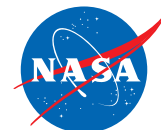


# NEWS &NOTES

National Aeronautics and  
Space Administration



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## FROM THE CHIEF HISTORIAN



In the run-up to the 50th anniversary of Apollo 11, historians across NASA have been responding to all kinds of questions from the press and public. The question I've heard in various forms most often is "From the perspective of 50 years, what is the legacy of Apollo?" So I thought I'd share my four-part answer with you here.

To me, the most important thing to remember about Apollo is that the primary goal was political—and Apollo was a stunning success by that measure. Historically, countries don't spend substantial percentages of their national budgets on science or exploration. During Apollo, the United States invested \$25 billion (in then-year dollars), in spending that peaked at over 4 percent of the national budget, to land people on the Moon and return them safely to Earth. While the technical objective was a safe trip to the Moon, the commitment of so much treasure (and blood) was based on the need to prove that Western market democracy was at least the equal of the Soviet communist command economy. The fact that you probably thought that last sentence was laughable is proof of the success of Apollo. But we need to remember that in the context of the early 1960s, when the Soviets appeared to be winning the space race, and newly free countries were looking to the Soviets for leadership, the question about what the political future

*continued on next page*

## APOLLO IN REAL TIME, 50 YEARS LATER

By Cat Baldwin

Over half of Earth's current population was not alive for the first Moon landing. But even those who had the opportunity to watch the Apollo 11 mission live on television in 1969 only had a limited view of all that was happening. If we had been able to apply current, cutting-edge technology to the experience, what would it have been like?

Software developer Ben Feist has created a time machine that answers that question. Built over two years, <https://apolloinrealtime.org> is an interactive, multimedia Web site that plays back the Apollo 11 mission as it happened in 1969. The Web site accounts for each second of the mission, from 20 hours before launch to just after recovery. Feist synced all forms of media to mission time, giving visitors to the site the unique opportunity to experience the Apollo 11 mission in its entirety. Every photo, video, and recording is organized chronologically and synced to mission time. The Web site includes 11,000 hours of Mission Control audio, 2,000 photographs, 240 hours of space-to-ground audio, and information on each of the lunar surface samples collected by Neil Armstrong and Buzz Aldrin. The timeline at the top of the page keeps track of your place in the mission and highlights interesting moments. A search function

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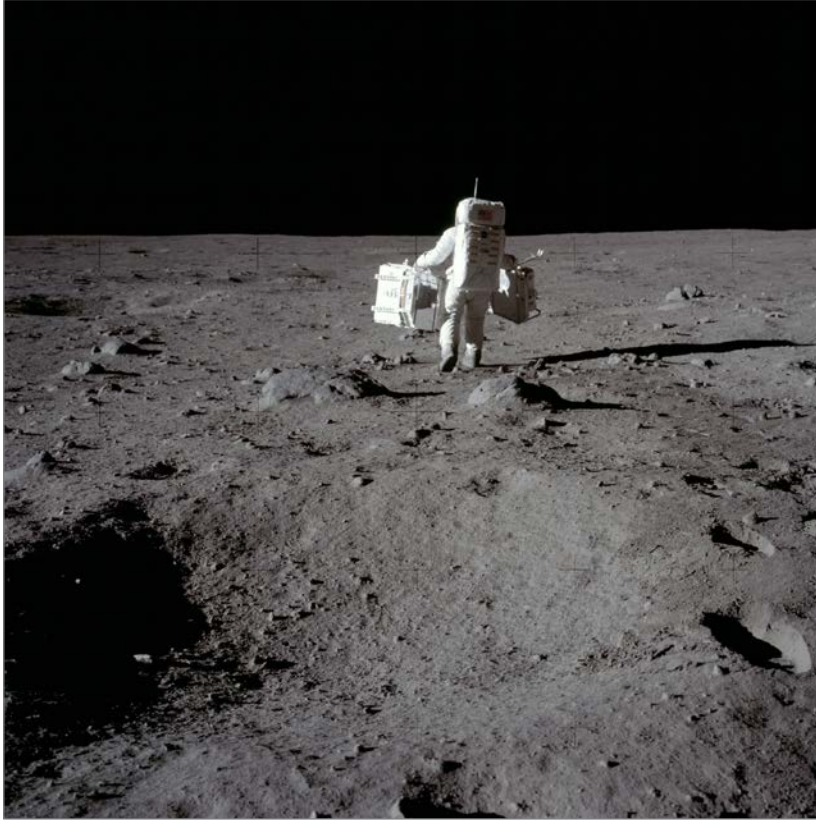
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NASA HISTORY DIVISION  
OFFICE OF COMMUNICATIONS



*From the Chief Historian (continued)*



Astronaut Edwin E. "Buzz" Aldrin, Lunar Module pilot, carries the Passive Seismic Experiments Package (left) and the Laser Ranging Retroreflector (right), to the deployment area on 20 July, 1969. (Credit: NASA)

was so soft and dusty that the lunar module would sink into the surface on touchdown and never be seen again. At the time, we really didn't know where the Moon had come from, but the major theories were that either both Earth and the Moon had formed at the same time or that the Moon was an old object that had wandered by Earth and been captured by our gravity. The samples we brought back from the Moon supported a completely different understanding: that Earth and the Moon had formed at the same time, but not at the birth of our solar system. Instead, the proto-Earth was hit by an object the size of Mars, and Earth and the Moon were formed out of that collision. The implications of this finding are huge, and our first foray to a solar system body

would hold for humanity was a real issue. President Kennedy's key political insight was that besting the Soviet Union in space was a vital geopolitical need. Winning the race to the Moon (and there really was one) undermined the legitimacy of the Soviet Union both internally and externally. I believe that it is not too much of a stretch to say that their loss in the race to the Moon contributed significantly to the collapse of the Soviet Union two decades later.

The second major legacy of Apollo is the impact of the program on our understanding of the universe around us. In reviewing the records from the 1960s, I've been struck by how ignorant we were about the Moon. Even in 1969, there were respectable scientists who were concerned that the surface of the Moon

other than our own has completely rewritten our understanding of the origins and history of our solar system and the universe more generally.

The third major legacy of Apollo is the massive technological boost that the race to the Moon delivered to our economy on a broad front. You might think that the government spends a lot of money on technology, so what makes Apollo different? The way it was done. The space program was an open, public program, largely executed by U.S. industry. Unlike investments in military research and development, the vast majority of the technology developed for the space program by the 20,000 U.S. companies that were involved in Apollo could be incorporated immediately and directly into the public market. There are many examples, but I

think that the most striking is in the computer industry. The Apollo Guidance Computer contract was the very first contract signed as part of the Apollo program. The requirements for that computer, especially the limited space, drove the need to use integrated circuits. About the same time, IBM was developing a new mainframe computer, and they decided not to use integrated circuits because they were very expensive and highly unreliable. There was a military need for integrated circuits in ballistic missiles, so that technology was under development on a small

and secretive scale. But the need for large numbers of highly reliable integrated circuits for Apollo pushed the nascent computer chip industry to create methods for high-volume, high-reliability, low-cost production. Did you know that Gordon Moore, author of the well-known “Moore’s Law,” worked for one of the most prominent subcontractors (Fairchild Semiconductor) that built the integrated circuits for the Apollo Guidance Computer? If you read his 1965 paper that first laid out his observations about the trends in industry, you will notice that the only government project mentioned by name is the Apollo program. This is because Apollo Guidance Computer requirements consumed almost the entire output of the integrated circuit industry through the mid-1960s. Where would the digital revolution be today if this boost to the industry had not happened? On a larger scale, NASA also had to build the infrastructure that made success in Apollo possible. This meant the construction of high-technology facilities across the economically disadvantaged South—places like Johnson, Stennis, and Kennedy Space Centers, as well as Marshall Space Flight Center. It also meant huge investments in higher education to create the engineering and scientific workforce that was anticipated for the space program. It is easy to imagine that we live in a society that was

largely inevitable, but think for a moment about how different our world might be if the race to the Moon had never happened.



