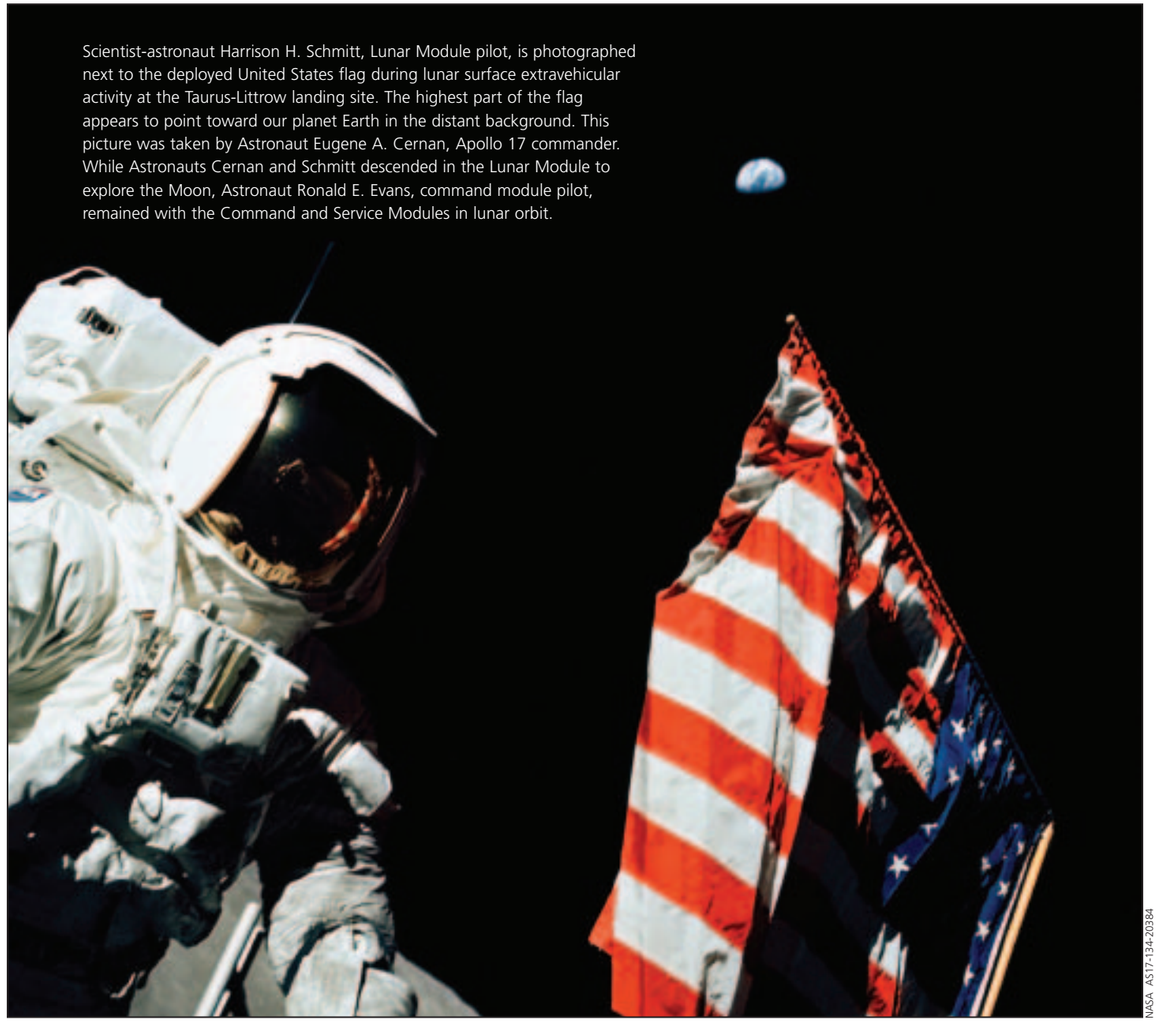
One giant leap for mankind



Scientist-astronaut Harrison H. Schmitt, Lunar Module pilot, is photographed next to the deployed United States flag during lunar surface extravehicular activity at the Taurus-Littrow landing site. The highest part of the flag appears to point toward our planet Earth in the distant background. This picture was taken by Astronaut Eugene A. Cernan, Apollo 17 commander. While Astronauts Cernan and Schmitt descended in the Lunar Module to explore the Moon, Astronaut Ronald E. Evans, command module pilot, remained with the Command and Service Modules in lunar orbit.

