



NEWS & NOTES

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FROM THE CHIEF HISTORIAN



More congratulations are in order for our very own Steve Garber and Glen Asner, authors of our most recent publication, *Origins of 21st Century Space Travel: A History of NASA's Decadal Planning Team and the Vision for Space Exploration, 1999–2004*. Following the release of the book at the end of June this year, it received a lot of positive press and has been extremely popular, with nearly 9,000 downloads of the e-book version in the first four months it was available. (Don't have your own e-book copy yet? You can find it in three different formats at https://www.nasa.gov/connect/ebooks/origins_detail.html. It's free!) Then, in early October, the American Institute for Aeronautics and Astronautics (AIAA) announced that the book had been selected as the winner of their 2020 History Manuscript Award! The award "is presented for the best historical manuscript dealing with the science, technology, and/or impact of aeronautics and astronautics on society." This is a great honor and a tremendous reflection on the outstanding research and writing of Steve and Glen. The nomination for the award was made in the spring based on the manuscript, which was still in the production process, hence the "manuscript" award. Steve and Glen will be presented the award, which comes with a cash prize, an engraved medal, and a certificate, at the AIAA Science and Technology Forum

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APOLLO 12: WHY DON'T YOU KNOW ME? YOU SHOULD.

THE FIRST SPACE ARCHAEOLOGISTS ON THE SECOND MOON LANDING

By David Skogerboe

"Do you know me?" the man asked, looking into the camera. The 1975 credit-card commercial was part of a popular ad campaign featuring celebrities with unknown faces. "I walked on the Moon," Apollo 12 Astronaut Charles "Pete" Conrad, Jr., continued.¹ What a topsy-turvy world we live in, that the commander of the second Moon landing and the third man to walk on the Moon, 1 of only 12 in the entirety of human history (so far), was largely unrecognizable to the public just six years after this epic accomplishment. Most people know who the first set of Moonwalkers are, but the same cannot be said about the second. This becomes more striking when one realizes just how close Pete Conrad was to actually becoming the first man on the Moon. Had the 1202 program alarm forced Apollo 11 to abort, Apollo 12

¹ Andrew Chaikin, "Live from the Moon: The Societal Impact of Apollo," in *Societal Impact of Spaceflight*, ed. Steven J. Dick and Roger D. Launius (Washington, DC: NASA SP-2007-4801, 2007), p. 61.

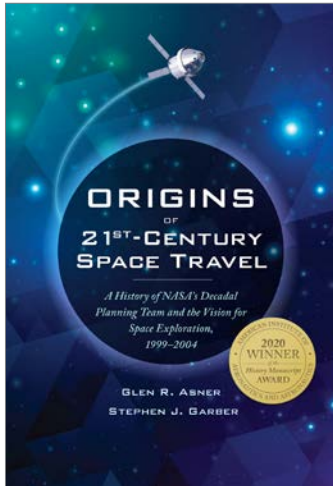
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From the Chief Historian (continued)



Glen R. Asner and Stephen J. Garber's book *Origins of 21st-Century Space Travel* is the recipient of the American Institute of Aeronautics and Astronautics' 2020 History Manuscript Award.

and Exposition (SciTech 2020) in January 2020, in Orlando, Florida. If you are at SciTech 2020, I hope you will cheer for them at the awards luncheon on Thursday, 9 January, at the Hyatt Regency Orlando.

Congratulations are also in order to the three NASA History Fellowship winners for 2019–20: Stephen Buono, American Historical Association (AHA) Fellow in Aerospace History; Claire Webb, History of Science Society (HSS) Fellow in Aerospace History; and Dana Burton, Society for the History of Technology (SHOT) Fellow in the History of Space Technology. You can read a brief overview of the fellows and their research projects inside this issue. This year, we have had a number of challenges with the fellowship program. Funding has been a perennial challenge, but we also encountered problems in renewing our agreement with SHOT. Thankfully, our great partners at AHA stepped up and saved us from having to terminate the History of Technology Fellowship this summer. But there will be some changes in responsibilities that we are working out now. For my part, let me assure you that I am committed to having three healthy fellowships. We have always kept the fellowships funded despite annual budget struggles over the last decade because of the proven impact of this program. Typically, discussions about the fellowship end when I show people the list of former fellows and where

they are today. The fellowships have had a broad and positive impact in many ways.

Finally, let me take a moment to pay tribute to Dr. Valerie Neal of the National Air and Space Museum. Valerie handed the reins of the Museum's Space History Division to Dr. Margaret Weitekamp this summer and retired this fall. You can read a bit more about Valerie's amazing career elsewhere in this issue, but I'd like to take a moment here to sing her praises as a colleague, collaborator, and friend. Valerie always brought a positive, can-do attitude to the job



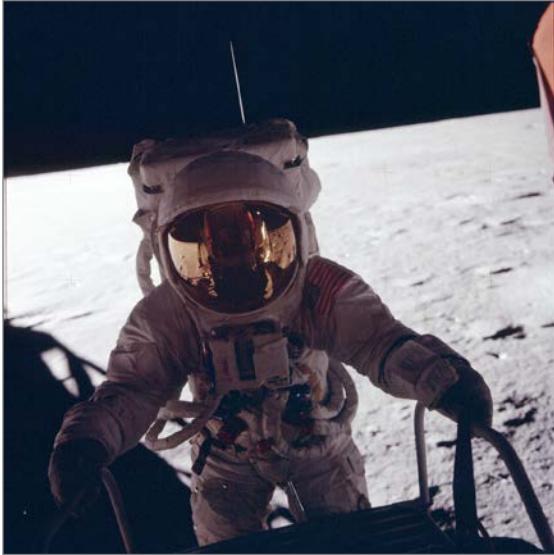
[NEAL] IS AN INSPIRATIONAL LEADER AND A PRODUCTIVE SCHOLAR, AND I WISH HER A LONG AND HAPPY RETIREMENT.



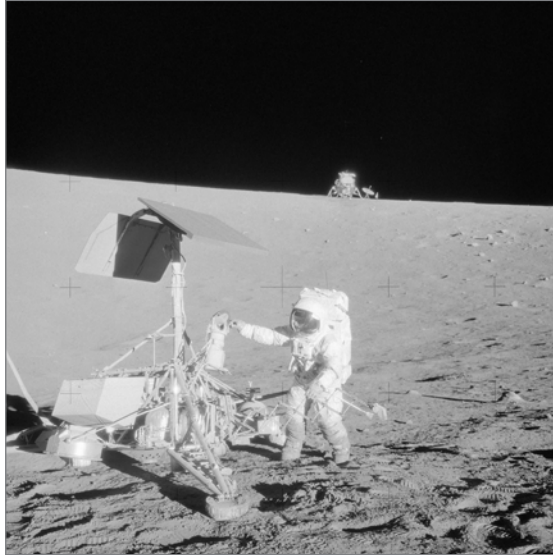
and a practical focus on getting things done. I could always depend on her to ferret out the work that needed to be done and prod the right people (including me) to get it done, but to always do so with a smile and good humor. She is an inspirational leader and a productive scholar, and I wish her a long and happy retirement. Even better, Margaret and I have already been meeting to see how we can further deepen the already strong relationship between the NASA History Program and the Museum's Space History Division. I see a bright future ahead for all of us.

Until next time, Godspeed,

William P. Barry
Chief Historian

Apollo 12: Why Don't You Know Me? You Should. (continued)

Apollo 12 Commander Pete Conrad becomes the third man on the Moon. (NASA History Flickr site, <https://www.flickr.com/photos/nasacommons>, image number AS12-46-6718; other images from same source unless otherwise noted)



Pete Conrad performs the first example of space archaeology fieldwork. (Image number AS12-48-7134)

was prepared to try again. Apollo 12 was not the *first* Moon landing, but why has it been so overshadowed? Was being first really that important? It seems so.

Being “first” was a centerpiece of space race geopolitics, with the United States and Soviet Union ever vying to beat the other to the punch.² The Soviets achieved many firsts—first satellite, first probe to reach the Moon, first animal in space, first human in space, first woman in space, first multiperson spacecraft, and first spacewalk, to name a few.³ When Apollo 8 became the first human lunar orbital mission and Apollo 11, well, you know, it could be argued that NASA had achieved the ultimate firsts, and all of humankind recognized it. President Richard Nixon likely felt justified when

he stated that the week of the Apollo 11 mission had been “the greatest week in the history of the world since the Creation.”⁴

When we consider the global impact of the Apollo 11 mission, witnessed live by one-fifth of the world’s population, the lackluster enthusiasm for Apollo 12, both then and now, is worthy of exploration.⁵ A closer look at the mission’s fascinating highlights, beautiful images, and scientific successes can help to showcase why Apollo 12 deserves a more prominent place in the American zeitgeist. Apollo 12 was not the *first* Moon landing, but it also was not just a do-over. Astronauts Pete Conrad, Alan Bean, and Richard Gordon performed a science-focused mission with some of the

2 Howard E. McCurdy, *Space and the American Imagination*, Smithsonian History of Aviation Series (Washington, DC: Smithsonian Institution Press, 1997), p. 214.