**...THE VAST MAJORITY OF THE TECHNOLOGY DEVELOPED FOR THE SPACE PROGRAM BY THE 20,000 U.S. COMPANIES THAT WERE INVOLVED IN APOLLO COULD BE INCORPORATED IMMEDIATELY AND DIRECTLY INTO THE PUBLIC MARKET.**



Finally, the Apollo program provided an inspiration to an entire generation—a group sometimes called “the children of Apollo.” I count myself in that group because much of my life has been driven in one way or another by a childhood marinated in a fascination with space exploration. Clearly, I wasn’t the only one, because there was a threefold increase in the number of science and

engineering Ph.D.’s between the mid-1960s and mid-1970s. While many of those people were disappointed by the cutbacks in the space program and the cancellation of the supersonic transport airplane project, that training and those talents were put to use in other parts of the economy. But, perhaps more importantly, even people who did not pursue a career in science and engineering were infused with a belief in humanity’s ability to accomplish great things. How many times have you found yourself saying, “if we can put a person on the Moon, certainly we can (fill in the blank)?”

In the five decades that have passed since that “one giant leap for mankind,” the world is a very different place. One of the pleasures of being a historian is that I’m reminded regularly of how much things have changed and how even small steps can change the course of history.

Happy Apollo 11 anniversary and Godspeed,

**William P. Barry**  
Chief Historian

## CHIEF ARCHIVIST JANE H. ODOM

By Bill Barry

At press time, we learned of the death of former Chief Archivist Jane Odom. It is a bitter truth that after retiring three years ago, she did not get much time to pursue the active plans that I know she had for her well-deserved and long-awaited retirement. Instead, she spent the last two years in a battle with brain cancer. I was humbled by my interactions with her during these last years—she bravely endured difficult new treatments at the National Institutes of

Health and maintained a positive demeanor throughout. A memorial service was held for Jane at her home church, the Fairlington United Methodist Church, in Arlington, Virginia, on 19 July 2019. I know that you join me and Jane's many friends and family in mourning the passing of an outstanding archivist and a wonderfully brave and decent human being. Rest in peace, Jane.



Jane Odom, NASA Chief Archivist from 1999 to 2016, holds a Civil Service/Contractor Team Award granted to the NASA History Archival Team. Also pictured from left to right are BfJV Archivist John Hargenrader, Nadine Andreassen, Yvette Smith, Stephen Garber, Elizabeth Suckow, and Colin Fries.



*Apollo in Real Time, 50 Years Later (continued)*

Pictured is the main page of <https://apolloinrealtime.org>. Visitors can either begin the mission at the time of launch or choose to click "Now" and experience it 50 years later to the second.

enables users to look through the transcripts, commentary, and samples.

Feist and his collaborator, archivist Stephen Slater, have done amazing things that will allow site visitors to hear and see things that even people working on the mission would not have been able to experience. There is a panel that contains the audio of every control position in Mission Control and several other communication loops. Visitors can open this panel at any second of the mission and be able to hear such things as the flight surgeon threatening to quarantine the entire USS Hornet (34:48:49).<sup>1</sup> The Mission Control audio has only recently been digitized, but creating the version of this audio you will hear on the site was one of the more difficult feats accomplished during the two-year process. According to Feist, "The digitized analog tapes suffered from both high-speed

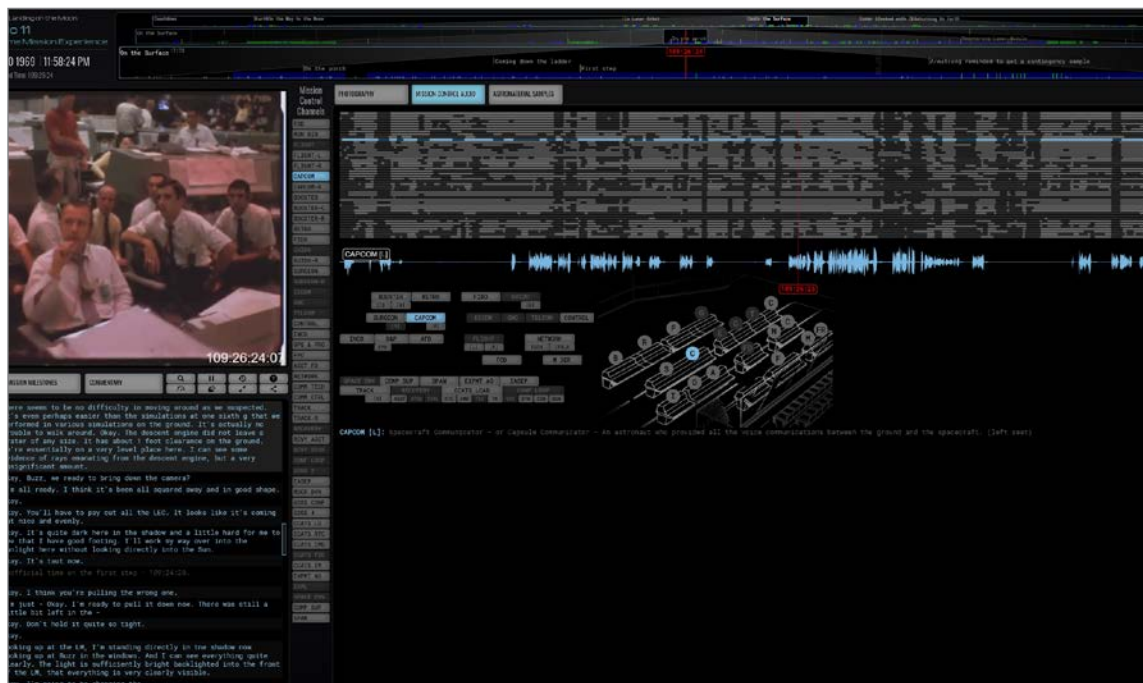
variations and overall playback speed problems. It was looking like it would be impossible to sync them to mission time, but with the help of others, I was able to crack the case."<sup>2</sup>

This is not Feist's first foray into space history. Inspired by the Apollo Lunar Surface Journal (ALSJ),<sup>3</sup> a Web site that holds a vast collection of Apollo media, he had created a similar Web site that recreates the Apollo 17 mission. Feist wanted to make an experience with the same depth and breadth of information as the ALSJ, but one that had even more interactive capabilities. So, in 2009, he began a six-year project that would later become <https://apollo17.org/>. Like <https://apolloinrealtime.org>, every media element in <https://apollo17.org> is synced to mission time. The site <https://apollo17.org> ended up sharing much of its code with <https://apolloinrealtime.org>. However, for

1 The article will refer to different points during the mission. These moments are marked by their time stamp and hyperlinked to <https://apolloinrealtime.org>. This particular moment happened on the 34th hour, 48th minute, and 49th second of the mission and can be found here: <https://apolloinrealtime.org/11/?t=034:48:47&ch=13>.