NASA AS17-134-20384

Space Center Roundup

The Roundup is an official publication of the National Aeronautics and Space Administration, Johnson Space Center, Houston, Texas, and is published by the Public Affairs Office for all Space Center employees. The Roundup office is in Bldg. 2, Rm. 166A. The mail code is AP121. Visit our Web site at: **www.jsc.nasa.gov/roundup/weekly/**
For distribution questions or to suggest a story idea, please call 281/244-6397 or send an e-mail to roundup@ems.jsc.nasa.gov.

Joanne Hale Editor
Kendra Phipps Assistant Editor
Marshall Mellard Graphic Designer

PRSRT STD
U.S. POSTAGE
PAID
WEBSTER, TX
Permit No. G27

Roundup

volume 43/7 Number

SPACE CENTER ROUNDUP
Lyndon B. Johnson Space Center

NASA AS11-40-5880

One small step for man...

"Here men from the planet Earth first set foot upon the Moon, July 1969 A.D. We came in peace for all mankind."

Quote from the plaque affixed to the Lunar Module and signed by Neil Armstrong, Michael Collins, Edwin (Buzz) Aldrin and President Richard Nixon.

35th anniversary coverage of the first Moon landing begins on page 12

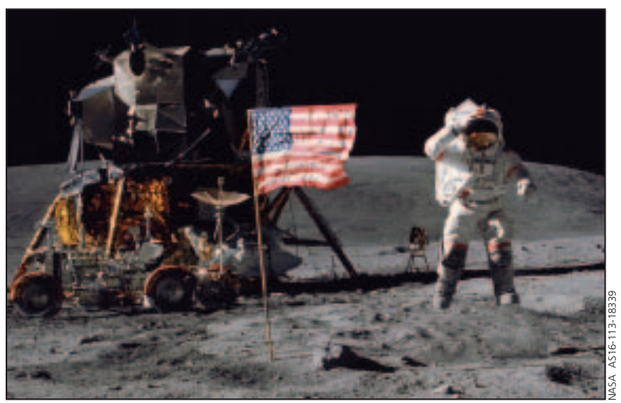
July 2004
Houston, Texas

Special Guest...

A MESSAGE FROM ASTRONAUT JOHN W. YOUNG, APOLLO 16 COMMANDER

THE 35TH ANNIVERSARY of the Apollo 11 Moon landing is a good time to look at the past and think of the future. The Apollo lunar missions were building block missions. Every mission took all the techniques and procedures of the past missions and filled in their parts. In those days we all worked many hours around the clock to get the job done.

The Apollo 11 landing was indeed a giant leap for mankind. Mission Control team members came through with their knowledge that the software computer alarms were of no worry to the crew and allowed the landing approach to continue. When Neil took over the manual control and flew over the block field surrounding a large crater and then landed nearly out of fuel, we all were very thankful that he was successful. Many do not remember that after extra vehicular activity on the Moon, Neil and Buzz got a chance to sleep. Then, after igniting the Lunar Module's Ascent Stage engine to pick up the 6060.2 fps that Apollo 11 needed to get their rendezvous orbit, the single motor fired for almost 440 seconds. About three days later the Command Module splashed down in the Pacific, nose down. The crew got the Command Module up-righted and were hauled aboard the USS Hornet. Then, the rest of us could catch our breath. Neil, Buzz and Mike had performed an outstanding mission.



NASA AS16-113-18339

Astronaut John W. Young, commander of the Apollo 16 lunar landing mission, leaps from the lunar surface as he salutes the United States flag at the Descartes landing site during the first Apollo 16 EVA.

