and encouragement. Also, you will be pleased (and hopefully not surprised) to discover that enthusiasm for history is also strong within NASA itself. This starts at the top. I have had numerous conversations with Administrator Bolden and Deputy Administrator Newman about the state of the history program in the last few months. In fact, the Administrator tasked me with a summer project to provide him with suggestions for an integrated NASA history program. The mandate was remarkably wide-ranging and included a requirement that the suggestions come with projected costs. This has been a remarkable opportunity to rethink history efforts at NASA. While I've been a bureaucrat long enough to know that this is not a magic wand that will make hard budget realities go away, it is a very clear sign of leadership vision for the history program. That is a wonderful thing!

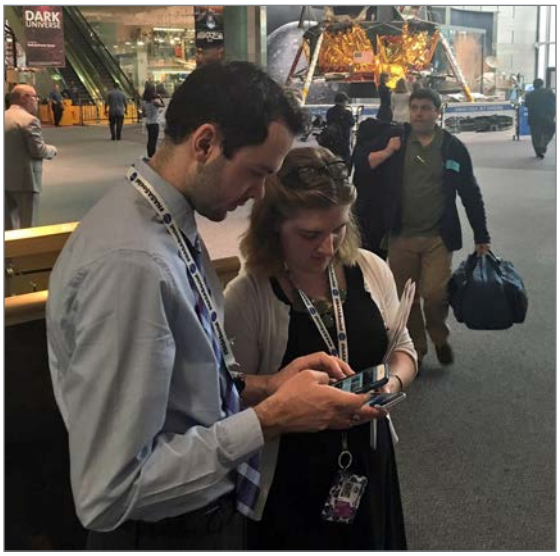
One of the other highlights of this summer was celebrating the 40th anniversary of the landing of Viking 1 on Mars (20 July 1976). The NASA events marking the anniversary were centered at Langley Research Center and kicked off with a historical panel discussion on 19 July featuring a stellar lineup of NASA historians. Former Chief Historian Roger Launius, Jet Propulsion Laboratory (JPL) historian Erik Conway, and Ames Research Center historian Glenn Bugos did a great job of setting the historical stage for the celebration and discussion of past and present Mars exploration efforts. (I was fortunate to serve as moderator for the panel.) NASA has posted video of the hour-and-a-half-long presentation on YouTube here: *https://www.youtube.com/watch?v=yYjoiMq6UuM*. The symposium on the next day was entitled "From NASA's First Soft Landing to Humans on Mars" and featured not only leaders of our current Mars efforts, but also a number of "Vikings" (as those involved in that program refer to themselves). It was a spectacular daylong event. I was particularly moved by the juxtaposition of having the day kick off with a talk by our Chief Scientist Ellen Stofan, followed later in the day by a talk by her father, Andy Stofan. Andy, who would eventually serve as Center Director at Lewis (now Glenn) Research Center (among other key duties), had served in the 1970s as the Viking Titan Centaur Project Manager. To me, their talks encapsulated the generational enterprise that is Mars exploration—and that was evident in so many other ways during the symposium. You can view an archived Web stream of the event at *http://livestream.com/viewnow/Viking40*. I'm certain that you will learn things from this that you never knew before—I did. On another note, the visit to Langley also provided an opportunity for some chats about plans for the Langley Research Center centennial next year. They have some great things in store, so keep your eyes peeled for further announcements.

Until next time…

Godspeed,

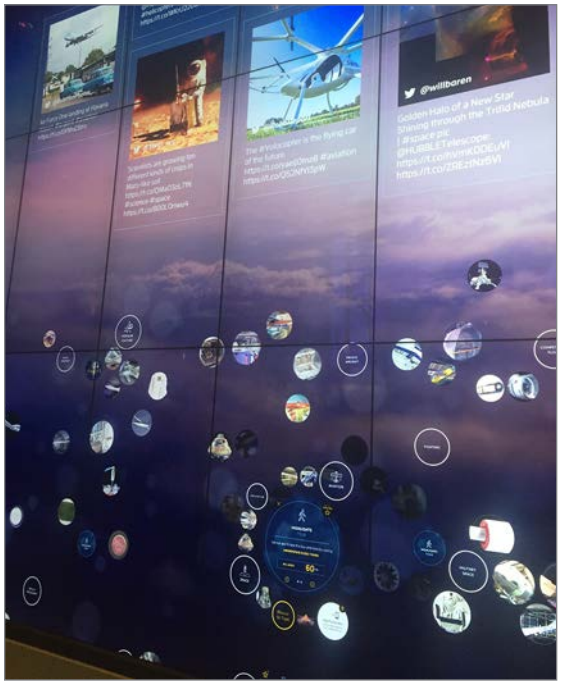
William P. Barry
Chief Historian

If You Give a NASA History Intern Some Apple Juice (continued)



you even imagine? Pink! We will be searching the rest of our lives for apple juice like that. (If you have any information on where we can get some pink apple juice, please contact us. Looking at you, NASM.) For our first tweet, we instead settled on "Having fun exploring #airandspace. Waiting to hear remarks from directors and curators."

For those of you who haven't been to the museum 17 times in the past seven weeks like we have, entering the main gallery is nothing short of breathtaking. The 2-year renovation was the first in the gallery's 40-year history. Many of the artifacts are the same but have found a new place in the updated hall. The biggest change is the museum's new exploration of interactive technology. "The Boeing Milestones of Flight Hall will serve as the model for our new approach to more interactive, dynamic exhibitions and enable us to share the story of flight like never before," General J. R. "Jack" Dailey, the museum's director, told the crowd of reporters. "We are transforming this museum from the icon it has been for the past 40 years by preparing it for the future." The future of the museum goes by the name of GO FLIGHT, NASM's new official mobile app. It lets you read stories, discover artifacts, navigate the museum, and share your memories. But it doesn't stop there. A new 16- by 12-foot touch screen has appeared in the gallery, giving visitors an opportunity to plan their visit and interact with other aerospace enthusiasts. You can pick your favorite artifacts and send their locations to your phone. The touch screen will show your Instagram pics of you with the Wright Flyer (#ThrowbackThursday #NoFilter). It also cycles

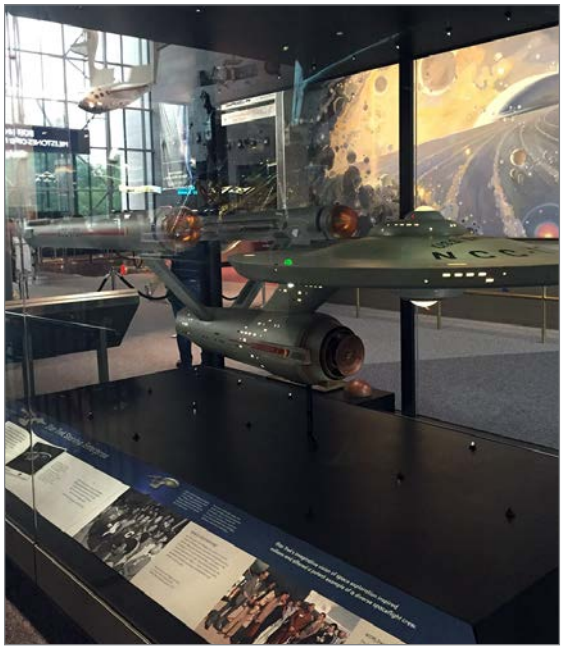


through iconic images: we were greeted by Sally Ride, telling us that "All adventures, especially into new territory, are scary."

After enjoying the apple juice and other food provided (like omelet muffins and chocolate croissants—we're currently in talks to have NASM cater our weddings), we began to explore.

It's hard to miss the Apollo Lunar Module when you walk through the doors. The gold-foil-covered spacecraft, which used to stand guard in front of the food court, has now been honored with a place in the main hall below Charles Lindbergh's Spirit of St. Louis. This Lunar Module was used for ground testing and never actually went to space, making it one of the few artifacts in the hall that didn't actually fly. Despite the fact that it never left the ground, we echo the Smithsonian's words: "This lunar module represents one of humanity's greatest achievements: landing people on another heavenly body."

We were excited to see the U.S.S. Enterprise studio model from *Star Trek: The Original Series* on display again after almost two years of conservation work. We were truly starstruck (though we will be more starstruck if William Shatner ever responds to our tweet inviting him to come visit). With the 50th anniversary of *Star Trek* and the release of a new movie, we are sure the starship will have lots of visitors, even if William Shatner never comes.