3 Asif Siddiqi, “From Cosmic Enthusiasm to Nostalgia for the Future,” in *Soviet Space Culture: Cosmic Enthusiasm in Socialist Societies*, ed. E. Maurer, J. Richers, M. Rütters, and C. Scheide (London: Palgrave Macmillan, 2011), p. 285.

4 *Astronautics and Aeronautics, 1969: Chronology of Science, Technology, and Policy* (Washington, DC: NASA SP-4014), p. 242.

5 Chaikin, “Live from the Moon,” p. 55.



Commander Charles "Pete" Conrad, Jr., Command Module pilot Richard F. Gordon, Jr., and Lunar Module pilot Alan L. Bean. (Image number S69-38852)

most incredible moments in the Apollo program's history: being struck by lightning—twice, filming with a color television camera, showcasing precision landing prowess, performing two separate extravehicular activities (EVAs) on the lunar surface, and deploying the full Apollo Lunar Surface Experiments Package (ALSEP). On top of all that, Apollo 12 has earned its own special first that does not get the credit it deserves. When Pete and Al visited the 1967 Surveyor 3 lunar lander during their second EVA, they became the first space archaeologists.

Before we explore the highs, we must understand the lows. A 20 November 1969 *New York Times* article titled "Second Moon Visit Stirs Less Public Excitement" said quite a lot.⁶ The Associated Press reported that the landing was "almost a ho-hum," and when the *Times* further interviewed 12 New Yorkers about the Apollo 12 landing, why did the *only one* who watched it remark, "The first one was more exciting. This one was anticlimactic..."?⁷ Apollo 12 simply did not register on the Richter scale like its forerunner. Truth was, a Moon landing was no longer an impossible dream. Landing on the Moon and returning safely to Earth could be, and had been, done.

It is remarkable to recall that President Dwight D. Eisenhower, who in 1958 created NASA when he signed the National Aeronautics and Space Act, was born in 1890. This means he was 13 years old when the Wright brothers first flew in 1903, and he was 78 when the Apollo 8 astronauts became the first humans to orbit the Moon on 24 December 1968. It is incredible how much can change in one lifetime. When NASA released the film *Debrief: Apollo 8* on 24 January 1969, a voiceover from historian Arthur Schlesinger, Jr., set to images of a distant Earth, captured this sense of awe:⁸

The salient fact of our age is the fantastic speedup in the velocity of history. It was as recently as 1903 that the Wright brothers soared for a moment over the sand at Kitty Hawk. And today, 65 years later, within the same lifetime of many men, astronauts fly around the Moon. And now the velocity of history is carrying us into a new phase in the human adventure. No one knows where this new phase will end, in what triumph or tragedy. But it is clear that the flight of Apollo 8 begins a new epoch in the history of man.⁹

6 Douglas Robinson, "Second Moon Visit Stirs Less Public Excitement," *New York Times* (20 November 1969): 30.

7 *Astronautics and Aeronautics 1969*, p. 385.

8 *Ibid.*, p. 8.

9 *Debrief: Apollo 8*, NASA Films, 1969.

Assuming the presidency at the onset of this “new epoch,” Nixon would get the honor of witnessing triumph. When he addressed Neil, Buzz, and Michael upon their return on 24 July, he remarked, “Emperors, Presidents, Prime Ministers, and Kings, have sent the most warm messages that we have ever received. They represent over two billion people on this Earth, all of them who had the opportunity, through television, to see what you have done.”¹⁰ The optics were stupendous.

Once the Moon dust settled, Apollo 11 had earned its place in history. But when the 14 November launch of Apollo 12 rolled around, the *New York Times* attributed the public’s “scant enthusiasm” to the “intense national emotion spent on the first moon landing four months ago.”¹¹ Many Americans found themselves investing more national emotion elsewhere. The day after Apollo 12 launched, 500,000 activists marched in the Second Moratorium to End the War in Vietnam in DC, and with the Vietnam draft scheduled for 1 December, a second government-funded Moon spectacle may have seemed superficial.¹² Civil rights, environmental, feminist, and anti-war activists increasingly felt that the space race shifted funds and attention away from more pressing domestic needs.¹³ Perhaps there really was only excitement for the first landing. In hindsight, it is somewhat reasonable why Apollo 12 has been lost to the margins of history, a public relations victim of its time. Today, with the 50th anniversary of the mission now upon us, perhaps it is time to give it the credit it is due.

Apollo 12, “The Pinpoint Mission,” was a master class in precision. Launching on 14 November 1969 at 11:22 a.m. ET, the mission’s total flight time of 244 hours, 36 minutes, and 25 seconds went just 62 seconds longer than its planned duration, splashing down on 24 November at 3:58 p.m. ET only



“Earthrise” was taken by Apollo 8 astronaut Bill Anders. (Image number AS08-14-2383)



Apollo 11 astronauts visit Mexico City, 29 September 1969. (Image number 70-H-1553)

10 *Astronautics and Aeronautics 1969*, p. 242.

11 *Ibid.*, p. 380.

12 Andrew Smith, *Moon dust: In Search of the Men Who Fell to Earth* (London: Bloomsbury, 2019), p. 201.

13 Neil M. Maher, *Apollo in the Age of Aquarius* (Cambridge, MA: Harvard University Press, 2017), p. 96.



Alan Bean becomes the fourth man on the Moon. (Image number AS12-46-6729)

3 miles from its target area in the Pacific Ocean.¹⁴ Even more impressive was the pinpoint lunar landing. In 1967, Surveyor 3, one of seven robotic landers NASA sent to prepare for and support the coming Apollo missions, successfully soft-landed in the lunar *Oceanus Procellarum* (Ocean of Storms).¹⁵ When the Lunar Module Intrepid separated from the orbiting Command Module Yankee Clipper on 19 November, Pete and Al sought to land within walking distance of Surveyor 3. Incredibly, they touched down just over 500 feet away.¹⁶

14 “Apollo 12: The Pinpoint Mission,” https://www.nasa.gov/mission_pages/apollo/missions/apollo12.html (accessed 25 November 2019).

15 “Mission to Moon: Surveyor 3,” <https://www.jpl.nasa.gov/missions/surveyor-3/> (accessed 25 November 2019).

16 “Apollo 12: The Pinpoint Mission.”

17 Ibid.

18 “Analysis of Surveyor 3 Material and Photographs Returned by Apollo 12,” 1972, <https://www.bq.nasa.gov/alsj/a12/AnalysSurvIIIMtrial.pdf> (accessed 25 November 2019).

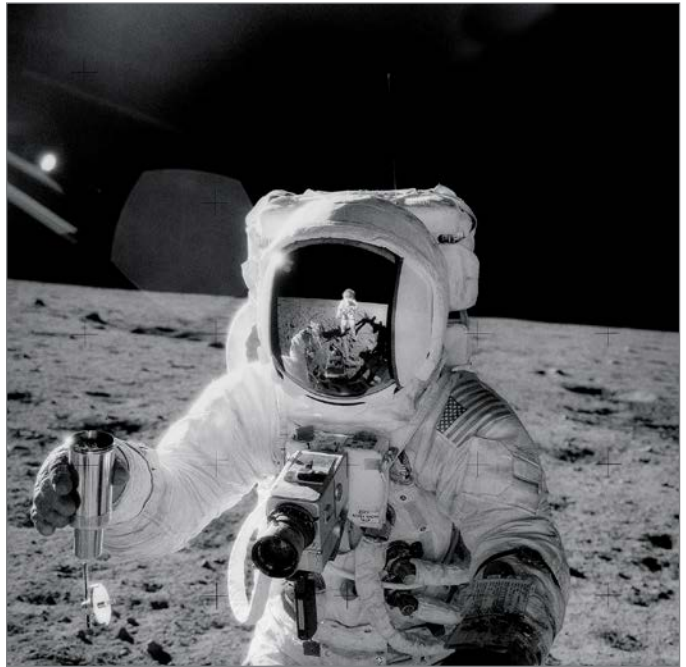
While Apollo 11 was the first time humans performed an EVA on the lunar surface, Apollo 12 was the first time it happened twice. Pete proclaimed “Whoopie!” and became the third man on the Moon; Al became the fourth; and they spent the first EVA collecting samples and deploying ALSEP experiments.¹⁷ When they embarked on their second EVA the next day, the itinerary included a visit to Surveyor 3, earning Pete and Al the rare distinction of being the first, and still only, space archaeologists.