Even now, we are still just beginning. Now we have a new space vision. Civil service and contractor folks at JSC and all over the country will be busy developing the technologies we will need to get astronauts back to the Moon and on to Mars. What will those technologies be? Clearly, we will need heavy lift to put a lot of equipment on the Moon. Advanced ideas have looked at Shuttle derived launch vehicles that can put 100 metric tons to 150 nm in orbit. To live on the Moon we will need reliable advanced life support systems that will be 100 percent recycled food, water and waste. We will need to be able to terraform to grow crops such as vegetables and wheat. Large inflatable structures on the lunar surface will provide habitats – places to live and grow crops. We will need storm shelters to under one and one-half meters of regolith to protect us from the radiation of bad solar flares. The lunar base must be power rich. Reliable uninterruptible electric power is required. Initially, we believe uranium powered reactors can develop 300 kw inside a large garbage can generator. If, as some predict, the rims of some craters at the Moon's South or North Pole are in daylight nearly 100 percent of the time, solar arrays can provide electrical power. Design, development, test and checkout of the Crew Exploration Vehicle and the Lunar Landing Vehicle will be a big job. We worked that job for Apollo 11. Of course, we will require lightweight, high performance, comfortable, highly mobile pressure suits. Large inflatable-pressured rovers will greatly improve lunar surface exploration.

Although 35 years have passed since the Apollo 11 landing, the next 35 years with everyone busy at JSC are going to be even more spectacular.

REMEMBERING THE LEGACY OF

President Ronald Reagan

PRESIDENT REAGAN'S BOUNDLESS OPTIMISM about America manifested itself in many ways. Among them was his energetic and unbridled support for NASA's space exploration program. Less than three months after he took the oath of office, on April 12, 1981, the Space Shuttle *Columbia* launched on its first mission, and after a six-year hiatus, Americans were back in space to stay.

Following the initial successes of the Space Shuttle Program, space policy took on a new level of national importance in the Reagan Administration. In his 1984 State of the Union Address, President Reagan announced plans for a permanent human presence in space with the construction of a space station, and he tasked NASA to include the international community to be a part of a project designed for the benefit of everyone on Earth.

GPN-2000-001655

President Ronald Reagan's term saw triumph and tragedy for NASA – from the first Space Shuttle mission in 1981, to his 1984 call to develop a permanently crewed space station, to the 1986 Challenger *disaster. His moving tribute to the seven* Challenger *crewmembers inspired the nation.*

President Reagan also brought his sense of humor to NASA, as seen in this 1981 photo from Mission Control in Houston. Making an extremely long-distance call, the President jokingly asked Joe Engle and Richard Truly, the crew of the second Shuttle flight, if they could stop by Washington en route to their California landing site so that he could come along with them.

Today, the International Space Station orbits overhead as a living testament to the optimism and visionary leadership of this great man.

As President Reagan said, "Our progress in space, taking giant steps for all mankind, is a tribute to American teamwork and excellence. Our finest minds in government, industry and academia have all pulled together. And we can be proud to say: We are first; we are the best and we are so because we're free."

May God bless President Ronald Reagan. We are indebted to him for his visionary and persistent leadership. On behalf of all members of the NASA family, we offer our condolences to the Reagan family in their time of reflection on his contributions to them and, indeed, all Americans.

Sean O'Keefe
NASA Administrator

ROCK SOLID

JSC's lunar sample lab turns 25

by Bill Jeffs

NASA/Blair/DeHoyos JSC2004-00015

A researcher examines a lunar rock in JSC's Lunar Sample Laboratory Facility.

The lab technician very slowly opens the heavy, stainless steel door to the vault. This is no ordinary storage facility. It contains priceless national treasures – samples brought back from the Moon during the Apollo era.

The Lunar Sample Laboratory Facility in Building 31N at Johnson Space Center is NASA's chief repository for the invaluable lunar materials. The facility was dedicated on July 20, 1979, after two years of construction, and marks its 25th anniversary this month.

Between 1969 and 1972, six Apollo missions brought back 842 pounds of lunar rocks, core samples, pebbles, sand and dust.

The spaceflights returned 2,200 separate samples from six different exploration sites, and the samples are estimated to be 3.1 billion to 4.4 billion years old.

"These samples and their study represent the strong, continuing science legacy of Apollo," Dr. Carlton Allen, Manager of JSC's Astromaterials Acquisition and Curation Office said. "New generations of researchers are using new generations of instruments to study the lunar rocks and soils. The Apollo missions ended over 30 years ago but, thanks to these samples, we continue to better understand the solar system and our place in it."

A place to call home

Nobody imagined so much material would be returned. Before the Lunar Sample Laboratory Facility was built, lunar materials were stored in the Lunar Receiving Lab in Building 37 and in vaults across JSC. That earlier lab was large enough to process samples but too small to store them. Modifications made to Building 31 provided additional storage areas but still more space was needed.