Last year, NASM acquired the Sally Ride collection, which consists of papers and photographs created and collected by the late astronaut herself. The collection highlights not only her career with NASA, but her achievements scientifically, academically, socially, and athletically. The papers are now open for research, and a small display honors Ride in the new Milestones of Flight Hall. "A woman's place," a sign reads, "is now in space."

Walking around the museum, we found an answer to a common question we see on the NASA History Twitter and Facebook feeds: "What does this have to do with NASA?" This question usually pops up whenever we highlight the achievements of other nations. In this instance, we noted that hanging alongside Explorer 1 is a model of Sputnik. Standing proudly across from the Apollo Lunar Module is the Soviet SS-20 Pioneer rocket. NASM recognizes that there are many sides to history. History is not solely an American phenomenon.

Need another reason to visit? NASM has a Moon rock that you can touch. Go touch it!

As you can tell, we are both very enthusiastic when it comes to space. Going to this press preview was the highlight of an incredible summer studying the history of space exploration. Suffice it to say, we'll be back again soon.

Happy 40th birthday, NASM. You don't look a day over 30! And no, we aren't trying to get the name of your apple juice supplier. But that would be nice.

All our love,
Cat Baldwin and Chris Rudeen,
The NASA History Interns, Summer 2016

NEWS FROM HEADQUARTERS AND THE CENTERS

NASA HEADQUARTERS

Washington, DC

History Division

By Bill Barry

Summer 2016 has been a continuing whirlwind of activity and change for the history program. From an organizational perspective, our "home" in the Office of Communications rolled out a long-planned reorganization over the summer. For the last seven years, the History Program Office has been a part of the Outreach Division of the Office of Communications. But with this reorganization, the history effort becomes one of the six Divisions reporting directly to our Associate Administrator for Communications, David Weaver. For most purposes, there will be little practical impact, since we functioned largely as a self-sufficient part of the old Outreach Division. The good news/bad news aspect of the change is that I'll have a formal "seat at the table" in management discussions for the Office of Communications and… will also have a seat at the table in more meetings. On the whole, the change recognizes that the history function is not just an outreach operation and that we bring many support capabilities to both the Office of Communications and the Agency more widely. This change is also consistent with the increased attention that the situation at Johnson Space Center has brought on the NASA History Division. As noted in the "From the Chief Historian" article, NASA's senior leadership is deeply interested in the History Division and is strongly supportive of our work. In a time of numerous challenges, such support has been critical.

On the subject of challenges, personnel issues have been particularly attention-grabbing this summer. As you know from our last newsletter, Chief Archivist Jane Odom retired at the end of May. While we continue to push for hiring a backfill, the constraints of a Headquarters freeze on hiring staff from outside the Agency mean that we are unlikely to have a Chief Archivist for several months. In the interim, Steve Garber has picked up most of Jane's duties. (So if you have a question for our Chief Archivist, Steve will help you out.) This July, we also lost our resident editor, Yvette Smith. She is still in the Office of Communications, but she applied for and won a position on the expanding Social Media Team. While she will be a tremendous asset to them, we are left with a second big gap in our team. Fortunately, Andres Almeida, a former intern who had been working for us part-time on special projects, was able to step up to full-time contract status. In addition to managing our work on the newsletter and the annual *Aeronautics and Space Report of the President*, Andres has also absorbed the "intern wrangler" role and our Web/social media work from Yvette. We are also working to bring on an editor who can fill the big shoes Yvette left in that area.

While we were short-handed on archivists and editors this summer, we did have the pleasure of two great interns. Christopher Rudeen, now a senior at Yale, and Cat Baldwin, now a junior at St. John's College in Annapolis, Maryland, were an incredible team. They churned out a number of Web stories, wrote our social media posts (including for several weeks after their departures at the start of August), made contributions to a number of Office of Communications activities, and had a great time while working so hard. Their enthusiasm and joy were a tremendous boost in the midst of all of the other challenges this summer. Early this summer, we selected another pair of interns for the fall. When you contact us now, you may wind up talking with Bob Collom, a graduate student at American University, or Nick Russo, a senior at the University of Rhode Island. Bob joined us in late August, and Nick started in early September.

Historical Reference Collection (HRC)

By Bill Barry

The archival team (Colin Fries and Liz Suckow) continues to keep our reference operation on an even keel. I continue to be impressed by the number and variety of unusual questions that they answer on a daily basis. From biographical details, to documents on the Arecibo radio telescope, to the music carried on tape recorders by the Apollo crews, their skills at finding the most obscure details continue to amaze me. They also continue to amaze the researchers who come to Headquarters to use our Historical Reference Collection (65 in July alone). All the while, Colin and Liz continue to preserve our large paper collection, process new donations to the collection, and do a phenomenal amount of scanning (which allows our collection to be more accessible electronically and not overflow the shelves). This summer, they have also rearranged some of our storage area to incorporate more of our book stock that had been stored in a warehouse at Goddard Space Flight Center but was shifted to a commercial warehouse. Bringing those items back to Headquarters will cut those storage charges from our budget. Creativity and attention to detail by Nadine Andreassen over the last couple of years has not only put our back stock of books in the hands of happy readers but also headed off a major crisis over the warehouse closure. I should also note our huge debt of gratitude to Headquarters librarian Rick Spencer and his team for their continuing work in promoting History publications at the Headquarters Information Center.

Another budget challenge has arisen from cuts to the Headquarters central printing budget. History book printing has always come out of this central pot of money, and printing costs were not a significant concern to our operations. But that is no longer the case, and we are looking at ways to continue to produce printed copies at reduced prices. Fortunately, the advent of electronic books has dramatically increased the circulation of our publications with no added burden to our printing operations. At virtually no added cost, we've increased the distribution of our titles by a factor of over 10, and e-books are now our primary way of reaching readers. But there is still a need for printed reference copies and a medium-sized "market" for books you can hold in your hand. We have been successful, so far, in keeping that balance. By the time you read this, our latest publication, *Walking to Olympus*, an update to our 1997 chronology of spacewalks, should be in distribution. We expect that *Making the Invisible Visible*, a monograph on the Spitzer Space Telescope project, will be published later this fall. We've got many more interesting works in the pipeline, and we expect to continue to put those on your screens and in your hands in the months to come.

> "AT VIRTUALLY NO ADDED COST, WE'VE INCREASED THE DISTRIBUTION OF OUR TITLES BY A FACTOR OF OVER 10, AND E-BOOKS ARE NOW OUR PRIMARY WAY OF REACHING READERS."

AMES RESEARCH CENTER (ARC)

Moffett Field, California

By Glenn Bugos and Jack Boyd

The Ames History Office is preparing to mark, through papers and presentations, the 40th anniversary of the landing of Viking on Mars. Ames scientists led the design of the Viking biological experiment package, which returned a null result that dramatically shifted how NASA would look for life in our solar system.

The New Museum Los Gatos (NUMU), with much help from Dennis Wingo, is preparing a display on

the work of the Lunar Orbiter Image Recovery Project, focusing on their historical work in preserving and migrating digital images more than 50 years old. It will open alongside a display of artwork from the Search for Extraterrestrial Intelligence (SETI) Institute's SETI Artist in Residence program.

We note the passing of legendary Ames test pilot George Cooper on 8 April 2016, one month before his 100th birthday. Cooper joined Ames in June 1945 following service as a fighter pilot over Europe, for which he later earned the French Legion of Honor, the highest order of distinction in France. He became Ames's chief test pilot in 1953 and, at the request of the U.S. Air Force, flew every aircraft in the Century series of supersonic fighters. Later in the 1950s, the U.S. Navy asked for his help in understanding how sleek supersonic aircraft could fly slowly enough to land on carriers. That experience led him to write the Cooper-Harper Handling Quality Rating Scale, which standardized pilot opinions of aircraft in flight and is still widely used today. He was later the primary NASA spokesman on the piloting requirements for the supersonic transport and for vertical takeoff and landing (VTOL) aircraft. He helped Ames develop a major research program in human factors, focusing on the use of new generations of general-purpose flight simulators. He cofounded the Aviation Safety Reporting System, and other pilots sent in their incident reports out of respect for him.