Having masterfully landed within a short jaunt to Surveyor 3, Al and Pete meandered over, getting to work collecting the TV camera and robotic scoop, along with some tubing, glass, and cables. NASA was interested in determining how exposure to the elements on the lunar surface affected these materials. When they carefully gathered

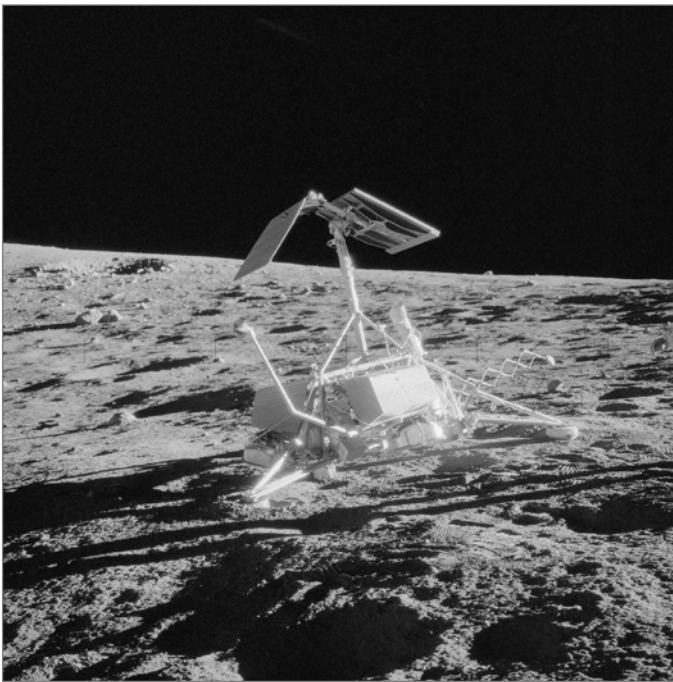
these human artifacts in the field and prepared them for a trip back to Earth, they accomplished a truly significant first. To add to the drama, the subsequent analysis that NASA performed on Surveyor’s parts identified bacteria that (they believed at the time) had survived over two years exposed to the vacuum of space.¹⁸ Recent scholarship has persuasively argued that the bacteria were a result of Apollo 12 contamination, but the controversy remains important in debates about life’s capacity to survive in space, the potential for contaminating distant worlds, and the



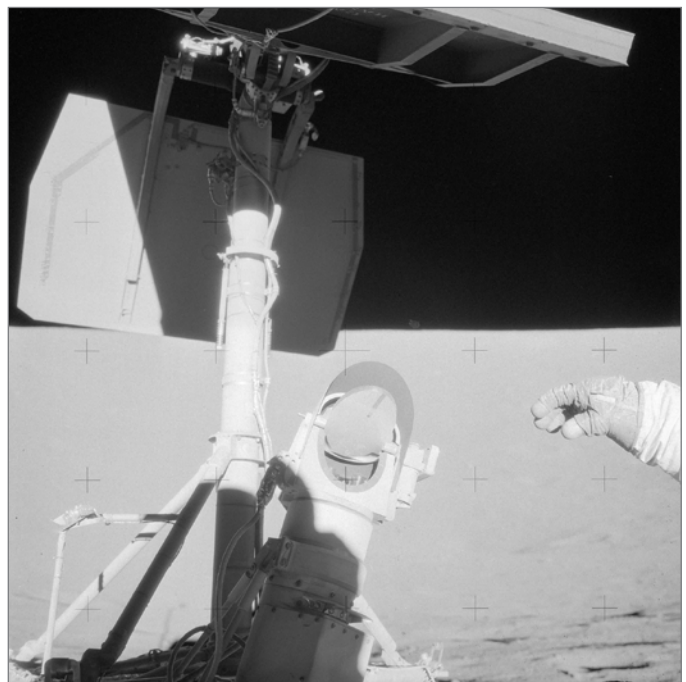
Alan Bean deploys the Lunar Surface Magnetometer (LSM) with Intrepid in the background. (Image number AS12-46-6813)



Alan Bean holds the vacuum-sealed Special Environmental Sample Container (SESC). (Image number AS12-49-7278)



This image of Surveyor 3 was taken from about 15 feet away. (Image number AS12-48-7121HR)



Pete Conrad reaches for the Surveyor 3 camera he will extract. (Image number AS12-48-7132HR)



Artist Robert Watts's October 1969 envisioning of Apollo 12's visit to Surveyor 3. (Image number S69-55553)



Artist Pat Rawlings's 1997 envisioning of a future visit to Sojourner. (Image credit: NASA/JSC by Pat Rawlings, SAIC)

importance of planetary protection. To say this collection was significant would be an understatement.

The Apollo 12 visit to Surveyor 3 was made possible through Pete Conrad's incredible precision landing. As a result, it marked a historic illustration of archaeological fieldwork in space, a feat that may prove to be enormously challenging to replicate.¹⁹ With most probes, orbiters, landers, and rovers being millions—or even billions—of miles, miles per hour, and dollars out of reach, we may have a long wait before the next space archaeologists get to work.

But we can certainly dream of, and strive for, that moment. Sojourner, the now-defunct Mars Pathfinder rover, currently sits on the Martian surface collecting dust. As visualized by artist Pat Rawlings in 1997, sending an astronaut to meet Sojourner like Pete and Al met Surveyor 3 is a valiant aspiration. We can only hope that the Apollo 12 mission has proven that visiting a human artifact on a celestial body far from Earth is a fully attainable goal. If Apollo 11 can inspire the world and prove that a Moon landing is possible, then why cannot the achievements of Apollo 12 help drive us toward Mars? It is up to us to ensure that this trail-blazing mission gets its proper place in the moonlight.

¹⁹ Beth O'Leary and P. J. Capelotti, eds., *Archaeology and Heritage of the Human Movement into Space: Space and Society* (Cham, Switzerland: Springer, 2014), p. 7.

NEWS FROM HEADQUARTERS AND THE CENTERS

NASA HEADQUARTERS

Washington, DC

By Bill Barry

This fall, the Headquarters history team continued work on the Apollo 50th anniversaries. These efforts included support for the Apollo 12 50th anniversary in November. In addition to the videos on NASA TV and the assorted social media coverage, did you notice the reissue of the Apollo 12 comic book (originally issued on the 25th anniversary)¹ and the 3D printable model of the Apollo 12 landing site created by our colleagues at Goddard Space Flight Center with data from the Lunar Reconnaissance Orbiter? We have also been involved in planning for events related to the 50th anniversary of Apollo 13 in April 2020. Stand by for more on that soon.

But the major new job this fall in the NASA Headquarters History Division has been the Mission Support Future Architecture Program, or MAP. If this is the first that you have heard of it, MAP is an Agency-wide effort to improve NASA support functions, and with the Apollo 11 anniversary over, the History Program is now being “MAPped.” Following a briefing to our Associate Administrator Bettina Inclan and the Office of Communications MAP team, a History Working Group was established. This group includes a mix of historians and archivists from six Centers (Glenn Research Center, Marshall Space Flight Center, Stennis Space Center, Johnson Space Center, Ames Research Center, and the Jet Propulsion Laboratory) as well as representatives from the Headquarters Office of

the Chief Information Officer, the Space Technology Mission Directorate, the Human Exploration and Operations Mission Directorate, and a MAP program resources expert. This group was chartered to provide options for how the history and archival programs at the Agency should operate under MAP. This is a great opportunity to address some of the shortcomings in history and archival work at NASA, but the wide variety of Center-specific arrangements make this an incredibly complicated task. The Working Group’s goal is to provide recommendations by the end of this calendar year (a daunting task) and then hammer

out an implementation plan by mid-April. This is an extremely aggressive schedule, but the Working Group is off to a good start.

While the MAP History Working Group got started, the history and archival team at Headquarters continued to push ahead with ongoing projects. This included wrapping up work on the delayed fiscal year 2018 *Aeronautics and Space Report of the President*, getting the production ball rolling again on the third volume of *The*

Wind and Beyond, and getting a book on space science and two books on the National Advisory Committee for Aeronautics (NACA) ready for copyediting. We’ve got some great publications in the pipeline for 2020. We also continue to fine-tune and expand the <https://history.nasa.gov> website. If you haven’t visited it lately, you should go take a look. Our amazing archival team has been extremely productive in producing finding aids for our collection. If you don’t know what a finding aid is, go take a look. These new tools will help



THIS IS A GREAT OPPORTUNITY TO ADDRESS SOME OF THE SHORTCOMINGS IN HISTORY AND ARCHIVAL WORK AT NASA, BUT THE WIDE VARIETY OF CENTER-SPECIFIC ARRANGEMENTS MAKE THIS AN INCREDIBLY COMPLICATED TASK.



¹ See https://www.nasa.gov/sites/default/files/atoms/files/apollo_12_comic_book_web_res.pdf.

researchers to identify what we have in our collection without having to send a question to Colin or Liz. We hope to make it ever easier for you to do your research from the comfort of your home computer, and the finding aids, plus increasing access to our electronic collection online, are huge steps in that direction. This doesn't mean that we don't want to see you here in person. In fact, Robyn Rodgers and the archival team have been working hard to make the Headquarters Historical Reference Collection an inviting place to do research. If you are in the Washington, DC, area, come take a look. (Details about arranging a visit can be found at https://www.history.nasa.gov/visit_us.html.)