Thus the idea for the construction of a new sample storage facility arose. But Congress would not authorize its construction until a remote site was found to store some of the samples. In the mid-1970s, an empty ammunition bunker at Brooks Air Force Base in San Antonio was selected. A vault was built inside the building to store some of the lunar samples. In 2002, those materials – about 14 percent of the collection – were moved to a secure building in White Sands, N.M.

Eighty percent of the 842-pound collection, most of it still in pristine condition, is stored in the Lunar Sample Laboratory Facility at JSC. The two-story, 14,000-square-foot facility provides permanent storage of the lunar sample collection in a physically secure and non-contaminating environment.

The facility is virtually indestructible yet has a basic structure. It features storage vaults that stand elevated above storm-surge sea level height to protect the samples from threats posed by hurricanes and tornadoes.

"The facility was incredibly well designed," said Dr. Gary Lofgren, curator of the Lunar Sample Laboratory Facility and a planetary scientist in JSC's Office of Astromaterials Research and Exploration Science (ARES). "There were several National Academy of Science members on the committee that laid out the science requirements for the building and reviewed designs to ensure their inputs were implemented. They thought of every contingency you can imagine to safeguard the samples."

Keeping it clean

The facility has exceeded expectations. The storage and processing areas in the lab were designed to be class 10,000 cleanrooms, allowing for 1,000 to 10,000 particles larger than .5 microns in each cubic foot of air space. Today the facility rarely has particle counts above 200.

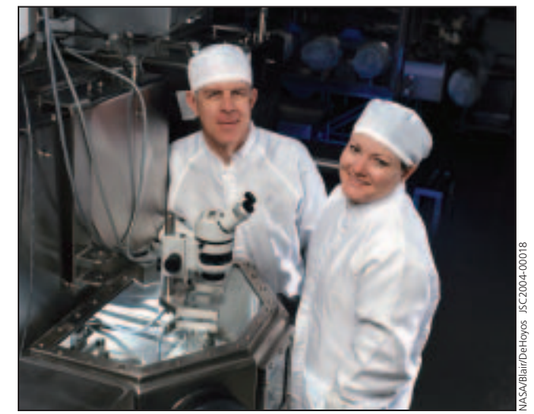
"The concept of the building – to preserve samples with a high degree of integrity – has not been matched elsewhere," said Lofgren. "It is a one-of-a-kind facility in the world."

Members of JSC's Astromaterials Acquisition and Curation Office within ARES curate the lunar collection. They keep the collection in pristine condition, while making the samples available to approved scientists and educators.

Pristine lunar samples are stored and handled in stainless steel cabinets purged by high-purity nitrogen gas to minimize degradation of the samples. The nitrogen is continuously monitored for oxygen and moisture contents. Curators working in the lab wear three layers of gloves to keep their hands from touching the samples.

"The key to the cleanliness and preservation of the samples is the nitrogen environment and packaging the samples in that environment in multilayers," Lofgren said. "Since the samples are triply contained in sealed packages, even if the nitrogen environment were to fail, the integrity of the samples, at least for a short time, would not be compromised."

continued on page 6



NASA/Blair/DeHoyos JSC2004-00018

Carlton Allen, astromaterials curator with NASA, works in the lab with Kathleen McBride, research scientist with Lockheed Martin.

NASA/Blair/DeHoyos JSC2004-00017

Charles Galindo, senior scientist with Lockheed Martin, and Mary Drake, curatorial administrative officer with NASA, are pictured working in the Lunar Sample Laboratory Facility.

NASA/Blair/DeHoyos JSC2004-00005

Andrea Mosie, senior research scientist, and Jerome Hittle, laboratory assistant, examine lunar samples.

Samples subdivided for research projects are handled with specially cleaned tools and are sealed under nitrogen before being lent to science customers. The lunar collection now comprises about 100,000 subsamples. Some of them are securely stored in research laboratories and museums, the latter having about five percent of the collection on display.

Lunar learning

Interest in studying the samples remains high. The lab allocates 200 to 400 samples each year to scientists. Today about 90 active lunar principal investigators worldwide, mainly from the university community, have samples. Close to 60 groups worldwide have been actively requesting samples for the past decade.