Cooper is a member of the Ames Hall of Fame, was a supporter of the Saratoga Historical Foundation, and was always a big help in telling the history of NASA Ames. The tasting room at the winery he founded in retirement, Cooper-Garrod Estate Vineyards, is rich with photographs and memorabilia from his career with NASA. His son Bill recently released a "Test Pilot" series of wines, each matched to the characteristics of a few of the hundreds of aircraft George flew. Speaking at a Final Flight celebration at the vineyard on 21 May, Jack Boyd presented some memories of his good friend. Among the many other ceremonies, Nili Gold, with the Army laboratory at Ames, presented some

J. P. Harrison, husband of Columbia mission specialist and robotic arm operator Kalpana Chawla, lent to the Ames public affairs office mementos from her astronaut training. They are on display in the Ames Café, so the many hundreds of Ames interns here for the summer can reflect on her life as a NASA astronaut. Indian Prime Minister Narendra Modi later honored Chawla at the beginning of his state visit to the United States. (Photo credit: Glenn Bugos)

"George Cooper was the walking embodiment of the importance of safety," said Ames historian Jack Boyd. "Ames aerodynamicists knew it was George's life on the line when they asked him and his superb team of test pilots to flight-test some innovation or collect some data that would enable them to solve a flight problem. George had a gravitas about him and earned respect." (Photo credit: NASA)

remarks on Cooper's involvement with rotorcraft to the local chapter of the American Helicopter Society. George was also a mentor to many generations of test pilots, and the Society of Experimental Test Pilots is preparing a program to honor him at their upcoming meeting.

Reference Collection

By April Gage and Danielle Lopez

Artists' conceptions of space settlement designs from the 1970s by Rick Guidice and Don Davis continue to draw interest from scholars and the media. Born from joint Ames–Stanford University investigations nearly half a century ago, these striking paintings depict three basic architectures for housing human populations in space: spherical, toroidal, and cylindrical. A variation of this last and perhaps most ambitious space colony design, the O'Neil Cylinder (named for Princeton's Gerard O'Neil), was envisioned as extending 20 miles long and supporting a bustling community of up to several million settlers. Habitation areas in the different architectures range from rustic homes dotting a bucolic countryside to high-density housing in a suburban cityscape, and they are illustrated in cunning detail. Flora-filled green living spaces, artificial gravity, and sophisticated mechanisms for screening out radiation and creating light and dark cycles all contribute to an "Earth-normal" habitat designed to both protect settlers from the harsh environment of space and provide physical and psychological comfort. Supportive operations such as farm crop and livestock cultivation, power generation, propulsion technologies, and nearby asteroid mining efforts suggest how populations might sustain food and energy production for survival and develop non-terrestrial resources for mobility and expansion. In addition to being of scholarly interest to students of architecture, philosophy, psychology, sociology, and the history of science and technology, these works were featured recently in the *New York Times* and *CNN Style* and are the focus of an upcoming television documentary.

Artist and architect Rick Guidice is in the spotlight during documentary filming in the archives. (Photo credit: Danielle K. Lopez)

Lois Rosson (far right) presents her research to faculty and students from the UC Berkeley Center for New Media. (Photo credit: April Gage)

Highlights of our support for the ongoing interest in the space settlement studies this quarter included hosting artist Rick Guidice and a television crew, as well as leading a group tour of students and faculty from the University of California (UC) Berkeley Center for New Media.

Rick Guidice and a crew from Steve Rotfeld Productions spent the day in the archive filming Guidice and his settlement paintings for an upcoming episode of *Xploration Outer Space*, a series designed to provide science, technology, engineering, art, and mathematics (STEAM) instruction and inspiration to middle and high school students. In addition to providing what promises to be stimulating STEAM educational content for younger generations, the series presents new information about Guidice's creative process and the techniques used in specific paintings, as well as biographical data about the artist's life and work.

The archivists developed exhibits for a cohort of 17 students and faculty from the UC Berkeley Center for New Media. During the visit, graduate student and former Ames intern Lois Rosson delivered an oral presentation about research she conducted in our archives that explores imagery in science and art.

GLENN RESEARCH CENTER (GRC)

Cleveland, Ohio

By Anne Mills

Our yearlong 75th anniversary celebration has included a number of special events and activities, including the publishing of an updated Center history. *Bringing the Future Within Reach: Celebrating 75 Years of the NASA John H. Glenn Research Center*, authored by Center archivist Robert Arrighi (ATS), is now available as a .pdf through the NASA Technical Reports Server at *http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20160004991.pdf*. Hard copies are available for purchase through the Government Publishing Office's U.S. Government Bookstore.

The book heavily utilizes our image collection to tell the story of the Center and includes many previously unpublished photos. Coming in at over 400 pages, the book starts with our beginnings as the National Advisory Committee for Aeronautics (NACA) Aircraft Engine Research Laboratory, whose work involved trouble-shooting engine issues in support of the war effort during World War II, and explores our continued evolution as a NASA research center with a diverse portfolio of competencies. Highlights include our management of the Centaur program, the icing research program, and developments in electric propulsion.

GRC archivist Bob Arrighi (ATS) signs a copy of his book for a visitor at the GRC open house. (Photo credit: Anne Mills)

During 21–22 May, Glenn opened its doors to the public for our first open house since 2008. Over 25,000 people poured in to tour our facilities and learn more about the research we do. The History Office spent the weekend educating our visitors on our 75 years of history—answering questions like "Who was Lewis?", "Why are you in Cleveland?", and "Did John Glenn work here?" We were able to showcase our Historic Images iPad app and enlighten visitors with GRC trivia, including the origins of the NASA "meatball" logo and Neil Armstrong's first job with the NACA.

MARSHALL SPACE FLIGHT CENTER (MSFC)

Huntsville, Alabama

By Brian Odom

The History Office at Marshall Space Flight Center has been particularly busy over this past quarter. In May, Jordan Whetstone joined the Marshall History Office as archivist. Jordan is a recent graduate of the University of Alabama's Library and Information

Science program, where she worked closely in the management of digital archives in that university's W. S. Hoole Special Collections. Jordan is originally from Anniston, Alabama, and holds an undergraduate degree from Birmingham-Southern College, located in Birmingham, Alabama. Jordan has already made tremendous strides in the office, organizing several noteworthy archival collections and performing significant primary research at the National Archives in Atlanta, Georgia.

At the 10th Annual Southern History of Science and Technology Conference in Auburn, Alabama, in April, Brian Odom gave a talk entitled "Alternate Paths of Paperclip: Fritz Pauli and Transnational Technology Transfer." The talk explored the life of Fritz Pauli (1913–69), a German engineer who worked with Dr. Wernher von Braun at Peenemünde and spent the post–World War II years working in the French rocket program before coming to Huntsville with his family in February 1953. At Redstone and later at Marshall, Pauli worked as an engine designer with a focus on combustion-chamber development and as deputy in the Test Division alongside director Karl Heimburg. During the Saturn program, Pauli worked on the problems associated with the design of the H-1 and F-1 engines, developing small-scale versions of these engines for testing.

Pauli had a reputation as an ingenious inventor with a keen mind whose innovative nature continued to befuddle his supervisors throughout his career. In October 1967, Pauli prepared a proposal for a "Possible Solution of a Protective Shroud for a Pitot Tube Cone" to be located on top of the escape rocket of the Saturn V launch vehicle. The response from Dr. von Braun was not what Pauli had expected. Von Braun's comments were, "Fritz—In all of your proposals one could say either: Why so darned simple if it could be complicated—or: why so cheap when it could be more expensive!" Pauli's career was significant in that it demonstrated both the multiple channels of postwar international technology transfer and the "cross-pollinating" nature of early Cold War rocket development.

Fritz Pauli (right) is interviewed by a German reporter at Marshall Space Flight Center in Huntsville, Alabama. (Photo credit: NASA)

The office will continue to be busy over the next months: conducting oral histories, answering reference queries, and developing an exhibit in support of the "NASA in the 'Long' Civil Rights Movement" conference, scheduled for 16–17 March 2017. The exhibit will explore the history of the Equal Employment Opportunity Program at Marshall and the relationship of these efforts to the larger civil rights movement in Huntsville. The deadline for paper proposals was 31 July 2016. For more information, contact the Marshall History Office or check online at *https://www.nasa.gov/centers/marshall/history/call-for-papers-nasa-in-the-long-civil-rights-movement-symposium-university-of-alabama.html*.