These days, when you visit the Reference Collection, you will also get to meet our interns. This fall, we had a highly productive and creative pair of interns. Andrew Parco, a Senior at George Washington University, was with us several days a week (while still carrying a full academic load at school—I'm not sure how he did that). David Skogerboe, a graduate student at Utrecht University, was in the office almost full-time. (He spent a few days this semester in various other archives in DC doing research for his Master's thesis.) If you follow our social media accounts on Twitter and Facebook, you will have seen the creative genius of Andrew and David on display—and if you missed that, well, they also have contributed to this copy of *News & Notes*. For spring 2020, we will have Stacy Bishop, a former teacher and now graduate student at the University of Maryland University College, and Alisa Greenhalgh, a junior at Brigham Young University, serving as our history interns. Fortunately for us, both of them will start here early in January and be on the job into April. We are all looking forward to another busy and highly productive spring.

AMES RESEARCH CENTER (ARC)

Moffett Field, California

By April Gage

A Look Back at LCROSS

The History Archives lent its support to another 10th anniversary celebration of the Lunar CRater

Observation and Sensing Satellite (LCROSS) mission, this time focusing on the spacecraft's successful impact at the South Pole of Earth's Moon on 9 October 2009 and subsequent confirmation of the presence of water ice there. LCROSS Project Manager Daniel Andrews and Project Scientist Anthony Colaprete hosted the event, entitled "LCROSS: The Impact, 10 Years On," and provided a frank and fascinating discussion of the mission design, development, and science results. Afterward, the audience joined members of the LCROSS team at a lively reception.

NASA launched LCROSS on 18 June 2009 as a secondary payload to the Lunar Reconnaissance Orbiter (LRO). LCROSS was designed to confirm the presence and nature of water ice on the Moon and to study the composition of lunar regolith by using the launch vehicle's upper stage as a kinetic impactor and its shepherding spacecraft as a data collector. The impact dislodged lunar material at the bottom of a permanently shadowed crater near the Moon's south pole and elevated it high into the sunlight, thus enabling the instruments aboard the spacecraft to record its characteristics.

The data returned from the instruments aboard LCROSS and LRO showed that the debris plume contained a significant amount of pure water ice grains as well as other volatiles, such as methane, ammonia, hydrogen gas, carbon dioxide, and carbon monoxide, in addition to some light metals, such as sodium, mercury, and silver. This detection of water on the Moon definitively confirmed what the scientific community had already suspected based on data obtained from three earlier lunar missions that remotely detected the chemical signatures of water in the Moon's polar regions: Clementine (Naval Research Laboratory, launched 1994), Lunar Prospector (NASA Ames Research Center, launched 1998), and Chandrayaan-1 (Indian Space Research Organization, launched 2008). The amount of water ice was a major discovery showing that the Moon holds a vital resource for human space exploration in its accessible crust. That ice is potential fuel, water, and air that future surface facilities could harvest from the soil to support exploration instead of bringing it all from Earth.

In April 2006, NASA's Exploration Systems Mission Directorate selected the proposal for LCROSS to lift off as a secondary payload on the LRO. LCROSS had to remain within a budget of 79 million dollars, weigh less than 1,000 kilograms, and be completed in time for the LRO launch scheduled just 31 months following the selection date. To meet these requirements, the designers pursued a nontraditional approach, creatively employing various management measures and incorporating low-cost components. For example, the spacecraft incorporated durable, commercially available, "off-the-shelf" materials, such as the visible camera and other scientific instruments, along with existing flight-qualified hardware, such as the Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) ring, rather than costly, time- and resource-consuming custom-made items. The Centaur was repurposed for use as the kinetic impactor, thus maximizing the mass available to the working payload. Ultimately, the spacecraft was completed and delivered on time and within the budgeted total mission cost.

The mission, science, payload, and operations were managed from Ames Research Center. Northrop Grumman designed and built the LCROSS spacecraft bus with oversight from the team at Ames. Mission operations was led by Ames, along with navigational support from Goddard Space Flight Center and the Jet Propulsion Laboratory. LCROSS was launched co-manifested with LRO from Kennedy Space Center with network communications provided by the Deep Space Network.

Current News

In other news, space settlement artwork from the History Archives collections by Ames-commissioned artist Rick Guidice are now on exhibit at the Design Museum in London. The exhibition, entitled *Moving to Mars*, presents design concepts for living and working in space and runs through February 2020.

As we approach the 80th anniversary of Ames, a short coffee-table-style book that captures the past and present of Ames has been drafted and will be reviewed. A small run of printed copies should be available early next year.



Ames Deputy Director Carol Carroll introduces LCROSS Project Manager Dan Andrews (center) and Project Scientist Tony Colaprete (right) at the "LCROSS: The Impact, 10 Years On" anniversary event. (Photo credit: Dominic Hart, NASA Ames Research Center)



Space settlement concept artwork by Rick Guidice is now on display at the Design Museum in London. (Photo credit: Jessica Taylor, Design Museum)

ARMSTRONG FLIGHT RESEARCH CENTER (AFRC)

Edwards Air Force Base, California

By Christian Gelzer

Christian hosted a Fulbright scholar from New Zealand for nearly two weeks. Fiona Amundsen, of Auckland University of Technology (AUT), is working on a photography project, and Christian facilitated her access to different hangars and locations as well as serving as escort. Additionally, he spoke to two different organizations at Edwards Air Force Base about different aspects of the Center's and Agency's history. He continues interviews with the Preliminary Research Aerodynamic Design to Lower Drag (PRANDTL-D) team members as part of a book project. He has also submitted an article for publication, a reassessment of Neil Armstrong's "excursion," as fellow X-15 pilot Mil Thompson called his long flight to a Los Angeles suburb and back to Edwards.

Meanwhile, the reference collection's digitization remains paused until the backlog is managed. One of the delights in cleaning out the warehouse where the collection was housed is the discovery of artifacts stashed in rooms and lost to memory. These include a small, custom-made flag with the meatball sewn onto a deep blue background, which Armstrong took with him on Gemini VIII. It will be displayed with a small U.S. flag carried to the Moon on Apollo 11. There are other surprises: a large, portable, all-metal thermos likely carried on board an aircraft—which is probably how it got here—and which Christian will send to



ONE OF THE DELIGHTS IN CLEANING OUT THE WAREHOUSE WHERE THE COLLECTION WAS HOUSED IS THE DISCOVERY OF ARTIFACTS STASHED IN ROOMS AND LOST TO MEMORY.



his colleagues at Glenn Research Center since it has a Lewis identifier on it. It most likely dates from the 1950s or early '60s.

JOHNSON SPACE CENTER (JSC)

Houston, Texas

By John Uri

Although the 50th anniversary of the Apollo 11 Moon landing took place in July 2019, the JSC History Office continues to respond to requests for information from groups looking to honor the accomplishment. For example, we received a request, coordinated through NASA Headquarters, from a researcher on the iHeartRadio *Nine Days in July* podcast regarding Apollo 11. The requestor is reviewing the oral history transcripts and choosing sections to be clipped.

Sandra Johnson provided audio clips from the oral histories that the History Office conducted with Flight Director and former JSC Center Director Christopher Kraft. The JSC Multimedia Operations team utilized these clips in the production of a video that was shown at Dr. Kraft's memorial service.

The JSC History Office has been actively participating in an effort led by the External Relations Office (ERO) to celebrate key moments leading up to the 20th anniversary of permanent occupancy of the International Space Station on 2 November 2020. Activities to date have included generating a list of significant milestones achieved prior to the Expedition 1 crew occupation, as well as providing meaningful topics about planning, assembly, operations, and research aboard the facility. Stories about day-to-day living and working aboard the outpost have also been proposed. As part of the messaging effort, ERO designed the logo and banner featured below.

We want to thank Bill Barry, Robyn Rodgers, Steve Garber, and the entire History and Archive team at NASA Headquarters for hosting John Uri for a useful and productive set of meetings and excellent tours. The discussions pertaining to the ongoing Mission



The External Relations Office's logo and banner design for the ISS's 20th anniversary as an inhabited outpost. (Image credit: NASA)

Support Future Architecture Program (MAP) activities regarding history and archive programs were particularly fruitful. We would also like to thank Center Archivist Holly McIntyre and her team at Goddard Space Flight Center for providing an excellent overview of Center activities, including the new outstanding archive website as well as informative tours of the Center and several key facilities.

The History Office provided research assistance to Ben Feist, an engineer working with the Astromaterials Research and Exploration Science (ARES) Division at JSC. The Chief Exploration Scientist within the Human Exploration and Operations Mission Directorate at NASA Headquarters asked the engineer to write a report on how geology operations were designed and performed during Apollo in the backrooms, as well as the lessons learned that can be applied to the Artemis structure. NASA Chief Historian Bill Barry asked the JSC History Office to assist the engineer. In order to complete the project by a short, 30-day deadline, Feist required items such as organizational structures, memos, and documents. The History Office forwarded the staffing lists of the geology rooms in the Building 30 Mission Control Center, as well as a number of reports about geology operations, manuals, and mission plans. Additionally,

“
THE FINAL PRODUCT, A PUBLICATION, WILL BE A WAY FOR THE PUBLIC TO LEARN MORE ABOUT THE FLIGHT SURGEON'S OFFICE.
 ”

we put Feist in contact with John Osborn, an astronomer who conducted a similar study for the Constellation Program. Other sources like Bill Muehlberger's papers at the University of Texas were also searched. In all, we provided Feist with more than 1,500 pages of material.