While early studies focused on using the lunar samples to reconstruct the overall structure of the Moon, today scientists study the lunar samples for two primary reasons: to conduct comparative planetology studies and to take advantage of recent improvements in analytical instruments, primarily in the field of isotope geochemistry.

Isotope geochemistry involves studying the history of planets. When radioactive elements decay and change from one form of an element to another, they are called isotopes. Scientists study them to date and compare samples from the Moon, Mars or Earth.

"We now are convinced that we have samples from Mars from the meteorites that have come to Earth," Lofgren said. "We have samples from the Moon, and we have, of course, samples from Earth. We also have samples of meteorites that preceded the formation of the planets.

"By studying materials from these different entities, we have a better handle on how the solar system formed."

In addition, Lofgren said that "scientific instruments have improved tremendously in the last 30 years. Elements that were present in amounts too small to be analyzed in the early 1970s can now be studied."

Studies of lunar materials have played a key role in understanding the history of the solar system. Because the Moon is not geologically active like the Earth, the solar system's history is still easily seen on its surface. As a result, the Moon provides a unique glimpse into the system's early history.

Scientists also study lunar materials to learn about the Sun. Since the Moon has no atmosphere, all the particles given off by the Sun get trapped on the lunar surface, where they can later be studied.

Working in the Lunar Sample Laboratory Facility are Andrea Mosie; Carol Schwarz, staff research scientist; and Jerome Hittle, all with Lockheed Martin. (Inset) A close-up view of the lunar rocks contained in the second Apollo 11 sample return container.

Much has been learned about the Moon, but much more remains to be learned. Future return missions to gather more samples would be welcomed by scientists worldwide.

"We have samples from only six lunar sites," Lofgren said. "Just imagine if you had samples from only six places on Earth – there would be a lot you would not know about. Specifically, we still don't understand the full breadth of the evolution of the Moon. We need a broader range of samples to date to capture the history of the evolution of the planet."

Like scientists around the world, the Lunar Sample Laboratory Facility and its curators stand ready to receive any additional samples that may be returned. There are two missions on their way to return samples to Earth and to the facility: the Genesis mission will return particles expelled from the Sun in September, and the Stardust mission will return dust from a comet's tail in January 2006. A Japanese mission called Hayabusa will return samples from an asteroid and some of these samples will be brought to JSC's facility as well.

For more information on NASA's lunar samples and the lab, visit **http://curator.jsc.nasa.gov/lunar/lunar.htm**.

Imagery project maintains quality of historic spaceflight photos

by Kendra Phipps

The images of the Apollo Program, and of Apollo 11 in particular, are unmistakable. The picture of Buzz Aldrin facing an American flag, dazzlingly colorful against the bleak surface of the Moon, is part of America's national consciousness. That photograph documents one of the greatest accomplishments in human history and is a source of national pride.

True colors

NOW IMAGINE if the film that produced that photograph, and thousands of priceless others, was allowed to deteriorate in a vault. After a few decades, it could become completely unusable.

A team at Johnson Space Center is working to prevent that from happening.

Ed Wilson, NASA Technical Monitor for Imagery Operations, and Maura White, IMPASS Photography Lab Supervisor, are part of an Information Resources Directorate team working to scan historic spaceflight imagery into a digital format.

"These are NASA records, and we need to maintain them in the best possible way," Wilson said.

One advantage of this project is that the quality of the images is noticeably better in digital format.

"Any Apollo image you see right now is made from a duplicate – for example, a Xerox from a Xerox – so you lose quality," White said. "With digital files made from the original, we'll have greater dynamic range, which means more detail in the shadows and highlights and much higher quality in general."

"You can really see the difference between a duplicate and a new digital scan," she said.

The digital scanning process will not only help preserve the images for future generations, but make access to the imagery much easier via the Imagery Online Web site. It will also expedite the process of retrieving the images when they are requested for printing.

"In the past, if somebody requested an Apollo frame and we didn't have it scanned, we pulled the cut duplicate negative and scanned it in one frame at a time," White said. She said that while the old process was "costly and time consuming," the new digital format will "make it easy to retrieve the file from digital storage and produce products such as prints, slides and CDs for the NASA community and the public."

Currently, JSC's Building 8 houses all of the original spaceflight imagery except for that of the Mercury and Gemini programs, which has already been transferred to the National Archives and Records Administration (NARA).