2 All quotes from Ben Feist are taken from an e-mail interview between Feist and the author in June 2019.

3 Found at <https://www.bq.nasa.gov/alsj/>.



Pictured is Apollo 11 in Real Time with its Mission Control panel open. Visitors can explore the audio by clicking on the console of the Mission Control position they want to hear.

<https://apolloinrealtime.org>. Feist expanded his project by adding the new Mission Control audio and the information on lunar samples. Additionally, he developed a mobile version of the site that focuses on Mission Control.

Feist recently joined the Astromaterials Research and Exploration Science Division at Johnson Space Center (JSC) as a software engineer. Feist's job is, in his own words, "to create new techniques to manage and visualize the large quantity of proliferating real-time scientific and operational data on future missions, with the aim of enabling future crews and mission managers to be able to quickly jump back to a previous moment during a mission in order to triage, understand, and act upon timely information." His data visualization

in real-time work draws in no small part on his Apollo in Real Time projects.

Beginning 16 July, visitors to the Web site will be able to click the "Now" launch button and experience the mission exactly 50 years later to the second. The visitor will get to experience moments that have been immortalized in history books. The launch of the rocket (00:00:00),<sup>4</sup> the first steps on the Moon (109:23:40),<sup>5</sup> the landing of the Eagle (102:46:02):<sup>6</sup> these are moments that are typically viewed in a global and historical context. However, it is Mission Control that is given the spotlight on <https://apolloinrealtime.org>. Even 50 years later, the tension in Houston is palpable. When the Lunar Module (LM) touches the lunar surface, you can feel the collective exhalation and watch the anxious hands unclasp in relief.

<sup>4</sup> Found at <https://apolloinrealtime.org/11/?t=-00:00:07>.

<sup>5</sup> Found at <https://apolloinrealtime.org/11/?t=109:23:40>.

<sup>6</sup> Found at <https://apolloinrealtime.org/11/?t=102:46:02>.

The Web site reminds us that the response to “The Eagle has landed” was “You got a bunch of guys about to turn blue. We’re breathing again. Thanks a lot” (102:46:02).<sup>7</sup>

The site <https://apolloinrealtime.org> also captures the “smaller” moments of history. For example, one of Feist’s “mission highlights” is Mission Control’s morning delivery of Earth news to the astronauts, including an update on their families, a sports report, and a personalized horoscope (72:29:34).<sup>8</sup> Another endearing moment is captured during the trip to the Moon when Buzz Aldrin decides that it is time to listen to some music and plays a tape of Peggy Lee and Barbra Streisand songs (83:48:57).<sup>9</sup> Even before the rocket left the ground, some good old-fashioned teasing was caught on the recovery loop between a man in Mission Control who overslept and his amused colleagues (–02:27:33).<sup>10</sup> These small human moments are a common thread throughout the mission, reminding us that the men and women who worked on the Apollo program were, as Feist puts it, “very likable, regular people just doing a job.” What

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7 Found at <https://apolloinrealtime.org/11/?t=102:46:02>.

8 Found at <https://apolloinrealtime.org/11/?t=072:29:35>.

9 Found at <https://apolloinrealtime.org/11/?t=083:49:01>.

10 Found at <https://apolloinrealtime.org/11/?t=-02:27:33&cb=34>.



This photo of Earth from the Moon was taken by Apollo 11 astronauts on 20 June 1969. It is one of many photos time-stamped and organized temporally on <https://apolloinrealtime.org>. (Photo credit: NASA)

this Web site truly highlights is the ordinary roots of extraordinary feats.

Ben Feist has given us a gift in <https://apolloinrealtime.org>. The Apollo 11 Moon landing was a once-in-a-lifetime experience, but now the mission in its full context is at the world’s fingertips. The Web site is so filled with material that there seems to be something new to discover every minute. So take a few minutes, take an hour, take nine days and explore this gem. There’s something for everyone. Feist says it best: “If you’re a space aficionado, researcher, historian, or anyone else with a deep interest in the topic, it should deliver new insight. If you’re just mildly interested it should pull you in a little and show you what humanity can achieve when we collectively put our minds to it.”

To explore more of the Apollo 11 mission in real time, visit: <https://apolloinrealtime.org/11/>.



## 29 JANUARY 1971: APOLLO 11'S COLUMBIA LANDS IN MONTGOMERY, ALABAMA

On 24 July 1969, the Columbia Command Module splashed down in the Pacific Ocean, ending the incredible journey of Apollo 11 astronauts Neil Armstrong, Edwin “Buzz” Aldrin, and Michael Collins. From the moment the powerful Saturn V launched from Kennedy Space Center on 16 July until recovery by the aircraft carrier Hornet crew, the world had watched with pronounced anticipation as the bold mission unfolded on television sets in homes, bars, and storefronts across the globe.

In 1970 and 1971, the recovered Apollo 11 Command Module Columbia embarked on another journey—this one consisting of a 13-month tour of the 50 states and Washington, DC. The tour brought the celebrated space hardware directly to the communities of the men and women who had labored diligently to

solve the lengthy list of difficult technical, logistical, and political challenges faced throughout the decade of the Apollo program to accomplish the astounding feat of engineering.

The tour of Columbia was not the first of its kind. The Apollo 11 Fifty-State Tour followed the model of previous traveling national exhibits, such as the 21-state tour of the USS Constitution between 1930 and 1934, and space hardware exhibits, including the tour of John Glenn’s Mercury Friendship 7 in 1962 and Gordon Cooper’s Mercury Faith 7 tour in 1963 and 1964. Altogether, the Apollo 11 tour covered approximately 26,000 miles nationwide—14,000 by land and 12,000 by sea—opening in Sacramento, California, on 17 April 1970 and culminating in Anchorage, Alaska, the only non-capital city visited, in May 1971.

Columbia was not the only Apollo 11 artifact included in the mobile exhibit. Displayed alongside the 6-ton spacecraft was a small lunar rock collected during the



Visitors lined up for a tour of the Apollo 11 Command Module in front of the Alabama Capitol Building. (Photo courtesy of the Alabama Department of Archives and History)



A crowd of visitors gathers on the grounds of the Alabama Capitol Building in Montgomery to see the Apollo 11 Command Module in January 1971. (Photo courtesy of the Alabama Department of Archives and History)



mission, along with the spacesuits worn by all three of the Apollo 11 astronauts, a sampling of space food, Buzz Aldrin's glove, a medical kit, a Norman Rockwell painting of the Lunar Module, and a pair of sunglasses. While Columbia received the bulk of the attention, a cutaway model spoke directly to Alabama's primary contribution to the mission—the Saturn V launch vehicle.

The Apollo 11 Command Module arrived in Montgomery on 29 January 1971, just two days before the launching of the Apollo 14 lunar landing mission. The recently reelected Alabama Governor George Wallace spoke at the opening ceremony, with Alabama State Finance Director General Taylor Hardin presiding over the event. The 1970 Alabama Democratic primary had been a closely contested affair, with Wallace narrowly defeating the incumbent, Albert Brewer, in a runoff. While Brewer counted Marshall Space Flight Center Director Dr. Wernher von Braun among his close friends, Wallace was a longtime opponent of federal influence in the state—particularly related to the battle over civil rights and the process of desegregation. The celebration of such a profound national achievement seemed to override the deep wounds of past conflicts.

With interest in the Apollo missions diminishing in the aftermath of the success of Apollo 11, NASA expended considerable public affairs efforts promoting the tour at each stop. As part of the Alabama tour advertising, Marshall employees Ludie Richards, Richard Smith, and Lucian Bell appeared on the Alabama Education Television Network to discuss the specifics of the Apollo 11 mission, including the state's own role in the program. Meanwhile, the director of the space sciences laboratory at Marshall, Gerhard Heller, discussed scientific results from the lunar landing before two groups of Alabama science teachers on 29 January in the auditorium of the State Department of Education in Montgomery.