The History Office provided support to an intern assigned to the JSC Flight Surgeon's Office. The intern was assigned the task of writing a review of NASA Flight Surgeon activity from 1958 to 2019. The intern, also constrained to a 30-day deadline, looked to the History Office for assistance. Jennifer Ross-Nazzal provided him with a packet of historical documents and offered advice on how to complete the project. The final product, a publication, will be a way for the public to learn more about the Flight Surgeon's Office.

We continue to expand our extensive oral history collection. As a follow-on to an interview trip Sandra Johnson and Jennifer Ross-Nazzal took to Kerrville, Texas, over the summer for an oral history project involving the neighborhoods surrounding JSC in the 1960s, they again traveled to several locations around Texas in November. This trip included interviews with wives and children of several astronauts and a former Center Director, including Jane Conrad Dreyfus (first wife of Pete Conrad), Dottie Duke (wife of Charlie Duke), Kirk Griffin (son of Gerry Griffin), and Kent Slayton (son of Deke Slayton). Later this year, Sandra and Jennifer are pursuing oral history interviews with more family members, including Marilyn Lovell (wife of Jim Lovell), Sue Bean (first wife of Alan Bean), and Barbara Cernan (first wife

of Gene Cernan). Locally, interviews were conducted with Dianne Bobko (wife of Bo Bobko) and longtime JSC employee (now retired) George Weisskopf. Interviews are scheduled with William Bowers, who worked on Shuttle photo/TV training, as well as Kathy Weisskopf.

Although the anniversary of the first Moon landing is behind us, the JSC History Office continues to work with the JSC External Relations Office on a series of articles commemorating other significant historical milestones, including the next Apollo missions. The content is posted on the www.nasa.gov website and JSC's Facebook and Twitter accounts. Select articles are posted on JSC's *Roundup Reads*, and abstracts of the articles appear online in JSC's *Roundup Today*. These features often highlight the anniversaries of lesser-known, but still important events/people in the Apollo program and other spaceflight endeavors. We would like to thank history and archive personnel at other NASA Centers for their valued help and contributions to many of these products.

John Uri attended the annual meeting of the American Association of State and Local Historians (AASLH) in Philadelphia in September. In addition to the usual outstanding set of technical sessions and guest speakers, this year's conference included a session on the preservation of space artifacts. The session, cochaired by Margaret Weitekamp of the Smithsonian Institution's National Air and Space Museum, focused primarily of the memorabilia and public display varieties.

The History Office continues its effort to publish Jennifer Ross-Nazzal's book *Making Space for Women*, in collaboration with the JSC University Research, Collaboration and Partnership Office. The manuscript is currently undergoing peer review at Texas A&M University Press.

As a reminder, the JSC History Portal recently migrated to a new web address (<https://historycollection.jsc.nasa.gov/JSCHistoryPortal/history/>). It appears that most of the issues encountered after the transition have now been corrected, and the oral histories should

be updated soon. We encourage you to update your bookmark to the new URL and ask that you spread the word about the new address. Also, please inform us if you run into any issues with the new site so that we may address them expeditiously. We are continuing efforts to upgrade the look and feel of the History Portal. This improvement will provide the History Office more control over content updates and deliver a more modern format to users.

MARSHALL SPACE FLIGHT CENTER (MSFC)

Huntsville, Alabama

By Brian Odom

On 5 September, the Marshall History Office and Chandra Program Office celebrated 20 years of NASA's Chandra X-ray Observatory by organizing a panel discussion at the U.S. Space and Rocket Center's INTUITIVE® Planetarium. There, Kim Kowal Arcand, Visualization Lead at the Chandra X-ray Center in Cambridge, Massachusetts, moderated a roundtable discussion with panelists including retired astronaut Eileen Collins, the first female commander of a Space Shuttle mission; Dr. Martin Weisskopf, Chandra project scientist; Dr. Harvey Tananbaum, senior astrophysicist at the Chandra X-ray Center; and Dr. Aneta Siemiginowska, another astrophysicist at the Chandra X-ray Center. Developed and managed by Marshall Space Flight Center, Chandra has spent the last two decades making profound new discoveries and reshaping our understanding of the x-ray



THE HISTORY OFFICE IS COLLABORATING WITH THE UNIVERSITY OF ALABAMA PRESS ON THE PUBLICATION OF AN ANTHOLOGY OF ESSAYS, NASA AND THE AMERICAN SOUTH.





At the 5 September 2019 “20 Years of Chandra” panel discussion, Chandra project scientist Dr. Martin Weisskopf (center) summarizes the observatory’s great scientific accomplishments. Looking on are Kim Arcand (left) and Eileen Collins (right).

universe, black holes, dark matter, and dark energy. The panel discussion utilized the planetarium’s state-of-the-art projection capability to explore Chandra’s development, the 23 July 1999 launch, what we have learned from two decades of space-based observations, and what the future of x-ray astronomy holds. For more information on Chandra, visit https://www.nasa.gov/mission_pages/chandra/main/index.html.

The History Office is collaborating with the University of Alabama Press on the publication of an anthology of essays, *NASA and the American South*. This collection includes essays surveying everything from aerospace tourism to NASA’s impact on southern religion and architecture. This work originated from a symposium held in March 2019 at the University of Alabama in Huntsville.

Looking toward the future, the History Office will soon release a call for papers for our next symposium, “NASA and the Rise of Commercial Space.” This event, scheduled for March 2021 at the University of Alabama in Huntsville, invites scholars to explore the evolution of commercial space from the beginnings of the space program to the present. The symposium will address topics including, but not limited to, developments in commercial and private space industry, space tourism, commercial use of the International Space Station, the developing economy of low-Earth orbit, presidential administrations and NASA Administrators, and the development of launch vehicles and rocket technologies. If you have questions or would like to participate, please contact Brian Odom at brian.c.odom@nasa.gov.

CLEVELAND HOSTS NASA'S SPACE EXTRAVAGANZA IN 1962

By Bob Arrighi (ATS)

On 23 November 1962, crowds in the brisk morning air outside Cleveland Public Hall formed lines around the block. Many were students off on the day after Thanksgiving. At noon, the doors opened, and the throng streamed into NASA's largest public exhibition to date. Turnout was so good that the fire department periodically blocked entrances to disperse the congestion. It was an impressive start to the Space Science Fair—a 10-day space extravaganza sponsored by NASA and the Cleveland *Plain Dealer*.

Public interest in the new space agency was high, with the development of the Apollo program and the Mercury missions already in full swing. Recently, President John F. Kennedy had given his Moon speech¹ at Rice University, Walter Schirra had completed a record six Earth orbits, and NASA Lewis Research Center (later renamed Glenn) had assumed responsibility for the Centaur² and Agena rockets. Despite its mandate to share information on its activities, NASA had done a poor job communicating with the public. There were no NASA T-shirts or mission patches for sale, and interactions with the media were deficient. In addition, NASA was finding it difficult to obtain enough competent individuals to meet its massive hiring goals.

In 1962, the Agency began taking steps to better keep the public abreast of its activities and to encourage students to pursue science in school. These efforts included providing a variety of space hardware and models at the Seattle World's Fair (April–October of that year) and hosting a two-day student open house at Lewis that drew three times as many visitors as in

the previous 20 years combined. On 13 June 1962, the *Plain Dealer* announced NASA's most ambitious event to date—a 10-day Space Science Fair. The newspaper promoted the event, disseminated the free tickets, and provided educational materials. Lewis employees acquired the hardware, set up the displays, and served as guides.

There were twice as many exhibits displayed on Public Hall's 30,000-square-foot floor as at the NASA Pavilion during the World's Fair. An illuminated 8-foot-diameter globe near the entrance was encircled by dozens of rings indicating the paths of all satellites then in orbit. Space hardware included Mercury and Gemini capsules, Ranger and Mariner II spacecraft, an Echo satellite, and Lewis's infamous Gimbal Rig.³ The scores of large models included an X-15 Eagle, an Atlas-Centaur, a Scout, a Saturn, and an Atlas-Mercury.

The fair also featured live demonstrations, films in balcony theaters, materials for teachers, and career counselors. Large blocks of time were set aside for qualified students to attend a special Space Science Institute. Guests included test pilot Joe Walker,⁴ flight surgeon John Stapp,⁵ and pilot Jerrie Cobb.⁶

Sunday, 25 November, was perhaps the most eventful day of the fair. It began with the arrival of 15,000 Thompson Ramo Wooldridge (TRW), Inc., employees in the morning. Over 25,000 others, many also attending Cleveland's annual Christmas Parade or the Browns-Steelers football game, viewed the exhibits that day. The estimated 300,000 people

1 See <https://er.jsc.nasa.gov/seb/ricetalk.htm>.

2 See <https://www.nasa.gov/centers/glenn/about/history/centaur.html>.

3 See <https://www1.grc.nasa.gov/historic-facilities/altitude-wind-tunnel/project-mercury-testing/#astronaut-training-in-the-mastif>.