If you are interested in researching historical topics related to 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*.

Archives Update

By Jordan Whetstone

In May, Jordan Whetstone assumed the position of archivist at Marshall Space Flight Center. She has been learning a lot about the position over the last couple of months, familiarizing herself with the collections,

processing oral history interviews, and assessing areas of priority for the program. In just her second week, she traveled to the NASA History Program Review in Washington—a great way to jump into the history program! It has been a whirlwind, no doubt.

Beginning in May, the archive staff has processed several collections, the first of which was the Jesco von Puttkamer Papers, donated to the Marshall History Archive by now-retired NASA Chief Archivist Jane Odom. Von Puttkamer came to Marshall from Germany in 1962 and worked there until 1974, when he was called up to Headquarters to serve as Program Manager for human space project activities. Von Puttkamer passed away in December 2012. This collection most notably includes weekly notes from 1965–74 and correspondence about bringing von Puttkamer to Marshall to work as part of Center Director Dr. Wernher von Braun's rocket team. Particularly noteworthy is a memo dated March 1965, early in Puttkamer's career at Marshall, that discusses the possibility of S-1C Booster Recovery. In a note to Dr. Geissler and then another to Dr. von Braun in March 1965, von Puttkamer lists some facts about the recovery plan, such as missing elements, aspects that will work/not work as conceptualized, and monetary concerns. Von Puttkamer argued that hypersonic stabilization of the booster was a major problem and that the booster itself would require "more modifications than just a modest heat-shield." While both letters denote concern, the letter to von Braun also states von Puttkamer's lack of attraction to the recovery concept. Portions of this collection are being scanned and arranged for use on the Marshall History Web page.

OTHER AEROSPACE HISTORY NEWS

NATIONAL AIR AND SPACE MUSEUM

By Hunter Hollins

Public Outreach

On 31 March, NASA's Goddard Space Flight Center and the Space Telescope Science Institute (STScI) sponsored the annual John N. Bahcall Lecture, hosted by David DeVorkin at the National Air and Space Museum's Udvar-Hazy Center. The program featured Professor Ewine van Dischoek, a leading molecular astrophysicist from Leiden, Netherlands, and president-elect of the International Astronomical Union (IAU), who lectured on how far-infrared studies of the spaces between the stars in star-forming regions have led to more sophisticated models of how stars and planets form.

From 1 through 4 April, Jennifer Levasseur, Cathleen Lewis, and Valerie Neal presented at the "Mutual Concerns of Air and Space Museums Conference" in New York. Sessions were held at the conference hotel; the Intrepid Sea, Air & Space Museum; and the Cradle of Aviation Museum. Jennifer Levasseur chaired two programs: "Curating the Present: Challenges and Opportunities" and "Digital Trajectories: Transforming the Exhibition Process and the Digital/Physical Connection."

On 5 April, NASM awarded the annual National Air and Space Museum Trophies for 2016. Tom Lassman oversaw the process for determining the winners. The Lifetime Achievement Trophy, which recognizes achievements that have had lasting impact on the history of space exploration, went to Captain James A. Lovell; the Current Achievement Trophy went to NASA's New Horizons Team, which is responsible for the New Horizons spacecraft that accomplished the first direct investigation of Kuiper Belt objects at the outer margins of the solar system. "The winners of the 2016 Trophy Awards have significantly advanced

space exploration in major ways," said Gen. J. R. "Jack" Dailey, the director of NASM. "They have demonstrated the courage, tenacity, and innovative spirit that defines leaders in America's space program from its early years through today." Unrelated to the trophy, *Physics Today* published as its 2016 April cover story an edited version of Michael Neufeld's article on the development of New Horizons titled "The Difficult Birth of NASA's Pluto Mission."

Pictured is the National Air and Space Museum Trophy. (Photo credit: NASM)

In May, Matt Shindell represented NASM at the Humans to Mars (H2M) three-day summit at George Washington University in Washington, DC, and Paul Ceruzzi attended the conference on "International Communities of Invention and Innovation" at New York University, where he presented "The Apollo Guidance Computer and the Seeding of Technological Knowledge: NASA's Role in the Development of the Silicon Chip."

The search for life in the universe was an important topic this quarter. Chris McKay of the Space Science Division of NASA's Ames Research Center presented "Searching for Life in Our Solar System" in NASM's Exploring Space Lecture Series, followed by stargazing at the Haas Public Observatory. Also, David DeVorkin, the Chemical Heritage Foundation's 2016 Gordon Cain Fellow, organized a two-day conference titled "The Evolving Search for Life in the Universe." The conference gathered about 30 astronomers, geologists, and biologists, including Michael Meyer and Mitchell Schulte from NASA's Mars Exploration Program, Robert Pappalardo from the Planetary Science Section at NASA's Jet Propulsion Laboratory, and Melissa Trainer from the Planetary Environments Laboratory at NASA's Goddard Space Flight Center. Attendees formed panels that were moderated by historians, including Matt Shindell, to explore how the search for life has changed over time. The discussions highlighted the interdisciplinary nature of astrobiology and NASA's role in creating it.

On 9 June, Jennifer Levasseur hosted a *What's New in Aerospace* public program titled "Appropriate Attire" (about spacesuits) with NASM curator of spacesuits Cathleen Lewis and NASA Deputy Administrator Dava Newman. On 14 June, the Boeing Company sponsored the 13th annual John H. Glenn Lecture, "Spaceflight: Then, Now, and Next," at which David Rubenstein moderated a discussion between Apollo 11 astronaut Michael Collins and Jeff Bezos, founder of Blue Origin, the privately funded aerospace and spaceflight company.

Comings and Goings

In April, the Space History Department said goodbye to the 2015–16 Lindbergh Chair in Aerospace History, Patrick McCray, a professor in the Department of History at the University of California, Santa Barbara. McCray presented his research project *Frank Malina… Dreamer of Space, Engineer of Art* at the monthly History Seminar on Science and Technology. In June, NASM welcomed 62 interns from 49 different universities and colleges. The 43 women and 19 men represent 20 states and 4 countries. Project highlights include exploring the history of modern solar physics and creating a virtual tour of the Apollo Command Module for the Space History Department, as well as exploring double ridge formation on Jupiter's moon Europa and mapping tectonic landforms on Mercury and the Moon for the Center for Earth and Planetary Studies.

Milestones

This quarter, NASM completed two "Milestones"-related projects. Bob van der Linden, Alex Spencer, and Tom Paone of the Aeronautics Department published a new book, *Milestones of Flight: the Epic of Aviation with the National Air and Space Museum*

(Zenith Press, 2016), that coincided nicely with the reopening of the Boeing Milestones of Flight Hall on the National Mall on 1 July.

The Boeing Milestones of Flight Hall reopening is in conjunction with the museum's 40th anniversary, and the two-year renovation was made possible by a gift from Boeing. In addition to displaying the museum's most iconic artifacts, the installation introduces GO FLIGHT, a digital experience designed to allow visitors to make connections with and between artifacts and to share the national collection beyond the walls of the museum.

Since the building opened on the National Mall in 1976, the Milestones of Flight Hall has welcomed 327 million visitors. Positioned between the museum's two entrances, the 19,000-square-foot exhibition space had remained largely unaltered since the building's opening. The new installation features a streamlined, modern look with visitor-friendly amenities, such as a large welcome center. It is designed to introduce visitors to key artifacts that, in turn, enable them to learn more about the museum's renowned collection and ongoing research. The in-depth interpretation of the artifacts and the addition of new digital elements will serve as a model for future exhibitions as the museum prepares to launch into a period of revitalization.

All artifacts in the Milestones of Flight Hall have had a significant cultural, historic, scientific, or technological impact. The stunning Apollo Lunar Module, previously displayed in another gallery, serves as the centerpiece of the exhibition. Other spacecraft, such as John Glenn's Friendship 7 Mercury capsule, return to the space, along with the Viking Lander, the Gemini IV capsule, SpaceShipOne, and Mariner 2. A new addition is the Discoverer XIII satellite reentry capsule, the first humanmade object to be recovered from orbit. Charles Lindbergh's Spirit of St. Louis and Chuck Yeager's Bell X-1 return to the hall, exhibited near the massive wind tunnel fan formerly used by the National Advisory Committee for Aeronautics. Nearby are 18th- and 19th-century ballooning artifacts. The exhibition's emphasis on technology is represented by objects such as a turbojet engine developed by Sir Frank Whittle between 1939 and 1941 and the backup craft to Telstar 1, the world's first active communications satellite. After undergoing a nearly two-year restoration, the studio model of the Starship Enterprise from the original *Star Trek* series is a new addition to the hall.