Turnout for the first day of the exhibit exceeded even the highest expectations. Several civic leaders and NASA officials attended the opening, including Lieutenant Governor Jere Beasley and several Marshall



Columbia tour director Ellwood Johnson guides Alabama Governor George C. Wallace and his wife Cornelia Wallace through the exhibit. Alabama Lieutenant Governor Jere Beasley is standing directly behind Wallace. (Photo courtesy of the Alabama Department of Archives and History)



This image shows the Apollo 11 Command Module exhibit before opening. (Photo courtesy of the Alabama Department of Archives and History)



Alabama Governor George Wallace cuts the ribbon on the Apollo 11 Command Module Columbia exhibit in Montgomery, Alabama, on 29 January 1971. Pictured from left across front are Ellwood Johnson, Cornelia Wallace, Governor George Wallace, Richard Cook, and Alabama Junior Miss Gale Robertson. (Photo courtesy of the Alabama Department of Archives and History)

administrators, including Deputy Director Richard W. Cook, Deputy Associate Director for Science Dr. George C. Bucher, Deputy Director for Public Affairs Foster A. Haley, and Gerhard Heller.

Over three days of the exhibit's time in Montgomery, approximately 89,000 visitors arrived on the grounds of the State Capitol to pass through the lunar exhibit—a number NASA reported to be “among the best at any capital in the tour.” Alabamians took pride not only in the great national accomplishment of completing President John F. Kennedy's monumental goal, but also in their state's own vital contributions to

the lunar landing. During the years of the Saturn program, the economy of North Alabama in particular transformed from one dominated by rural agriculture to a Sun Belt economy characterized by increasingly technical fields.

Of course, Montgomery was just one stop on the Apollo 11 Command Module's pilgrimage across the country. The NASA final report produced in the aftermath of the tour proclaimed that everyone from “babes-in-arms to senior citizens” had “regularly queued up in lines several blocks long” and waited for several hours to see firsthand the historic space hardware. The turnout of more than three and a quarter million spectators over the period from 1970 to 1971 spoke to the high level of national pride in the success of the Apollo program.

Following the final stop in Anchorage, Alaska, the Apollo 11 Command Module made its way back to Washington, DC, where it was displayed in the Smithsonian's Arts and Industries Building before being installed as a permanent exhibit in 1976 in the halls of the newly opened

National Air and Space Museum. In 2017, the Command Module took to the road again, embarking on another tour that will carry it to Houston, St. Louis, Pittsburgh, and Seattle before finally returning home to the Air and Space Museum in 2020, where it will be part of a new exhibit: “Destination Moon: The Apollo 11 Mission.” From its original launch in July 1969 to its eventual return to Washington, DC, the Apollo Command Module continues to inspire new generations of Americans and serve as a testament to a monumental national fulfillment of an audacious presidential objective.

## NEWS FROM HEADQUARTERS AND THE CENTERS

### NASA HEADQUARTERS

Washington, DC

#### History Division

By Bill Barry

You might think that with the highly predictable 50th anniversary of Apollo 11 anchoring the middle of the year, life in the History Division might be busy, but largely a matter of executing long-standing plans. If any of us were thinking, or hoping, for that, we've been proven wrong. Change, and surprising demands, have continued to rule our days here. Perhaps the biggest change is that we lost Andres Almeida... again. This time, though, he was poached away by our own NASA social media team. So Andres isn't really gone this time. Even better, the company he worked for (TSI, Inc.) moved very quickly to hire an ARU (Andres Replacement Unit). We had a tremendous group of applicants for the position, so the final choice must have been hard. But we now have Catherine (she goes by Cat) Baldwin on the team. If that name seems somewhat familiar, it is probably because Cat was one of our summer interns three years ago. Since that time, she has graduated from St. John's College (Annapolis) and was working in Baltimore before returning to the NASA History fold. After a few weeks' gap between Andres's departure and Cat's arrival on 18 June, she had to jump in at the deep end. But, having been captain of the St. John's crew team, she seems pretty comfortable in the water.

If you come by for a visit, you will notice some recent changes to our archival spaces. Chief Archivist Robyn Rodgers noted that our visiting researcher area did not meet current standards and implemented some changes that make for a more open, welcoming,

and secure space. Just as we had implemented that change, we were informed that overcrowding on the fifth floor of Headquarters was going to force the movement of our interns and our ARU (i.e., Cat) downstairs into the archive office space. This took quite a bit of rearranging and caused no shortage of problems. But we now have a very full house in room CP72. The residents there now include our three contract archivists (Colin Fries, Liz Suckow, and Craig Haibon), Cat Baldwin, and our two (outstanding) summer interns (Gwendolyn Rak and Claire Smrt). Gone are the days when Colin and Liz were the only people in the space apart from the occasional researcher.

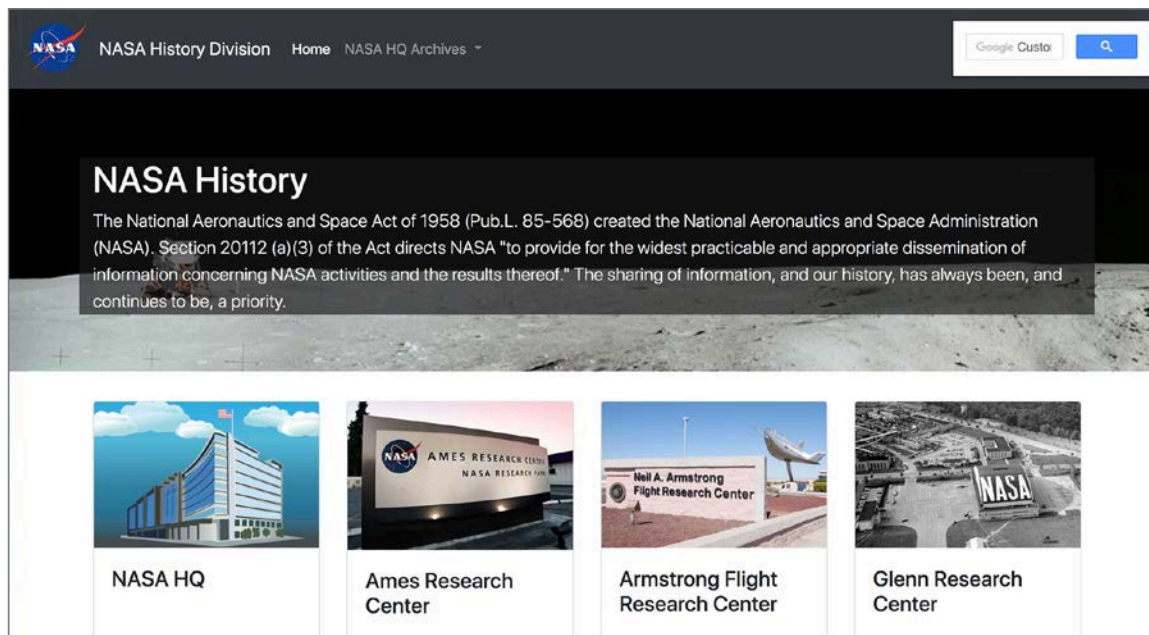
**“CHANGE, AND SURPRISING DEMANDS, HAVE CONTINUED TO RULE OUR DAYS HERE.”**

In early May, we held the annual History Program Review and Training at Armstrong Flight Research Center. We didn't have a lot of lead time to plan the event, and Nadine Andreassen had some

personal challenges that prevented her from traveling to the actual meeting. But, with outstanding support from our hosts at Armstrong and extra effort from Andres and the team here, the Program Review was a great success. I'd especially like to highlight the outstanding work by Christian Gelzer, Armstrong's historian. We couldn't have asked for a better host, and he really made maximum use of all the tools at his disposal. (I was particularly delighted to see that so many of our archivists and historians demonstrated amazing pilot skills when tossed into one of the Armstrong flight simulators.)