4 See <https://www.nasa.gov/centers/armstrong/news/Biographies/Pilots/bd-dfrc-p019.html>.

5 See <https://www.nationalaviation.org/our-ensbrinees/stapp-john-paul>.

6 See <https://www.nationalaviation.org/our-ensbrinees/cobb-geraldyn-jerrie-m>.



The Multiple Axis Space Test Inertia Facility (MASTIF), also known as the Gimbal Rig, is shown here in the Altitude Wind Tunnel (AWT) at Lewis Research Center, now John H. Glenn Research Center at Lewis Field.

downtown snarled traffic for hours. In the evening, a black-tie dinner was held at the Sheraton Hotel for 1,000 prominent northern Ohio leaders. Speakers included NASA officials Abe Silverstein, T. Keith Glennan, and Hugh Dryden, as well as President Kennedy (remotely).

The Space Science Fair was a huge success for NASA and the city. Its 375,000 attendees, including 49,000 students, broke all previous Public Hall records.

SPACE SHUTTLE TESTING LEADS TO FULL UTILIZATION IN 1970S

By Jessica Herr

In 1973, the then–Mississippi Test Facility (MTF), now known as Stennis Space Center, had a total of 1,127 employees. After the end of the Apollo program, however, the facility faced tough times that caused a cut in the workforce. However, an engine test project was on the horizon: the Space Shuttle. The Space Shuttle was designed as a reusable vehicle to carry humans to low-Earth orbit following the Apollo program.



Sunset offers a scenic view of a Space Shuttle main engine test on the A-2 Test Stand at Stennis Space Center on 21 July 2003. After an initial Space Shuttle main engine test in June 1975, Stennis continued testing of the engines for the next 34 years.

MTF jumped at the chance to test the engines that would power the Shuttle fleet. An effort to have Shuttle engines manufactured at Michoud Assembly Facility in nearby New Orleans and tested at MTF went into motion. One of the companies entering bids for the project was the Lockheed Propulsion Co. of California, which embraced the idea of using Michoud and MTF to perform the work. Other companies putting in bids for the work were Thiokol Chemical Corp. of Brigham City, Utah; Aerojet Solid Propulsion Co. of Sacramento, California; and United Technology Center of Sunnyvale, California.

With bids submitted, a delegation of elected officials, community leaders, and businesspeople from Louisiana and Mississippi began lobbying for the work to come to their states. In late 1973, the award was given to Thiokol Chemical Co. The local community around Michoud and MTF were shocked by this announcement. Just a few years earlier, NASA had deemed MTF “the nation’s foremost propulsion test site.”¹

The announcement set off a series of events that would shape the future of MTF: the protest of the solid rocket motor contract award to Thiokol and calls for “full utilization of MTF” by its future namesake, U.S. Senator John C. Stennis, as well as U.S. Representative Trent Lott and other Mississippi and Louisiana officials.

Senator Stennis spearheaded the movement for full utilization, and on 14 June 1974, the Mississippi Test Facility was renamed the National Space Technology Laboratories (NSTL) and became an independent installation of NASA, reporting to NASA Headquarters. Stennis said that the “efforts to increase the use of NSTL by NASA and other federal agencies [would] now be more successful than ever before.” Site Director Jackson Balch was quite pleased with the changes, saying that “it will be kind of nice to be a member of the club.”²

Just a year later, on 24 June 1975, a brief but very important event occurred at the newly independent site: the first ignition test of a Space Shuttle main engine. It lasted just a second but marked the return to propulsion testing for NSTL and opened the door for testing projects to follow, including the current testing of engines that eventually will carry humans further than ever before.

1 “Smith Blasts von Braun,” *Picayune Item* (24 March 1974).

2 “Stennis Announces MTF Reclassification,” *Sea Coast Echo* (Bay St. Louis, MS): 20 June 1974.

OTHER AEROSPACE HISTORY NEWS

NASA HISTORY FELLOWSHIP WINNERS FOR 2019

The NASA History Division supports three history fellowships in conjunction with three major historical organizations: the Society for the History of Technology (SHOT), the History of Science Society (HSS), and the American Historical Association (AHA). These fellowships fund research in a wide range of topics, but all three look to investigate the effect aerospace history has had on our world.

The Fellowship in Aerospace History is administered by the American Historical Association and funds projects that undertake advanced research in all aspects of aerospace history, from the earliest human interest in flight to the present, including cultural and intellectual history; economic history; the history of law and public policy; and the history of science, engineering, and management. The 2019–20 winner of the Fellowship in Aerospace History is Stephen Buono, for his project “The Province of All Mankind: Outer Space and the Promise of Peace, 1957–1970.” Buono is a Ph.D. candidate in the Department of

History at Indiana University and plans to use the funds to complete his dissertation—a political, intellectual, and cultural history of U.S. space diplomacy during the Cold War.

The Society for the History of Technology offers the Fellowship in the History of Space Technology, which supports advanced research related to all aspects of space history, leading to publications on the history of space technology broadly considered, including cultural and intellectual history, institutional history, economic history, history of law and public policy, and history of engineering and management. The 2019 Fellowship has been awarded to Dana Burton, a Ph.D. candidate in the George Washington University Anthropology Program, for her research project/dissertation, “Tracing Harmful Contamination in NASA’s Search for Life on Mars,” which analyzes contamination protocols for human and robotic space exploration.

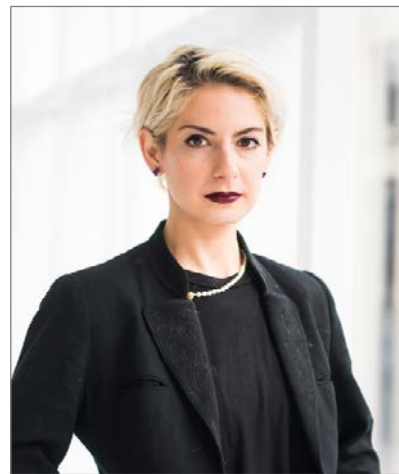
The History of Science Society funds a nine-month research project called the Fellowship in the History of Space Science. The research can be related to any aspect of the history of space science, from the earliest



Stephen Buono, Indiana University Ph.D. candidate and winner of the Fellowship in Aerospace History.



Dana Burton, George Washington University Ph.D. candidate and winner of the Fellowship in the History of Space Technology.



Claire Isabel Webb, MIT Ph.D. candidate and winner of the Fellowship in the History of Space Science.

human interest in space to the present. The winner of this year's HSS Fellowship is a fifth-year Ph.D. candidate in the History, Anthropology, and Science, Technology, and Society (HASTS) program at Massachusetts Institute of Technology (MIT) named Claire Isabel Webb. Her dissertation, "Technologies of Perception: The Search for Life and Intelligence Beyond Earth," uses both historical and ethnographic methods to analyze how radio and optical astronomers call upon familiar modes of sensing to make meaning about as-yet-undiscovered objects: the alien and extraterrestrial life.

Congratulations to all three winners! If you are interested in applying for any of these three fellowships, see the following:

Society for the History of Technology

<https://www.historyoftechnology.org/about-us/awards-prizes-and-grants/shot-nasa-fellowship/>

Fellowship in the History of Space Science

<https://hssonline.org/employment/fellowship-in-the-history-of-space-science/>

Fellowships in Aerospace History

<https://www.historians.org/awards-and-grants/grants-and-fellowships/fellowships-in-aerospace-history>

AMERICAN ASTRONAUTICAL SOCIETY (AAS) HISTORY COMMITTEE

By Michael Ciancone

2018 Emme Award for Astronautical Literature

The Emme Award Panel, chaired by Dr. Don Elder, has selected *Ronald Reagan and the Space Frontier*, by Dr. John Logsdon, as the recipient of the 2018 Emme Award. Other members of the panel are Dr. Rick Sturdevant, Dr. Asif Siddiqi, and Dr. De Witt Kilgore.

2019 Ordway Award

As an addendum to the announcement of the Ordway Award in the last newsletter, Michael Ciancone

(AAS History Committee Chair) presented the 2019 Ordway Award to John Noble Wilford, who was unable to attend the presentation ceremony.

CALL FOR PARTICIPANTS

Baruch S. Blumberg NASA/Library of Congress Chair in Astrobiology, Exploration, and Scientific Innovation

The Blumberg Chair is a partnership between NASA's Astrobiology Program and the Library of Congress. This annually selected position supports a scholar in the sciences or the humanities to be the scholar in residence at the Library's John W. Kluge Center.

The Blumberg Chair creates an opportunity to research the range and complexity of societal issues related to how life begins and evolves and to examine philosophical, religious, literary, ethical, legal, cultural, and other concerns arising from scientific research on the origin, evolution, and nature of life.

Within the parameters of NASA's mission, a Chair might also seek to investigate how innovative quests for fundamental understanding may lead to major developments for the betterment of society. Barry Blumberg, for whom the Chair is named, conducted groundbreaking research addressing a simple but fundamental question: Why do some people get sick while others, exposed to the same environment, remain healthy? That this work unexpectedly led to the discovery of the hepatitis B virus, the development of a vaccine, and the awarding of the Nobel Prize in Physiology or Medicine illustrates the potential for unconventional thinking about fundamental questions to yield great rewards. Using methodologies from the history and sociology of science; the philosophy of science; legal, political, and cultural history; and other disciplines, a Chair might study and tell the story of how a basic research initiative led to completely unexpected discoveries and applications.