AMERICAN ASTRONAUTICAL SOCIETY HISTORY COMMITTEE

By Michael Ciancone, Chair

Ordway Award

The American Astronautical Society (AAS) is reviewing nominations for the Ordway Award for Sustained Excellence in Spaceflight History and expects to identify recipients by September 2016.

The Ordway Award is named in memory of Frederick I. Ordway III (1927–2014), human spaceflight advocate and chronicler of the history of rocketry and space travel. The award recognizes exceptional, sustained efforts to inform and educate on spaceflight and its history through one or more media, such as 1) writing, editing, or publishing; 2) preparation and/or presentation of exhibits; or 3) production for distribution through film, television, art, or other nonprint media. The award is managed by the History Committee of the AAS.

History Series Publications

Univelt has published the following titles in the AAS History Series under the editorial leadership of Rick Sturdevant:

- *Proceedings of the 47th IAA History Symposium* (volume 45), edited by Andrew S. Erickson
- *Proceedings of the 48th IAA History Symposium* (volume 46), edited by Marsha Freeman

RECENT PUBLICATIONS AND ONLINE RESOURCES

COMMERCIALLY PUBLISHED WORKS

By Chris Gamble

Leaving Orbit: Notes from the Last Days of American Spaceflight, by Margaret Lazarus Dean (Graywolf Press, May 2015). In the 1960s, humans took their first steps away from Earth, and for a time our possibilities in space seemed endless. But in a period of austerity and in the wake of high-profile disasters like the destruction of Space Shuttle Challenger, that dream has ended. In early 2011, the author traveled to Cape Canaveral for NASA's last three Space Shuttle launches in order to bear witness to the end of an era. With Dean as our guide to Florida's Space Coast and to the history of NASA, *Leaving Orbit* takes the measure of what American spaceflight has achieved while reckoning with its earlier witnesses like Norman Mailer, Tom Wolfe, and Oriana Fallaci. Along the way, Dean meets NASA workers, astronauts, and space fans, gathering possible answers to the question, what does it mean that a spacefaring nation won't be going to space anymore?

Elon Musk: Tesla, SpaceX, and the Quest for a Fantastic Future, by Ashlee Vance (Ecco, May 2015). This book spotlights the technology and vision of Elon Musk, the renowned entrepreneur and innovator behind SpaceX, Tesla, and SolarCity. The author captures the full spectacle and arc of the genius's life and work, from his tumultuous upbringing in South Africa and flight to the United States to his dramatic technical innovations and entrepreneurial pursuits.

Shooting the Moon, by Brian Willems (Zero Books, May 2015). Films about the Moon show that even after the lunar landing of 1969, our celestial neighbor has lost none of its aptitude for appearing to be made of green cheese. In fact, as soon as you put the Moon on screen, it is lost. This is equally true for a wide range of Moon films, including the theatricality of Méliès, the incredulity of camp, the illegibility of footage shot by Apollo astronauts, and the revisionary history of *Transformers 3*. Yet as paradoxical as it might seem at first, it is only when we "lose sight" of the Moon that lunar truths begin to come forth. This is because fantastic elements of the Moon—by their mere absurdity—can indicate nonfantastic elements. However, what is of interest here is not realistic or fantastic lunar truths, but rather that the Moon is an object that invites, or even demands, more than one truth at once.

Earth and Space: Photographs from the Archives of NASA, by Nirmala Nataraj (author) and NASA (photographer), (Chronicle Books, October 2015). Take a tour of the universe with this collection of photographs from the archives of NASA. Astonishing images of Earth from above, the phenomena of our solar system, and the celestial bodies of deep space will captivate readers and photography lovers with an interest in science, astronomy, and the great beyond. Each extraordinary photograph from the legendary space agency is paired with explanatory text that contextualizes its place in the cosmic ballet of planets, stars, dust, and matter—from Earth's limb to solar flares, from the Jellyfish Nebula to Pandora's Cluster.

Cosmos: The Infographic Book of Space, by Stuart Lowe and Chris North (Aurum Press Ltd., October 2015). The human race has always revealed an insatiable hunger to search for knowledge. In this book, partners in science Stuart Lowe and Chris North use cutting-edge infographics to illuminate—in a new and unique way—the most amazing places and objects that modern science has laid bare. Featuring innovative, inspirational, and original designs by leading authors in their field, this book delves into a truly international subject and will appeal to stargazers and space enthusiasts of all ages.

The International Space Station: Management and Utilization Issues for NASA, edited by Evelyn Clemens (Nova Science Publishers, Inc., December 2015). The NASA Authorization Act of 2010 required NASA to enter into a cooperative agreement with a not-for-profit entity to manage the International Space Station (ISS) National Laboratory. In 2011, the Agency did so with the Center for the Advancement of Science in Space (CASIS). CASIS is charged with maximizing use of the ISS for scientific research by executing several required activities. Recently, questions have arisen about the progress being made to implement the required activities and the impact it has had on the ISS's return on the investment. This book assesses the extent to which CASIS has implemented the required management activities; both NASA and CASIS measure and assess CASIS's performance. Furthermore, this book assesses the extent to which NASA has ensured that essential spare parts are available and ISS structures and hardware are sound for continued ISS utilization through 2020.

NASA's Management of Commercial Crew and Cargo Operations: Assessments, edited by Eileen Purcell (Nova Science Publishers, Inc., December 2015). Since the retirement of the Space Shuttle Program in July 2011, the United States has lacked a domestic capability to transport crew and—until recently—cargo to and from the ISS. Consequently, NASA has been relying on the Russian Federal Space Agency (Roscosmos) for crew transportation. In anticipation of the Shuttle's retirement, Congress and the President directed NASA to foster the commercial spaceflight industry as a means of developing domestic cargo and crew transportation capabilities to the Station. In November 2005, NASA created the Commercial Crew and Cargo Program Office, and in 2011, the Agency activated a separate Commercial Crew Program Office to reflect the increased funding and priority for commercial crew. In June 2013, the Office of Inspector General (OIG) issued a report examining NASA's efforts to foster a commercial market for cargo resupply missions to the ISS. The report discusses NASA's funding over the past seven years of SpaceX and Orbital ATK (formerly Orbital Sciences Corporation) to further development of spaceflight capabilities and, on a separate track, the Agency's contracts with the companies for a combined 20 cargo resupply missions to the ISS. As a complement to that report, this book examines NASA's efforts to pursue commercial crew capabilities.

Spacecraft Egress and Rescue Operations: Planning for and Managing Post-Landing Contingencies in Manned Space Missions, by Jason David Reimuller (Integrated Spaceflight Services, LLC, December 2015). This book is intended to provide spacecraft operators and designers with an understanding of the risks associated with pad, ascent, landing, and post-landing phases of space missions as well as a background of the methods that have evolved throughout the history of U.S., Russian, and commercial space programs to best mitigate these risks. This book also presents the evolution of the planning associated with crew emergency egress and rescue operations and then presents an overview of the types of egress systems and procedures that have historically been used on crewed spacecraft. The book presents a methodology of how spaceflight architecture developers might best optimize vehicle design and mission profiles to best mitigate the most credible landing and post-landing risks and how they might develop mission profiles that reduce risk by minimizing exposure to hazardous or constrained environments, increase overall operability of the system, and minimize cost.

Exobiologists, Rocketeers and Engineers—Inside NASA's Quest for Life in Space, by Rick Eyerdam (Tate Publishing, March 2016). This book details the challenges faced by NASA engineers with the rise of the exobiologists, who had no laboratory and no way to conduct scientific research unless they could get a ride on a spaceship. NASA's legacy institutions—Langley Research Center, Ames Research Center, JPL, and Goddard Space Flight Center—were designed to devise new aeronautic feats, not space-based experiments. After the Moon missions, rockets heading into space with life-seeking equipment on board raised the horizon to infinity. This is the story of how it all began.