The rest of May and all of June were a blur of Apollo anniversary planning (and replanning) meetings, multiday meetings on the Mission Support Future Architecture Program (MAP), and work to keep the History Division functional. In that latter category, we finally got Steve Garber and Glen Asner's new book, *Origins of 21st-Century Space Travel*, in print and out





Shown above is the redesigned home page for the NASA History Division.

into distribution on the last day of June. The manuscript had been completed and ready to print last fall. Between problems with the government contract printers and the shutdown last winter, this project was pushed way past the originally planned release date. We'll have more about the book in our next newsletter. The Monday after the book release, an article that Steve coauthored with Jim Veddha of the Aerospace Corporation was published in the *Space Review*. It was a great start to the Fourth of July holiday week for Steve. Regarding MAP, we've been looking at communications functions across the Agency, and one of the questions that came up early on was whether or not the history program was primarily focused on communications. That is a complicated question, and with the crush of anniversary work, the MAP team had agreed to defer the issue. However, the MAP plan for communications is supposed to be completed (at least the initial plan) by mid-August. So, as soon as the Apollo anniversary activities are over, we'll be deep into working on MAP questions. There is much yet to be settled on the structure and operation of the history program.

One thing that is almost done is a revamp of the History Division Web site—<http://history.nasa.gov>. This site was one of the earliest of NASA's efforts on the Internet and is an invaluable resource. It has also always been a shoestring effort, with the work being done either in-house (largely by Steve and Colin) or by outside volunteers. The last overhaul in the mid-2000s was great for its time, but with the rapid evolution of the Web, the site has needed an update for the last 10 years. Several overhaul attempts have been foiled by budget cuts and other problems while we watched usage numbers stagnate and then begin to slide downward. Analysts told us that the big problem was that the site was not mobile-friendly. Moreover, in keeping with trends and open-government directives, we wanted to make the site more than a collection of links and static articles. We needed to make this a site where researchers could make use of the tremendous wealth of our Historical Reference Collection for their own research. Fortunately for us, Robyn Rodgers not only had some ideas about how to do this, but she also had an interest in coding (and an incredible appetite for tough problems). Robyn single-handedly



created a new, mobile- and researcher-friendly interface this spring. As I write this, the Headquarters Communications Support Services Center is finalizing testing on the site with Robyn. Very soon, when you go to <http://history.nasa.gov>, you will find a new site. We'll be looking for your feedback on the site, so don't be shy to let us know what we can do to make it even better.

## AMES RESEARCH CENTER (ARC)

**Moffett Field, California**

By April Gage, Jonathan Ikan, and James Anderson

We are pleased to announce the arrival of a new Ames historian and introduce the Center's Cultural Resources Manager (CRM).

James Anderson recently signed on as a new historian for NASA Ames Research Center. James returns to Ames after almost a decade. He spent a year in the former History Office as a research assistant after finishing his undergraduate studies in astrophysics and history.

After completing his master's degree in the history of science from the University of California, Berkeley, James moved to Los Angeles, where he received his master of fine arts in TV, film, and theater production from California State University, Los Angeles. His dual background in the history of science and in media and film production represent two passions that James is looking forward to bringing together to promote the unique history of Ames and to tell contemporary stories that reveal the past's importance at ARC.

Anderson joins the Public Affairs Office as a KBRwyle contractor under the Fully Integrated Lifecycle Mission Support Services contract. He will collaborate with archivists April Gage and Danielle Lopez, who oversee the History Archives at Ames. Together, they will explore ways to make the Center's past relevant to its future.

As an early career architect, Jonathan Ikan has been serving Ames Research Center for five years now. Through NASA's Pathways program, he is currently pursuing his graduate degree from the National



James Anderson. (Photo credit: Original tintype by Eric Mertens)



Jonathan Ikan. (Photo credit: Jonathan Ikan)

Architectural Accrediting Board (NAAB)—accredited Academy of Art University. In May 2019, Jonathan will graduate and receive his master of architecture degree. He aims to use his higher education to help bring to life Ames's Campus of the Future. Since Keith Venter's departure in 2017, Jonathan also has served as the Center's Cultural Resources Manager (CRM). In this capacity, he oversees the preservation of Shenandoah Plaza Historic District and the newly nominated Historic Wind Tunnel District through the preparation and review of section 106 of the National Historic Preservation Act. As our Center's new CRM, Jonathan's goal is to promote public awareness of our historic properties and preserve them for future generations. Jonathan's CRM efforts are supported by Senior Architectural Historian Trina Meiser and Senior Archivist April Gage.

Danielle K. Lopez and April Gage remain busy in the Ames History Archives and Life Sciences Data Archives. Highlights of their activities include their support of the NASA Astrobiology Institute's efforts to prepare an archive of the institute's history as it approaches its 20th anniversary and closure, as well as their assistance with a wide range of historical research projects on topics such as the formation of the field of astrobiology (researcher Ian Varga), the history of the Center's Entry Systems and Technology Division (Branch Chief David Hash), the Galileo Project, a graphic novel geared toward young audiences (author Holly Thomason), and the Center's contributions to the Apollo program and exploration of Earth's Moon and Mars (Public Affairs Office). A processing milestone of note this period is the completion of significant updates to the Public Affairs Office Collection with an accrual of three sets of digital material (nearly 16,000 digital items). The first two sets of material include a collection of press releases from 2006 to 2013 and a set of Ames Center-wide announcements spanning 21 years, from 1997 to 2018. The third set of material comprises digitized video footage and audio recordings, primarily consisting of television news footage of a variety of Ames-managed programs and projects such as Pioneer missions and airborne science efforts. April and Danielle also assisted the

San Francisco Museum of Modern Art in organizing a collection of space art from the History Archives that includes works by artists Rick Guidice, Roger Arno, and Chesley Bonestell. The museum plans to show them in an upcoming exhibition entitled *Far Out: Suits, Habs, and Labs for Outer Space*, which opens this July and will run through January 2020.

As the recently appointed Center Artifacts Manager, April formed an artifacts working group composed of representatives from Ames archives and the Logistics, Public Affairs, Historic Preservation, Records Management, and Director's offices. The group is making progress toward formulating a coordinated artifacts management program at the Center. Other efforts include making historical artifacts available to U.S. institutions through the NASA Artifacts Module powered by the General Services Administration, where they will be accessible to a wider public audience. Through this module, objects related to the history of Ames have already been apportioned to the Smithsonian's National Air and Space Museum, the Space Museum in Maryland, and a high school in South Dakota.