Possibilities for research subjects are many and wide-ranging in scope. The following potential topics of research are meant to inspire, not limit, your creativity:

- Legal issues related to governance of planets and space.
- Within the parameters of NASA's mission, "high-risk, high-reward" initiatives from a historical, legal, philosophical, or ethical perspective or one that draws on several disciplinary modes of analysis.
- Ethical implications of cross-contamination.
- Scientific and philosophical definitions of life.
- Conceptions of the origins of life in theistic and nontheistic religions.
- Comparison of the discussion of these issues in multiple nations and cultures.
- Life's collective future—for humans and other life, on Earth and beyond.
- Impacts on life and future evolutionary trajectories that may result from both natural events and human-directed activities.

Located in the Library's magnificent Jefferson Building, the Kluge Center offers a rich intellectual atmosphere for informal discussion and exchange of perspectives.

Completed applications are due by 1 January 2020. For further information, please consult the Center's web page: <https://www.loc.gov/programs/john-w-kluge-center/chairs-fellowships/chairs/blumberg-nasa-chair-in-astrobiology/>.

SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM

By Margaret Weitekamp

The Space History Department at the Smithsonian's National Air and Space Museum continues to see significant transitions.

In the building on the National Mall, the south-facing Independence Avenue entrance closed on 7 October 2019 to facilitate the construction of an immense wall that bisects the central Boeing Milestones of Flight Hall. Visitors can still enter the multistory atrium from the Mall side of the building, but the single-story south lobby of Milestones will remain closed for the next few years. In this form—with the west end and south entrance closed, but the north entrance and

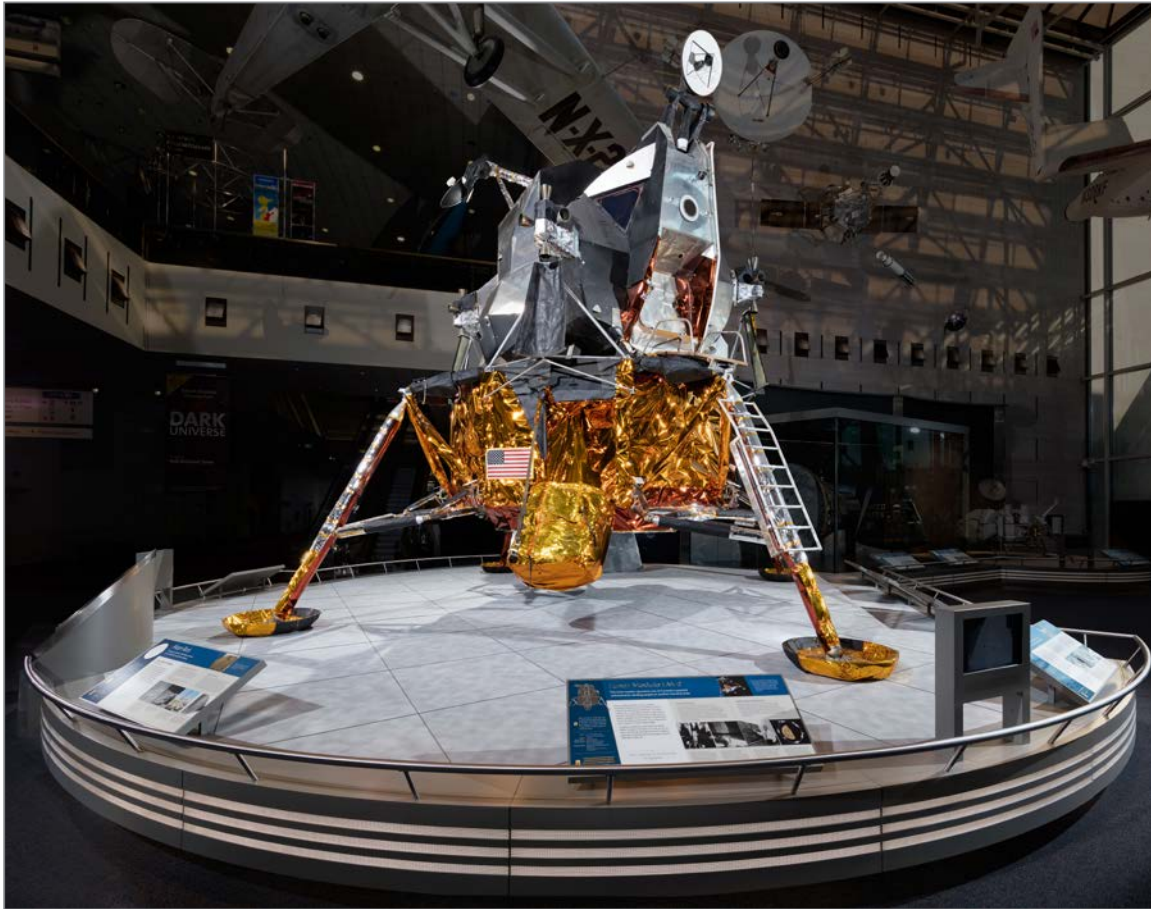
east end open—the museum will remain open to the public during the intensive construction to revitalize the historic structure. In a few years, the west end will reopen with all new exhibits and building access will flip. At that point, the east end of the museum will become a construction zone and visitors will be able to enter and exit only through the refurbished south lobby entrance on Independence Avenue. Artifacts have been removed from the construction zones, except for those pieces, such as the 747 nose, that are too large and are being protected in place or on site. In the meantime, Space History staff are actively engaged in reimagining all of the exhibit spaces, of which there are more than 20.



**DESTINATION MOON
EXPLORES AND HONORS THE
GREAT ACHIEVEMENT OF
APOLLO 11 USING GENUINE
FLOWN ARTIFACTS FROM
THE MISSION.**



The traveling exhibition *Destination Moon: The Apollo 11 Mission* reached its final stop in its national tour when it opened at the Cincinnati Museum Center on 28 September 2019. *Destination Moon* explores and honors the great achievement of Apollo 11 using genuine flown artifacts from the mission. Featuring the Apollo Command Module Columbia—the only portion of the historic spacecraft to survive the lunar journey—the exhibition explores the birth and development of the American space program and the space race in time for the 50th anniversary of humankind's greatest scientific achievement. *Destination Moon* gives guests the rare opportunity to see artifacts that made the 953,000-mile journey possible, like Buzz Aldrin's gold-plated extravehicular helmet visor and thermal-insulated gloves. The dizzying star chart that helped Neil Armstrong, Buzz Aldrin, and Michael Collins navigate the historic journey and the rucksack/



The Apollo Lunar Module (LM) on display at the National Air and Space Museum in Washington, DC.

survival kit that accompanied the astronauts are also included. The star of the exhibition is the Columbia Command Module, which is on display outside the National Air and Space Museum for the first time since 1976. *Destination Moon: The Apollo 11 Mission* was organized by the National Air and Space Museum and the Smithsonian Institution Traveling Exhibition Service. The exhibition will close on 17 February 2020.

Dr. Valerie Neal retired from the museum on 31 October 2019, assuming a new status as Curator Emerita. Neal joined the museum as a curator in 1989 and was responsible for human spaceflight artifact collections from the Space Shuttle era and International Space Station, most prominently the orbiter Discovery.

She led the museum's effort to prepare Shuttle test vehicle Enterprise for public display and to acquire Spacelab; SpaceShipOne; the Manned Maneuvering Unit; the space-flown IMAX camera; and personal effects from astronauts Sally Ride, Kathryn Sullivan, Pamela Melroy, David Brown, Tom Jones, and Danny Olivas for the national collection. She worked closely with NASA and museum staff to orchestrate the transfer of Discovery to the Smithsonian and the release of Enterprise back to NASA in 2012. Neal has curated three major exhibitions: *Where Next, Columbus?*, on the challenges of future exploration; *Space Race*; and *Moving Beyond Earth*, about spaceflight in and beyond the Space Shuttle era. She chaired the museum's Space History Department from 2015 to 2019.

Neal's publications include *Spaceflight in the Shuttle Era and Beyond* (2017), recipient of the AIAA Gardner-Lasser Aerospace History Literature Award; *Discovery, Champion of the Space Shuttle Fleet* (2014); and two edited books on space exploration, *Spaceflight: A Smithsonian Guide* (1995) and *Where Next, Columbus? The Future of Space Exploration* (1994). Her articles on Shuttle history have appeared in *History and Technology* and *Space Policy*. She has been instrumental in the production of eight Smithsonian Channel documentaries about the Space Shuttle and other major engineering projects for space exploration. Before joining the museum, Neal spent a decade as a writer, editor, and manager for some 25 NASA publications on Space Shuttle and Spacelab missions, the Hubble Space Telescope and other great space observatories, the space sciences, and NASA history. She also participated in underwater astronaut-training activities and worked on the mission management support team for four Shuttle missions. The staff, friends, and family who packed her farewell ice cream social in September illustrated the reach of her impact as a curator, historian, and friend. Despite having moved to North Carolina, she will maintain a relationship with the museum, working on various projects, including some ongoing productions for the Smithsonian Channel.