Planetary Rovers—Robotic Exploration of the Solar System, by Alex Ellery (Springer-Praxis, December 2015). The increasing adoption of terrain mobility—planetary rovers—for the investigation of planetary surfaces emphasizes their central importance in space exploration. This imposes a completely new set of technologies and methodologies to the design of such spacecraft—and planetary rovers are indeed, first and foremost, spacecraft. The use of rovers introduces vehicle engineering, mechatronics, robotics, artificial intelligence, and associated technologies to the spacecraft engineer's repertoire of skills. *Planetary Rovers* is the only book that comprehensively covers these aspects of planetary rover engineering and more.

Breaking the Chains of Gravity: The Story of Spaceflight Before NASA, by Amy Shira Teitel (Bloomsbury Sigma, January 2016). NASA's prehistory is a rarely told tale, one that is largely absent from the popular Space Age literature but that gives the context behind the incredible lunar program. America's space agency wasn't created in a vacuum; it was assembled from preexisting parts, drawing together some of the best minds the non-Soviet world had to offer. With a central narrative woven from the stories of key historical figures, this book tells the story of NASA's roots in an engaging and accessible way.

Extending Operations and Maximizing Research on the International Space Station, edited by Jocelyn Lawrence (Nova Science Publishers, Inc., December 2015). This book examines the challenges facing NASA in extending ISS operations until 2024. Specifically, it assesses NASA's progress in certifying the Station's structure and hardware for a longer lifespan, cost and schedule estimates associated with the extension, and efforts to increase utilization of the Station for exploration and other scientific research. Furthermore, this book examines the current level of Station research, CASIS's efforts to facilitate non-NASA research aboard the ISS, and transportation challenges that could hinder full research utilization of the ISS.

Our Space Environment—Opportunities, Stakes and Dangers, by Claude Nicollier and Volker Gass (EPFL Press, December 2015). By tackling a wide range of topics, this book aims to give a comprehensive overview of the opportunities and hazards in our immediate space environment. It also exposes the challenges that governments, space agencies, private companies, and human communities have to face in order to manage space together to create long-term and safe access to it while protecting life on Earth.

International Space Station: Architecture Beyond Earth, by David Nixon (Circa Press, March 2016). In 1984, President Ronald Reagan gave NASA the go-ahead to build a space station. A generation later, the International Space Station is an established and highly successful research center in Earth orbit. The history of this extraordinary project is a complex weave of powerful threads—political, diplomatic, financial, and technological among them—but none is more fascinating than the story of its design. This book provides the first comprehensive account of the International Space Station's conception, development, and assembly in space.

History of Rocketry and Astronautics, vol. 46, edited by Marsha Freeman, AAS History Series, vol. 46, International Academy of Astronautics (IAA) History Symposia, vol. 34 (AAS/Univelt, Inc., May 2016). This book is a compendium of the proceedings of the 48th History Symposium of the International Academy of Astronautics held in Toronto, Canada, 2014.

Skylab 3: The NASA Mission Reports, by Dwight Steven Boniecki (CGP Publishing, May 2016). With the successful repair of the Skylab workshop by the Skylab 2 crew, the stage was set for Apollo 12 Moon walker Alan Bean to lead a full scientific mission to the giant space station. Bean was to be accompanied by two of the next generation of astronauts, Owen Garriott and Jack Lousma. The crew was launched on a Saturn IB on 28 July 1973 for a mission that would last for just short of two months. This would be by far the longest-duration mission ever attempted by the United

States. Just as the previous mission had required spacewalks, Skylab 3 would also see the crew venture outside on three separate occasions. The experience gained from these early repair missions would be of incalculable value to the future of human space exploration. The Skylab 3 crew conducted an intensive series of experiments on themselves and on behalf of students back on Earth. They also began the serious study of our home planet through the Skylab Earth Resources Experiment Package and undertook meaningful studies of the Sun using the Apollo Telescope Mount. DVD included.

Reflections of the Moon: Retrospections on Earth, Mankind, and War, by Edgar Mitchell (Pen-L Publishing, May 2016). On 31 January 1971, Navy Captain Dr. Edgar Mitchell embarked on a journey into outer space, the Apollo 14 mission, resulting in his becoming the sixth man to walk on the Moon. For Mitchell, however, the most extraordinary journey was yet to come. As he hurtled Earthward through the abyss between the two worlds, Mitchell became engulfed by a profound sensation—a sense of universal connectedness. He intuitively sensed that his presence, that of his fellow astronauts, and that of the planet in the window were all part of a deliberate universal process—and that the glittering cosmos itself was in some sense conscious. The experience was so overwhelming that Mitchell knew his life would never be the same: "You don't look at our little planet from that perspective without its having a profound impact on your thinking." And while Mitchell regarded his experience, his education, and his lunar endeavors as invaluable milestones, they would become mere stepping-stones to what would eventually become his true life passion—exploring the power of the conscious mind.

Flying Higher and Faster, by Vance Brand (Mira Digital Publishing, February 2016). The book is a collection of stories on Vance Brand's life from his boyhood days, through his military flying, civilian test piloting, and space travel, to his departure from Johnson Space Center. Brand looks to the future in the fields of aeronautics and human spaceflight.

Picture This! Using Space Art To Grasp Size and Scale in the Solar System, by Michael Carroll (Springer, April 2016). Astronomical concepts can be truly hard to comprehend, especially those of planetary sizes and distances from Earth and from each other. These concepts are made more comprehensible by the group of illustrations in this book, which place, in scale, extraterrestrial objects side by side with objects on Earth to which we can more easily relate. For example, the reader can study the pictures of Earth floating above Jupiter's Great Red Spot and the asteroid Itokawa resting beside Toronto's CN Tower. These mind-bending images bring things into better perspective and will help the reader understand the size and scale of our solar system. But the real benefit of this work is in helping the reader better grasp the nature of our universe—how big it is and how we fit into it.

XCOR, Developing the Next Generation Spaceplane, by Erik Seedhouse (Springer-Praxis, April 2016). Employing the same informational approach Erik Seedhouse used in *SpaceX* and *Bigelow Aerospace*, this new book familiarizes space enthusiasts with the company XCOR Aerospace and examines the design of the two-seater Lynx. The book is a thorough chronicle of the development of rocket propulsion, avionics, simulators, and ground support operations being put into play by XCOR with the Lynx.

X-Planes of Europe II: X-Planes of Europe II: More Secret Research Aircraft from the Golden Age 1945–1971, by Tony Butler (Hikoki Publications, March 2016). Complemented by previously unseen archive photography, detailed specifications, manufacturer's drawings, and color artwork, this book is the logical and complete companion to the acclaimed *X-Planes of Europe* and offers a new and exciting perspective on Europe's military aircraft innovation throughout the Cold War years.

Rise of the Rocket Girls: The Women Who Propelled Us, from Missiles to the Moon to Mars, by Nathalia Holt (Little, Brown and Company, April 2016). In the 1940s and '50s, when the newly minted Jet Propulsion

Laboratory needed quick-thinking mathematicians to calculate velocities and plot trajectories, they didn't turn to male graduates. Rather, they recruited an elite group of young women who, with only pencil, paper, and mathematical prowess, transformed rocket design, helped bring about the first American satellites, and made the exploration of the solar system possible. For the first time, *Rise of the Rocket Girls* tells the stories of these women—known as "human computers"—who broke the boundaries of both gender and science.

The Value of the Moon: How To Explore, Live, and Prosper in Space Using the Moon's Resources, by Paul D. Spudis (Smithsonian Books, April 2016). Although the Moon was once thought to hold the key to space exploration, in recent decades the United States has largely turned its sights toward Mars and other celestial bodies instead. In this book, lunar scientist Paul Spudis argues that the United States can and should return to the Moon in order to remain a world leader in space utilization and development and a participant in and beneficiary of a new lunar economy.

No Dream Is Too High: Life Lessons from a Man Who Walked on the Moon, by Buzz Aldrin (National Geographic, April 2016). Buzz Aldrin reflects on the wisdom, guiding principles, and irreverent anecdotes he's gathered through his event-filled life—both in outer space and on Earth—in this inspiring guide to life for the next generation.

Moon Manual, by David M. Harland (Haynes Publishing, April 2016). This manual explains, in simple and straightforward terms and with a wealth of illustrations and photographs, what we have discovered about the Moon over the centuries, along with a general overview of the vehicles involved in the exploration.