Finally, a massive new collection of memoirs documenting 20 years of collaboration between NASA and the U.S. Army was released this period. Entitled



**A MASSIVE NEW COLLECTION  
OF MEMOIRS DOCUMENTING  
TWENTY YEARS OF COLLABO-  
RATION BETWEEN NASA AND  
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THIS PERIOD.**



*Memoir: Figures of Merit—Remembrances of Those Who Built an Army—NASA Collaboration and a New Age of Rotary-Wing Technology, 1965–1985* (NASA SP-2018-3713), this work is the product of 40 scientists,

engineers, technicians, secretaries, test pilots, and leaders who participated in the interagency collaboration under an Army-NASA Joint Agreement at Ames. Edited by Robert Ormiston and Irving Statler, the book is available online in full text on both the NASA Ames Aeromechanics Branch and History Archives Web sites.

## ARMSTRONG FLIGHT RESEARCH CENTER (AFRC)

Edwards Air Force Base, California

By Christian Gelzer

Following a request, the Armstrong History Office loaned a set of artifacts to the Richard M. Nixon Presidential Library in Yorba Linda, California, which wanted to host an exhibit on the space race and Apollo 11, as well as Nixon's decision to cancel the remaining Apollo missions and invest in the Space Shuttle instead. The exhibit was scheduled to run for six months. Among the artifacts we loaned were the Lunar Landing Research Vehicle and Lunar Landing Training Vehicle's side arm controller (plucked from Gemini VI-A and slightly modified) from which Neil Armstrong ejected in May 1968, a flown Shuttle tire, and Joe Walker's X-15 MC-2 full-pressure suit (with mannequin) and helmet. Walker became the first X-15 pilot to reach space and the first human to do so three times, achieving that on 17 January 1963, 19 July 1963, and 22 August 1963, the last flight coming almost within a month of the previous spaceflight. The library is having a grand opening the weekend of 20 July, should anybody be in the area and want to participate.

Christian Gelzer was interviewed by a French television production company for an upcoming program on NASA aeronautics; during the show, he presented a talk on "lessons learned from going fast." He discussed the transonic realm, the XB-70 and Mach 2 and 3, the X-15 and Mach 6+, and hypersonic flight by NASA and the Air Force, along with other aircraft. He focused on information gleaned from these projects and programs that is not obvious or common



On 17 January 1963, NASA research pilot Joe Walker flew the X-15 rocket plane to an altitude of 271,000 feet (51 miles), becoming the first civilian test pilot to exceed 50 miles in altitude. The flight was a precursor to his record altitude flights in July and August of the same year. (Photo credit: NASA)

knowledge. There is a lull in the digitization process as the vendor churns through the material it has (a backlog), after which we will resume shipping pallets. We have begun collecting material from existing engineers, the idea being not to wait for their departure to start this process. X-43 documents are the target in this first pass.

## GLENN RESEARCH CENTER (GRC)

Cleveland, Ohio

By Anne Mills

Glenn Research Center has kicked off its Apollo 50th anniversary celebration. A special exhibit, “Apollo and the Next Giant Leap,” was on display in our employee services building. As part of the exhibit closing, 11 employees who started their careers during the Apollo program were recognized for their service. The highlight of our Apollo 50th anniversary celebration will be our participation in the Summer Moon Festival in Wapakoneta, Ohio, in July. If you are interested in learning more about Glenn’s contributions to the Apollo program, check out this site: <https://www1.grc.nasa.gov/glenn-history/glenn-impact-on-the-apollo-program/>.

The 75th anniversary of the first run in Glenn’s historic Icing Research Tunnel (IRT) took place on 9 June. Getting the IRT up and running quickly was critical to the war effort. The tunnel required complex engineering in order to duplicate the conditions of

aircraft flying through clouds capable of producing ice. Notably, Willis Carrier, the father of air conditioning, was personally involved with the development of the massive cooling system necessary for the wind tunnel. Over the next several years, the tunnel’s spray system was further improved to mimic the natural conditions in which ice is generated. Research on how ice builds up and impacts aircraft performance as well as mitigation techniques has had far-reaching impact for both military and civilian applications. Even 75 years later, the IRT continues to have a significant impact on aircraft safety. In 1987, the IRT was designated an American Society of Mechanical Engineers International Historic Mechanical Engineering Landmark for its role in aviation safety.

## JOHNSON SPACE CENTER (JSC)

Houston, Texas

By John Uri

Most of the issues first encountered after relocating the JSC History Portal to a new Web address (<https://historycollection.jsc.nasa.gov/JSCHistoryPortal/history/>) have been corrected. We encourage everyone to update their bookmarks to the new URL and ask for your help in advertising 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, which will provide the History Office with easier control over content updates and provide users with a more modern format.

We continue to expand our extensive oral history collection. While in Huntsville, Alabama, to attend the NASA in the South Symposium, Jennifer Ross-Nazzari and Sandra Johnson interviewed James Splawn, co-developer of the concept of simulating weightlessness using neutral buoyancy in water. In Houston, they conducted several interviews with Janine Bolton, Supervisor of the JSC Scientific and Technical Information Center. JSC Deputy Director Vanessa Wyche will sit with the two-member team in May (her first interview, scheduled for January, needed to be

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**THE 75TH ANNIVERSARY OF THE FIRST RUN IN GLENN’S HISTORIC ICING RESEARCH TUNNEL (IRT) TOOK PLACE ON 9 JUNE. GETTING THE IRT UP AND RUNNING QUICKLY WAS CRITICAL TO THE WAR EFFORT. THE TUNNEL REQUIRED COMPLEX ENGINEERING IN ORDER TO DUPLICATE THE CONDITIONS OF AIRCRAFT FLYING THROUGH CLOUDS CAPABLE OF PRODUCING ICE.**

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rescheduled due to the partial government shutdown). The annual interview with JSC Center Director Mark Geyer is scheduled for June. Sandra and Jennifer have made initial contacts with Dan Quayle's assistant to arrange for an oral history with the former Vice President. A similar arrangement with former Vice President Al Gore is also under consideration. Jennifer and Sandra have processed the backlogged interview transcripts, which will be uploaded to the JSC History Portal once the subjects have approved them for release.

Jennifer provided a commencement address for the Girls in STEM (science, technology, engineering, and mathematics) (GIST) Program at the American Helicopter Museum in West Chester, Pennsylvania. She spoke via Skype and talked about her work for the Agency, focusing on her research about the first six female astronauts. The Education Program Manager at the Museum wrote to Jennifer with the following thanks: "I just wanted to drop a note of thanks for the *outstanding* presentation you gave to our GIST families yesterday. Several of them approached me and told me how much they enjoyed it (one GISTER told me that you were her favorite guest speaker of the whole cycle!)."

The History Office provided support to the JSC Women Excelling in Life and Leadership (WELL) Employee Resource Group (ERG). WELL's mission is to leverage the unique perspectives of all women at JSC, attract diverse talent to JSC, and develop women in all careers across JSC. In celebration of Women's History Month, WELL hoped to draw attention to some of NASA's notable Apollo women and asked the History Office for assistance. During this month, the WELL ERG featured links to interviews with outstanding women conducted by the JSC Oral History Project and placed those links in *Roundup Today*, JSC's daily electronic newsletter.