On 14 November 2019, the 50th anniversary of the launch of Apollo 12, the museum celebrated with its annual National Air and Space Society Lecture, held during Vice Admiral Donald D. Engen Flight Jacket Night. The speaker was NASA astronaut Al Worden, who flew on Apollo 9 and 15 and also served as the backup Command Module pilot for Apollo 12. Members of the National Air and Space Society receive invitations to Flight Jacket Night as a part of their membership, which supports the work of the museum.

The Outer Space Treaty

Piecing together six main points of one of the most important international agreements in the history of spaceflight
By Andrew Parco



"free for exploration and use by all"

Freedom and equality to:

- access space
- conduct research
- explore the cosmos



"not subject to national appropriation"

No country can annex any part of outer space by any means, including by occupation or use.

Space can be occupied and used, but those cannot be a justification for appropriation.



"maintaining international peace and security"

All activities must uphold peace and promote cooperation.

Weapons cannot be tested and no weapon of mass destruction can be placed in orbit.



"envoys of mankind"

Life and limb take top priority. Every measure must be taken to protect, rescue, and return astronauts.

Stranded astronauts are not returned to their home country necessarily, but instead "to the State of registry of their space vehicle."



"internationally liable"

The responsibilities and privileges of owning a craft are not impinged by its presence in space.



"all stations [...] shall be open to representatives"

Any country may request to inspect and observe the operations of any other.

What's Missing?

Commercial spaceflight is scarcely alluded to. The hallmarks of the Cold War are distinctive, but the questions of today were unheeded and remain unanswered. Today, another international agreement to dictate the role of governments amidst a rapidly privatizing industry could not come soon enough.

SOURCES: THANKS TO THE BROWN PAPER BOYS AND THEIR NEIGHBORS, BEYOND BEING, LANSING, AND SUPERHERO LEADERS
FOR INFORMATION FROM THE UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS
CONVENTION ON THE REGISTRATION OF OBJECTS LAUNCHED INTO OUTER SPACE

UPCOMING MEETINGS

The annual meeting of the American Historical Association will be held **3–6 January 2020** in New York, New York. Visit <https://www.historians.org/annual-meeting> for more details.

The annual meeting of the Society for History in the Federal Government will be held **13–14 March 2020** in Washington, DC. Visit <https://www.shfg.org/Annual-Meeting> for more details.

The American Astronautical Society's annual Goddard Memorial Symposium will be held **17–19 March 2020** in Silver Spring, Maryland. Visit <https://astronautical.org/events/goddard> for more details.

The annual meeting of the National Council on Public History will be held **18–21 March 2020** in Atlanta, Georgia. Visit <https://www.ncph.org> for more details.

The annual Spring Meetings of the International Astronautical Federation will be held **24–26 March 2020** in Paris, France. Visit <http://www.iafastro.org> for more details.

The annual meeting of the Organization of American Historians will be held **2–5 April 2020** in Washington, DC. Visit <https://www.oah.org> for more details.


The semiannual Mid-Atlantic Regional Archives Conference will be held **16–18 April 2020** in Harrisonburg, Virginia. Visit <https://www.marac.info> for more details.

NEW
from the
NASA HISTORY DIVISION

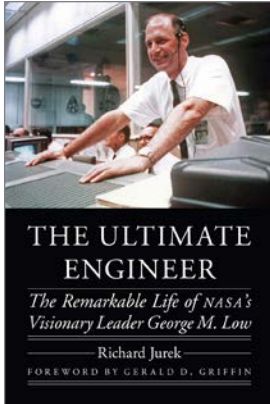
Now available in digital and print formats,
Origins of 21st-Century Space Travel: A History of NASA's Decadal Planning Team and the Vision for Space Exploration, 1999–2004 by Glen R. Asner and Stephen J. Garber gives a detailed historical account of the plans, debates, and decisions that opened the way for a new generation of spaceflight at the start of the 21st century.

ORDERING INFORMATION
<http://www.hq.nasa.gov/office/hqlibrary/ic/ic2.htm>

DOWNLOAD THE FREE E-BOOK
<http://www.nasa.gov/connect/ebooks/>

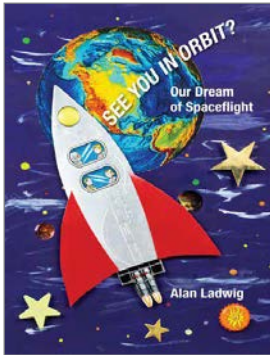
The image shows the front and back covers of the book 'Origins of 21st-Century Space Travel'. The front cover is dark blue with a starry background and a satellite in orbit. The title 'ORIGINS OF 21ST-CENTURY SPACE TRAVEL' is prominently displayed in white. Below the title, it says 'A History of NASA's Decadal Planning Team and the Vision for Space Exploration, 1999-2004' and lists the authors 'GLEN R. ASNER' and 'STEPHEN J. GARBER'. A gold circular seal from the American Institute of Aeronautics and Astronautics (AIAA) is overlaid on the top left of the book, stating '2020 WINNER of the History Manuscript AWARD'. The back cover is also dark blue with a starry background and a barcode at the bottom.

FEATURED PUBLICATIONS



The Ultimate Engineer: The Remarkable Life of NASA's Visionary Leader George M. Low
By Richard Jurek (University of Nebraska 2019)

Richard Jurek utilized many of the NASA History Division's resources, including the Historical Reference Collection, to tackle the subject of George M. Low. Former NASA Deputy Administrator George Low was a brilliant engineer and one of the chief architects of the Apollo program, among many other prominent NASA projects. In his book, Richard Jurek chronicles the life of the engineer, from his escape from Nazi-occupied Austria to his illustrious career at NASA. Jurek is also the author of *Marketing the Moon*, a retrospective on public relations and the Apollo era, on which he made a presentation at NASA Headquarters in early 2019.



See You in Orbit? Our Dream of Spaceflight
By Alan Ladwig (To Orbit Productions, LLC, 2019)

Alan Ladwig, the author of *See You in Orbit? Our Dream of Spaceflight*, is a former NASA senior manager who held a number of roles at Headquarters, including manager of the Agency's Space Flight Participant Program. He recently visited NASA Headquarters in November to give a brown-bag talk on the subject of space travel for the general public and his new book. The book discusses NASA's role in opening space travel beyond the traditional astronaut corps, delves into the history of space tourism, and shares other anecdotes within the same theme.

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IN MEMORIAM: WALTER VINCENTI

By James Anderson

Walter Vincenti died on 11 October at age 102. In addition to being an integral part of research at Ames Research Center from the very beginning, his legacy will always hold a particular importance within the history of science and technology community.

In 1971, Vincenti became the cofounder and a faculty member of the Program in Values, Technology, and Society, which is now the Program in Science, Technology, and Society (STS) at Stanford University. The program is one of the first such STS programs in the United States. Another one of his major contributions to the field was the book *What Engineers Know and How They Know It: Analytical Studies from Aeronautical History*, published by the Johns Hopkins University Press in 1990.

Vincenti's history at Stanford reaches back even further. He was a cofounder of Stanford's Department of Aeronautics in 1957. Stanford's Dean of Engineering

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and Provost at the time, Frederick Terman, offered Vincenti a job as a full-tenured professor that year. Along with Nicholas Hoff, Vincenti developed the new Department of Aeronautics, which would later expand to include astronautics. Well before Vincenti received Terman's offer, he had been teaching night classes at Stanford with Harvey Allen and Dean Chapman.

The connections between Ames and Stanford have been present since Russell Robinson oversaw the groundbreaking for Ames that commenced on 20 December 1939. Russell was a Stanford graduate, and Vincenti received his undergraduate degree in mechanical engineering from Stanford in 1938, followed by a graduate degree in 1940 in the same field with an emphasis on aeronautics. Robinson recruited Vincenti to Ames as one of its first engineers.

Longer tributes to Vincenti are no doubt forthcoming. Stanford has published an obituary available at <https://news.stanford.edu/2019/10/17/walter-vincenti-interdisciplinary-engineer-dead-102/>. In addition to the published Ames histories that document his work, there are oral history interviews that were recorded for the NASA Headquarters NACA Oral History Project as well as through Stanford's Oral History Program.



Engineer Walter Vincenti explains the benefits of wing sweep in front of the test section of the 1- by 3-foot supersonic wind tunnel. (Image credit: NASA)

MOMENT IN NASA HISTORY

The crew of Apollo 12 spent years preparing for their mission to the lunar surface. In this photo taken in October 1969, Commander Pete Conrad and Lunar Module pilot Al Bean are pictured at Kennedy Space Center's Crew Training Building, participating in an extravehicular activity simulation. This simulated

inspection of the unpiloted Surveyor 3 spacecraft was preparation for an important objective of the Apollo 12 mission. The Apollo 12 visit to Surveyor 3 was the first and is currently the only time human beings have visited a robot on another heavenly body.



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