Eyeing the Red Storm: Eisenhower and the First Attempt To Build a Spy Satellite, by Robert M. Dienesch (University of Nebraska Press, April 2016). This book examines the birth of space-based reconnaissance not from the perspective of CORONA (the first photoreconnaissance satellite to fly), but rather from that of the WS-117L. In 1954, the U.S. Air Force launched an ambitious program known as WS-117L to develop the world's first reconnaissance satellite. The goal was to take photographic images from space and relay them back to Earth via radio. Because of technical issues and bureaucratic resistance, however, WS-117L was seriously behind schedule by the time Sputnik orbited Earth in 1957 and was eventually canceled. The Air Force began concentrating instead on new programs that eventually launched the first successful U.S. spy satellites.

The Step: One Woman's Journey to Finding Her Own Happiness and Success During the Apollo Space Program, by Martha Lemasters (Morgan James Publishing, April 2016). The names of the Apollo astronauts will forever be inscribed in our history books, but the names of the entire Apollo launch support team at Kennedy Space Center and the thousands who supported Apollo elsewhere will be known only to a few—including those who read this book. It is the technical team—the engineers, analysts, programmers, and, yes, even the secretaries and typists who kept the administrative side moving—who are portrayed in this book. Some believe they were the greatest technological team ever assembled, achieving the most difficult challenge of all humankind to date.

Exploring the Planets: A Memoir, by Fred Taylor (Oxford University Press, April 2016). This book offers a personal account of how the space program evolved. It begins in the era of the first blurry views of our Earth as seen from space and ends with current plans for sophisticated robots to arrive at places as near as our neighbors Venus and Mars and as far away as the rainy lakelands of Saturn's planet-sized moon, Titan. The book examines the scientific goals of these complex voyages of discovery and the joys and hardships of working to achieve them. Most of the narrative is based on the author's experiences at the world's space agencies, research labs, and conferences, as well as at other places as diverse as Cape Canaveral and No. 10 Downing Street, the residence and office of the United Kingdom's Prime Minister.

Into the Black, by Rowland White (Bantam Press, April 2016). On 12 April 1981, a revolutionary new spacecraft blasted off from Florida on her maiden flight. NASA's Space Shuttle Columbia was the most advanced flying machine ever built—the high-water mark of postwar aviation development. Drawing on brand-new interviews with astronauts and engineers, archive material, and newly declassified documents, Rowland White has pieced together the dramatic untold story of the mission for the first time. *Into the Black* is a thrilling race against time; a gripping, high-stakes Cold War story; and a celebration of a beyond-the-state-of-the-art machine that, hailed as one of the seven new wonders of the world, rekindled our passion for spaceflight.

Fallen Astronauts: Heroes Who Died Reaching for the Moon, by Colin Burgess and Kate Doolan (University of Nebraska Press, revised edition, May 2016). Near the end of the Apollo 15 mission, David Scott and fellow Moon walker James Irwin conducted a secret ceremony unsanctioned by NASA: they placed on the lunar soil a small tin figurine called "The Fallen Astronaut," along with a plaque bearing a list of names. By telling the stories of those 16 astronauts and cosmonauts who died in the quest to reach the Moon between 1962 and 1972, this book enriches the saga of humankind's greatest scientific undertaking, Project Apollo, and conveys the human cost of the space race.

American Secret Projects: Fighters, Bombers and Attack Aircraft | 1937–1945, by Tony Buttler and Alan Griffith (Crecy Publishing, April 2016). This volume looks at concepts developed by the U.S. aircraft industry in the years immediately prior to and during World War II. This book includes and describes the major fighter and bomber proposals from the American aircraft industry, which embrace various fighter and interceptor concepts; medium, heavy, and intercontinental bombers; attack aircraft; and anti-submarine aircraft, for both the U.S. Air Force and the U.S. Navy. Particular emphasis is placed on "Circular Proposals," a system of submitting designs against requirements circulated around the industry by the Army Air Forces in the 1930s and early 1940s.

The Chang'E-1 Topographic Atlas of the Moon, by C. Li, J. Liu, L. Mu, X. Ren, and W. Zuo (Springer, 2nd edition, February 2016). This atlas is based on the lunar global Digital Elevation Models (DEM) of Chang'E-1 (CE-1) and presents charge coupled device (CCD) stereo image data with digital photogrammetry. The spatial resolution of the DEM in this atlas is 500 meters, with horizontal accuracy of 192 meters and vertical accuracy of 120 meters. Color-shaded relief maps with contour lines are used to show the lunar topographical characteristics. The topographical data gathered by CE-1 can provide fundamental information for the study of lunar topographical, morphological, and geological structures, as well as for lunar evolution research.

Eccentric Orbits: The Iridium Story, by John Bloom (Atlantic Monthly Press, June 2016). In the early 1990s, Motorola, the legendary American technology company, developed a revolutionary satellite system called Iridium. Iridium's constellation of 66 satellites in polar orbit meant that no matter where you were on Earth, at least one satellite was always overhead, and you could call Tibet from Fiji without a delay and without your call ever touching a wire. Iridium the satellite system was a mind-boggling technical accomplishment, surely the future of communication. The only problem was that Iridium the company was a commercial disaster. Bankruptcy was inevitable—the largest to that point in American history. That is, until Dan Colussy heard about Motorola's plans to deorbit the system and decided he would buy Iridium and somehow turn around one of the biggest blunders in the history of business. In *Eccentric Orbits*, the author masterfully traces the conception, development, and launching of Iridium and Colussy's tireless efforts to stop it from being destroyed.

The Birth of NASA—The Work of the Space Task Group, America's First True Space Pioneers, by Manfred "Dutch" von Ehrenfried (Springer-Praxis, April 2016). This is

the story of the work of the original NASA space pioneers: men and women who were suddenly organized in 1958 from part of the then–National Advisory Committee for Aeronautics (NACA) into the Space Task Group. A relatively small group, they developed the initial mission concept plans and procedures for the U.S. space program. Then they boldly built hardware and facilities to accomplish those missions. The group existed for only three years before it was transferred to the Manned Spacecraft Center (later to become Johnson Space Center) in Houston, Texas, in 1962, but the organization left a large mark on what would follow.

We Report Space: A Visual Reminiscence of Florida Rocket Launches from CRS-3 to Eutelsat-117 by Members of the SpaceX-3 #NASASocial, edited by Jared Haworth (Holy Macro! Books, June 2016). This book is a yearlong pictorial look at today's space program at Kennedy Space Center. This book traces the group of 37 people invited to watch the SpaceX CRS-3 mission via the NASA Social program, as well as their future exploits. In addition to displaying stunning launch photography, the book recounts the participants' experiences with SpaceX, Boeing, and United Launch Alliance. Take a ride on the Crawler and a trip to the roof of the Vehicle Assembly Building. *We Report Space* includes essays on the experiences of these normal, everyday people as they gain access to Kennedy Space Center.

Calculated Risk: The Supersonic Life and Times of Gus Grissom, by George Leopold (Purdue University Press, June 2016). Unlike other American astronauts, Virgil I. "Gus" Grissom never had the chance to publish his memoirs (save for an account of his role in the Gemini program) before the tragic launch pad fire on 27 January 1967, which took his life and those of Edward White and Roger Chaffee. Drawing on extensive interviews with fellow astronauts, NASA engineers, family members, and friends of Gus Grissom, the author delivers a comprehensive survey of Grissom's life that places his career in the context of the Cold War and the history of human spaceflight.

Earth Science Satellite Applications: Current and Future Prospects, edited by Faisal Hossain (Springer, June 2016). The combined observational power of the multiple Earth-observing satellites is currently not being harnessed holistically to produce more durable societal benefits. We are not able to take complete advantage of the prolific amount of scientific output and remote sensing data that are emerging rapidly from satellite missions and convert them quickly into decision-making products for users. The current application framework we have appears to be an analog one lacking the absorption bandwidth required to handle scientific research and the voluminous (petabyte-scale) satellite data. This book will tackle this question: How do we change this course and take full advantage of satellite observational capability for a more sustainable, happier, and safer future in the coming decades?

The Greatest Space Generation As Inspired by Wernher von Braun, edited by Ed Buckbee (Acclaim Press, June 2016). This book is the story of the scientists, engineers, managers, and skilled workers who created the Saturn rocket—a magnificent space machine—to take American astronauts to the Moon. It's about those who came to Huntsville, Alabama, because of the work underway at Redstone Arsenal and, later, Marshall Space Flight Center. They were the trailblazers for both missile defense and the peaceful exploration of outer space.