Sandra continued to respond to a series of ongoing requests for oral history audio and video from filmmakers working on projects related to upcoming Apollo anniversaries. Of note were the following:

- A request from a filmmaker working on a short educational documentary about Apollo 10 and the *Peanuts* connection for Tremolo Productions. The request was for audio and photo identification help, specifically about Jamye Flowers Coplin, a secretary working in the Astronaut Office at the time of the mission, and the Silver Snoopy Space Flight Awareness (SFA) award history. The documentary is being made by the Academy Award-winning director Morgan Neville and the Academy Award-winning producer and director Ron Howard.
- A request from the BBC Radio Science Unit in London for oral history audio for a series they are producing on the Apollo program. The 12-part audio series called *13 Minutes to the Moon* is to mark the 50th anniversary of the first Moon landing, culminating with the final episode on 20 July.
- A request for help with access to oral histories and photos from an author working on a book about Apollo 11. Sandra provided the information, oral histories, photos, and help with her research. The author recognized the support she received, stating, "I accessed either the JSC oral histories, or the archived *Roundups*, all the images, or other info on the JSC history site almost every day for the past year! I couldn't have done this without you! I'll definitely emphasize the JSC History Office in any talks I give or articles I write. I will gladly also sing your praises in some of my social media posts I'm planning to do when the book comes out. You really provided so much help and info, and everything you did really means a lot to me!" The book titled *Eight Years to the Moon* will be available in July.

In April, two representatives of the Presbyterian Church (USA) (PC[USA]) came to Houston to capture and collect memories and information from members of the historic Webster Presbyterian Church, known as the "Church of the Astronauts," where many early Apollo engineers, astronauts, and other NASA employees attended services during those years. More than a dozen congregants sat with the team and Jennifer for a series of video interviews about the

church and the impact of the space program on the Webster congregation and surrounding community. The PC(USA) plans to place edited clips of the interviews on their Web site in July, as part of the Apollo celebration, and publish an article about the church in *Presbyterian Today*. Several congregants spoke with the PC(USA) about many space-related events, including lunar communion held on the surface of the Moon by church elder Buzz Aldrin. Jennifer intends to continue interviews with some participants and others for an in-depth study of NASA and the Clear Lake community.

Jennifer gave a talk at Space Center Houston on 15 February 2019 about the decision to rename the Manned Spacecraft Center the Lyndon B. Johnson Space Center to honor the late President for his contributions to NASA and to human spaceflight in particular.

In recognition of significant space anniversaries leading up to the Moon landing, the JSC History Office is working with the JSC External Relations Office on a continuing series of articles posted on the <https://www.nasa.gov/topics/history/index.html> Web site and JSC's Facebook and Twitter accounts. Abstracts of

the articles appear online in JSC's *Roundup Today*. The features often highlight the anniversaries of less-celebrated events and people that were nevertheless crucial to achieving the Moon landing within President Kennedy's timetable. Selected articles have also appeared as feature articles on the JSC Home Page's "Roundup Reads." We would like to thank history and archive personnel at other NASA Centers for their valued help and contributions to many of these products.

The History Office continues its effort to publish Jennifer'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.

Jennifer and Sandra attended the "NASA in the South Symposium" in Huntsville, Alabama, in March, and the Annual Meeting of the Society for History in the Federal Government in Washington, DC, in April. John attended the American Productivity and Quality Center's annual Knowledge Management conference in Houston in May. That same month, Jennifer and Sandra spent a day at Rice University to attend a Society of American Archivists course.

## OTHER AEROSPACE HISTORY NEWS

### AMERICAN ASTRONAUTICAL SOCIETY (AAS) HISTORY COMMITTEE

By Michael Ciancone, Chair

#### Apollo 1 National Memorial

The Aerospace Industries Association (AIA) requested support from the AAS History Committee in national efforts to create an Apollo 1 memorial at Arlington National Cemetery, as noted in the 2017 National Defense Authorization Act. Dr. Don Elder led a special panel of the AAS History

Committee to prepare a study on the "availability and suitability on alternative locations outside of Arlington National Cemetery." A national memorial to the Apollo 1 crew, some 50 years after their tragic deaths, will serve as a fitting tribute from our nation to three men who served their country in military uniform and at NASA. It will also recognize the importance of their sacrifice to the millions of Americans, including servicemen and -women, who supported NASA to make the triumph of the Apollo space program possible. The final study report was submitted in April 2019.

## UPCOMING MEETINGS

The Experimental Aircraft Association (EAA) AirVenture will be held **22–28 July 2019** in Oshkosh, Wisconsin. Visit <https://www.eaa.org/en/airventure> for details.

The 2019 Joint Annual Meeting of the Council of State Archivists and the Society of American Archivists will be held **31 July–6 August 2019** in Austin, Texas. Visit <https://www2.archivists.org/conference> for details.

The annual meeting of the Society for Social Studies of Science (4S) will be held **4–7 September 2019** in New Orleans, Louisiana. Visit <http://www.4sonline.org/meeting> for details.

The 70th International Astronautical Congress will be held **21–25 October 2019** in Washington, DC. Visit <https://www.iac2019.org> for details.

## RECENT PUBLICATIONS

### COMMERCIALLY PUBLISHED WORKS

Compiled by Chris Gamble

*The Space Treaties at Crossroads: Considerations de Lege Ferenda*, edited by George D. Kyriakopoulos and Maria Manoli (Springer, February 2019). This contributed volume addresses the future development of space law in light of our ever-growing space activities, the multiplicity of new space actors, and the challenges posed by novel space technologies.

*The Moon Hoax?: Conspiracy Theories on Trial*, by Thomas Eversberg (Springer, February 2019). This book addresses, analyzes, and debunks the conspiracy theories about the American Moon landings.

*Exploring Planetary Climate: A History of Scientific Discovery on Earth, Mars, Venus and Titan*, by Ralph D. Lorenz (Cambridge University Press, February 2019). This book chronicles the history of climate science and planetary exploration, focusing on our ever-expanding knowledge of Earth's climate, as well as the parallel research under way on some of our nearest neighbors: Mars; Venus; and Titan, Saturn's moon.

*Space 2.0: How Private Spaceflight, a Resurgent NASA, and International Partners Are Creating a New Space Age*, by Rod Pyle (BenBella Books, March

2019). The author, in collaboration with the National Space Society, gives an inside look at what the next few decades of spaceflight might look like and long-term plans for exploration, utilization, and settlement.

*Earth from Space*, by Michael Bright and Chloe Sarosh (BBC Books, March 2019). This book contains over 200 images showing Earth's surface, megastructures, weather patterns, and natural wonders in detail.

*Afterglow: Reflections on the Golden Age of Moon Explorers*, by Derek Webber (Curtis Press, April 2019). This book provides a record of the human tales and complexity behind the technological triumph of Apollo, how going to the Moon affected the astronauts, and the lives they led upon returning to Earth.

*Shoot for the Moon: The Perilous Voyage of Apollo 11*, by James Donovan (Little, Brown and Company, March 2019). This book covers the dangers, the challenges, and the sheer determination that defined not only Apollo 11, but also the Mercury and Gemini missions that made it possible—as seen through the eyes of those who lived through those programs.

*Space Utopia: A Journey in Space Exploration History from the Apollo and Sputnik Programmes to the Next Mission to Mars*, by Vincent Fournier (Rizzoli, March

2019). This unique collection of photographs features over 10 years' worth of collaborations with the most important space and research centers in the world, resulting in a one-of-a-kind story of the human race to the stars.

*The Color of the Moon: Lunar Painting in American Art*, edited by Laura L. Vookles (Fordham University Press, March 2019). The Moon—its face, color, and power—threads through the tapestry of American landscape painting, holding timeless allure for artists and beloved by viewers of paintings everywhere. The Hudson River Museum has organized *The Color of the Moon: Lunar Painting in American Art*—the first major museum examination of the Moon in American visual arts from the 19th through the 20th centuries for a 2019 exhibition. This presentation also celebrates the 50th anniversary of the Apollo 11 mission.

*Hasselblad & the Moon Landing*, by Deborah Ireland (Ammonite Press, March 2019). This book looks at the history of the Apollo 11 mission through the lens of the Hasselblad camera while narrating the parallel tale of the challenge to create a camera that could work on the Moon.

*Universe Manual: From 13.7 Billion Years Ago to Infinity and Beyond*, by David M Harland (Haynes Publishing UK, March 2019). This book brings together the many fascinating theories of our universe, from the earliest philosophies to today's cutting-edge scientific discoveries. Collectively, it aims to explain the origin and evolution of the universe at large, the processes by which planetary systems form, and the chances of life being ubiquitous beyond our own planet.

*The Soviet Space Program: The Lunar Mission Years: 1959–1976*, by Eugen Reichl (Schiffer Publishing, March 2019). This book chronologically examines the 59 missions the USSR sent or intended to send to the Moon from 1959 to 1976.

*Mars*, by Rod Pyle (Andre Deutsch, Ltd., March 2019). With access to NASA's archives, the author traces the exploration of Mars from fleeting telescopic examinations of the first flybys in the 1960s, through the landers of the 1970s, to the increasingly sophisticated rovers and orbiters now exploring every region of the planet.

*The Space-Age Presidency of John F. Kennedy: A Rare Photographic History*, by John Bisney and J. L. Pickering (University of New Mexico Press, March 2019). This work captures the compelling story of John F. Kennedy's role in advancing the United States' space program, set against the Cold War with the Soviet Union.

*American Moonshot: John F. Kennedy and the Great Space Race*, by Douglas Brinkley (Harper, April 2019). This book discusses the extraordinary political, cultural, and scientific factors that fueled the birth and development of NASA and the Mercury, Gemini, and Apollo projects, which shot the United States to victory in the space race against the Soviet Union at the height of the Cold War.

*Understanding Space Strategy: The Art of War in Space*, by John J. Klein (Routledge, March 2019). This book examines the rise of great power competition in space, including the relevant and practical space strategies of China, Russia, the United States, and other countries. The work discusses the concepts and writings of past strategists, such as Thucydides, Sun Tzu, and Clausewitz, in relation to warfare initiated in or extending into space. This analysis underscores why policies initiate war based upon an assessment of fear, honor, and interest and explains why this will also be true of war in space.

*Understanding Gaia: A Mission to Map the Galaxy*, by Gabriella Bernardi and Alberto Vecchiato (Springer-Praxis, March 2019). This book provides a report on the European Space Agency's Gaia mission that will provide a complete and high-precision map of the positions, distances, and motions of the stars in our galaxy.



*The Mission of a Lifetime: Lessons from the Men Who Went to the Moon*, by Basil Hero (Grand Central Publishing, April 2019). The author chronicles the life lessons humanity can learn from the 12 remaining Apollo astronauts who went to the Moon.

*Rockets and Missiles of Vandenberg AFB: 1957–2017*, by Joseph T. Page II (Schiffer Publishing, April 2019). This book chronicles the launches by rocket/missile, launchpad location, and payload. The launches at Vandenberg helped drive the technological innovation and deterrence that helped the United States win the Cold War.

*The Book of the Moon: A Guide to Our Closest Neighbor*, by Dr. Maggie Aderin-Pocock (Abrams Image, April 2019). The author discusses the Moon's topography, composition, formation, and orbit around Earth. She discusses humanity's relationship with the Moon and how the Moon has influenced culture throughout the years—and then looks to the future, analyzing the pros and cons of continued space travel and exploration.

*Apollo Expeditions to the Moon: The 50th Anniversary Edition*, by Edgar M. Cortright (Dover Publications, April 2019). This special edition of *Apollo Expeditions to the Moon* is an official NASA publication with essays by participants—engineers, astronauts, and administrators—who recall the program's unprecedented challenges.

*Japanese Missions to the International Space Station: Help from the East*, by John O'Sullivan (Springer-Praxis, April 2019). This book tells the story of the Japan Aerospace Exploration Agency astronauts who have visited the International Space Station and how they have lived on board, helped construct the space laboratory, and performed valuable scientific experiments.

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

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## “OLD VIKING” ANGELO “GUS” GUASTAFERRO DIES

By Cat Baldwin

On 9 June 2019, the aerospace world lost an influential member of its community. Angelo “Gus” Guastafarro, the former Deputy Director of NASA Ames Research Center, passed away in Williamsburg, Virginia, at the age of 85. He is survived by his three sons and eight grandchildren.



Angelo “Gus” Guastafarro’s personnel portrait for the Viking Program taken in 1977. (Photo courtesy of NASA’s Viking Archives Collection)

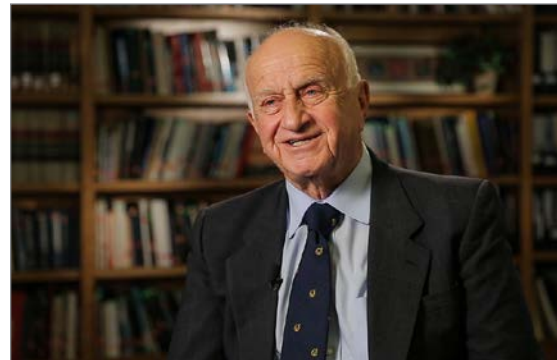
Angelo Guastafarro was 22 when he held one of his first leadership roles. The young man, known to many as Gus, began his distinguished managerial career as a project manager at Eglin Air Force Base, where he was tasked with converting the B-47 to fly as a remotely controlled drone. He took the responsibility very seriously, an attitude that would inform his career.

Guastafarro went on to be the Deputy Manager on the Viking Program at Langley Research Center. The Viking program was the United States’ most ambitious early mission to Mars, and Viking 1 became the first American spacecraft to land on another planetary body since the Apollo program. Guastafarro’s leadership was invaluable to the success of this program.

After working on the Viking Program for eight years, Guastafarro went on to become the Director of Planetary Programs at NASA Headquarters in Washington, DC, and subsequently the Deputy Director of NASA Ames Research Center. Guastafarro retired from NASA in the early 1990s and transitioned into the role of vice president of civil space for Lockheed Martin. Despite being retired, Gus

remained involved with NASA. He served as a consultant on future space systems and lent his project management expertise to creating professional development programs for new NASA employees.

Guastafarro’s leadership had a reach that extended far past his professional life. Throughout his life, he gave back to the community in various leadership and volunteer roles. He served as board chairman for the Hampton Roads Technology Council, a board member of Catholic Student Ministries at St. Bede Catholic Church in Williamsburg, a board member of the Virginia Symphony Orchestra of Williamsburg, as well as many other organizations.



Gus commenting on the “Viking 40th Anniversary: Legacy of Viking” podcast in 2016. (Photo courtesy of NASA)

Gus Guastafarro was a guiding force at NASA for 22 years. His philosophy on leadership and his “people first” attitude shaped everything he touched, from his time with the Air Force to his role in the Viking missions and into his tenure at Lockheed Martin. In his own words, “a process doesn’t get the spacecraft built. A logo or motto doesn’t make it happen. It’s the people.”<sup>1</sup>

1 Angelo “Gus” Guastafarro, “A Lengthy Career’s Lessons on Risk,” NASA Academy of Program/Project & Engineering Leadership (APPEL) Knowledge Services, 1 January 2005, available at <https://appel.nasa.gov/2005/01/01/a-lengthy-careers-lessons-on-risk/> (accessed 3 July 2019).

## IMAGE IN NASA HISTORY

Jubilant flight controllers at the Mission Control Center's Mission Operations Control Room celebrate the successful conclusion of the Apollo 11 Moon landing mission.



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