A Complete History of U.S. Combat Aircraft Fly-Off Competitions: Winners, Losers, and What Might Have Been, by Erik Simonsen (Specialty Press, June 2016). This book not only explains in detail how fly-off competitions are conducted, but it also shows the reader what both competing aircraft designs looked like during their trials and how the losing aircraft would have actually looked in operational markings had it won. Described in vivid detail are the specific aircraft and how they fared, as well as the inside political maneuvering and subterfuge involved in often-controversial aircraft contract awards. This book covers every era of post–World War II aviation.

Flying Wings & Radical Things: Northrop's Secret Aerospace Projects & Concepts 1939–1994, by Tony Chong (Specialty Press, June 2016). Since 1939, Northrop designed and built the world's most advanced aircraft, from the first primitive flying-wing designs to today's digital B-2 stealth bomber. Between these two eras, hundreds of design concepts were generated, many of which advanced to the mockup stage and still more of which advanced to construction, flight test, and series production. This book reveals recently declassified Northrop designs that revolutionized the aviation industry.

Design for Space: Soviet and Russian Mission Patches, by Alexander Glushko (DOM Publishers, June 2016). Covering the period from the beginning of the Cold War to the construction of the International Space Station, this book documents a rare collection: almost 250 mission patches worn by Soviet and Russian cosmonauts since 1963. Alexander Glushko, one of the leading specialists in the history of human spaceflight and rocket technology in Russia, presents numerous emblems with individual explanations in their applied context: as patches worn on spacesuits. The collection comprises not only partially forgotten mission patches, but also rare photographs of spacecraft crews and space stations. As well as providing additional historical information, the collection retraces the formation and development of Soviet and Russian symbolism in terms of space travel and brings the history of cosmic heraldry to life.

Workshop Practice for Building and Repairing Wooden Gliders and Sailplanes, by Hans Jacobs and Herbert Lück; edited by Neal Pfeiffer and Simine Short; translated from the original German by the Vintage Sailplane Association (Vintage Sailplane Association, July, 2016). This new English translation makes this long-established guide to building and repairing wooden gliders and sailplanes available to a wider audience. This guide contains 338 line drawings and photos. The new addendum, prepared by Neal Pfeiffer, includes up-to-date information.

Disclaimer: The History Division wishes to thank volunteer Chris Gamble, who compiles this section for us every quarter. Please note that the descriptions have been derived by Chris from promotional material and do not represent an endorsement by NASA.

UPCOMING MEETINGS

The American Institute of Aeronautics and Astronautics (AIAA) Forum and Exposition (SPACE 2016) 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/iac/iac2016* for 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.asgsr.org* for details.

The AIAA Science and Technology Forum and Exposition (AIAA SciTech 2017) will be held **9–13 January** in Grapevine, Texas. Visit *https://www.aiaa-scitech.org* for details.

The "NASA in the 'Long' Civil Rights Movement Symposium" will be held **16–17 March 2017** at the University of Alabama in Huntsville. Visit *https://www.nasa.gov/centers/marshall/history/call-for-papers-nasa-in-the-long-civil-rights-movement-symposium-university-of-alabama.html* for details.

OBITUARY

REMEMBERING SPACE POLICY RESEARCHER AND ECONOMIST DR. MOLLY K. MACAULEY

Molly K. Macauley

The space community suffered a tragic loss on 8 July 2016 when respected space policy researcher and economist Dr. Molly K. Macauley was killed while walking her two dogs in her Roland Park neighborhood of Baltimore, Maryland. She was 59.

Dr. Macauley, born in Richmond, Virginia, and raised in Youngstown, Ohio, graduated from high school in Falls Church, Virginia. In 1979, she earned a bachelor's degree in economics at the College of William and Mary in Virginia; in 1981, she earned a master's degree in economics from Johns Hopkins University, followed by a doctorate in 1983.

A supporter of women's success in aerospace, Dr. Macauley chaired the Women in Aerospace Scholarship. She also served on several prestigious boards and committees, including the National Academy of Sciences and the Space Studies Board. She often testified before Congress on the environmental and economic implications of space exploration. She authored more than 80 articles, reports, and books on space policy.

She was vice president and a senior fellow at Resources for the Future, a Washington, DC–based think tank that focuses on helping decision-makers craft policies related to natural resources, energy, and the environment. The organization's Web site recently posted on its blog an internal e-mail in memory of Dr. Macauley:

> *Anyone who worked with her over the years can no doubt recall many moments of remarkable personal kindness and support. She deeply loved coming into RFF and giving her all to make it a better place, all the while working and laughing with her colleagues. She admired you all immensely.*

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SKETCHES IN NASA HISTORY

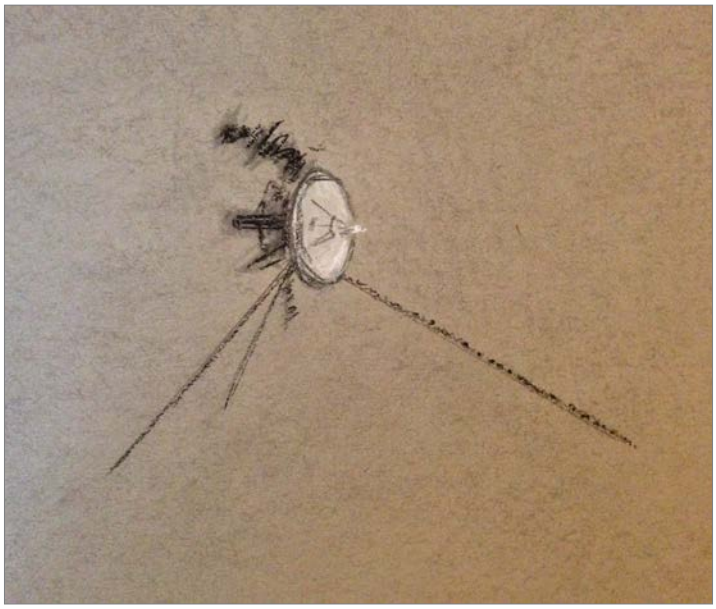
By Christine Rueter

What inspired you about Voyager for this piece?

The Voyager mission is tinged with nostalgia and melancholy for me. I think that's why I keep coming back to it in my art. I've rendered the Voyager probes in watery Japanese ink, in cut paper rolled over with thick printing ink, and in chalk and charcoal. Of all these media, I prefer the smudgy borders of chalk and charcoal, which give the impression the image is breaking apart or dissolving. It may seem counterintuitive to render something as resilient as Voyager using imprecise media, but the reality is that even Voyager is dissolving, disappearing in a sense. Fewer and fewer people are learning FORTRAN and assembly language, the languages used to program the Voyager computers; that knowledge is disappearing. And the snapshot of human experience captured on the Golden Record onboard Voyagers 1 and 2? Some of the images and songs became dated even before the spacecraft launched. And at some point soon, communication between the Voyagers and Earth will be lost, too.

What inspires you about NASA history to sketch?

As a child of the '70s, I grew up in the "golden age of space exploration." A love of NASA and all things space was in the water. I was in utero in July 1969; my parents still have a still photo of their TV from the Moon landing broadcast. Growing up close to DC, I spent a lot of time at the newly opened Smithsonian Air and Space Museum. I've seen the movie *To Fly* (which has been running continuously at Air and Space since the museum opened in 1976) more times than I care to admit. Even now, when I walk through the Apollo exhibit at Air and Space, I get goosebumps thinking we can accomplish something so tremendous and daring.



Pictured is a sketch by Christine Rueter of Voyager 1 in chalk and charcoal on paper.

What current or future mission would you like to sketch into history and why?

I've sketched the Moon bootprint in charcoal and chalk; I would love to create a diptych (a two-paneled piece) of the Moon bootprint alongside the first bootprint on Mars. Diptychs and triptychs are used to create visual narratives, and I think putting people on Mars will really be the completion of a story that started with the Moon landing. I'm also following New Horizons' extended mission very closely; I can't wait to sketch another KBO [Kuiper Belt object].

Christine Rueter has an M.A. in creative writing (poetry) and works as a project manager, writer, and editor in the DC/Baltimore area. A self-taught artist, she sketches and paints in her spare time. She tweets as @TychoGirl and posts her space poetry and art to her blog, *https://tychogirl.wordpress.com*.

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