"We keep it in a 10-degree cold vault with low humidity to help preserve it," Wilson said, "but some of it is in unstable film bases and is going to deteriorate eventually."

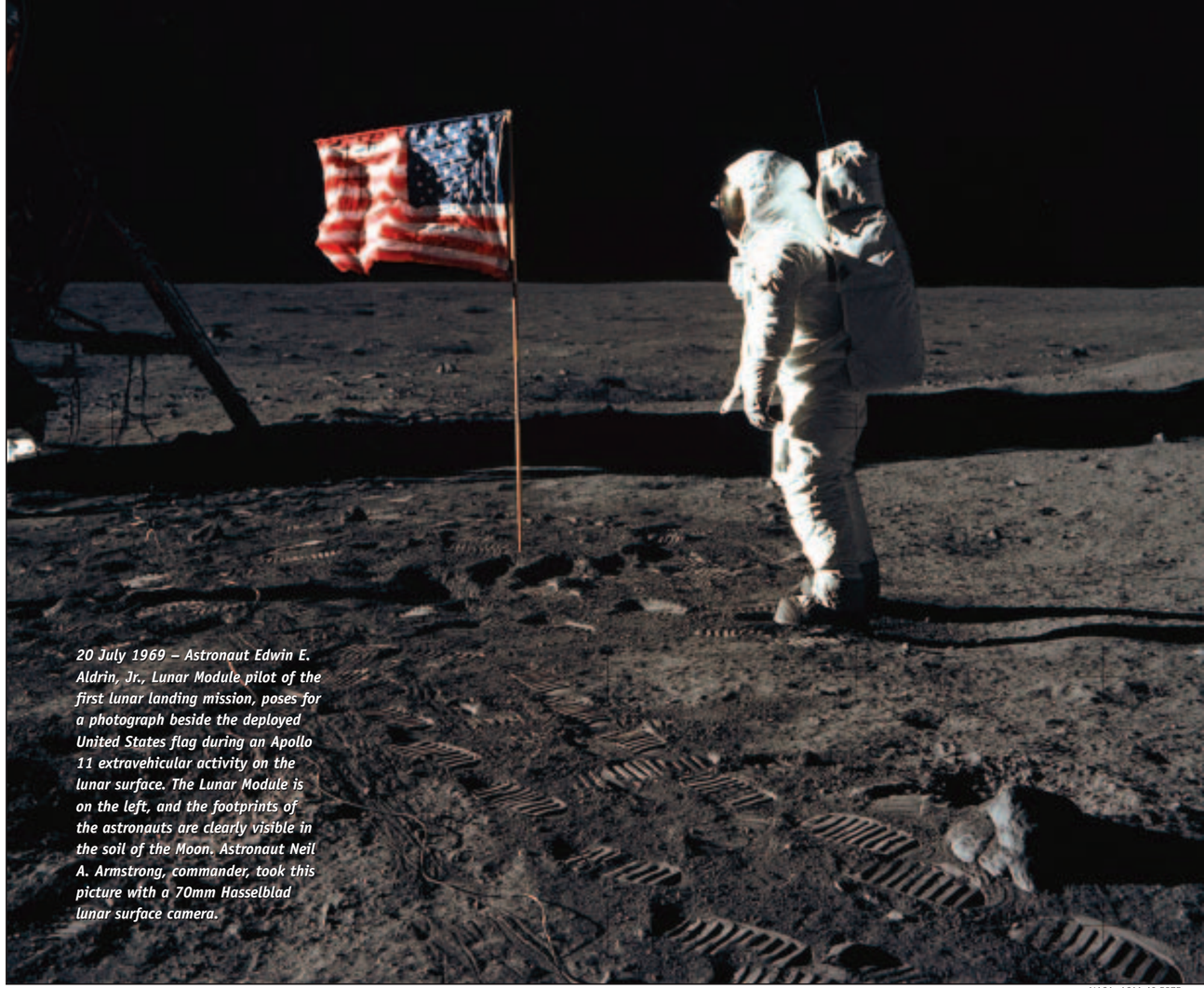
Scanning the original film is a multistep process.

"First, we prioritize the missions that people request the most," White said. "Then we remove the actual film from the cold vault, let it thaw, scan the original in a high-speed, adapted motion-picture scanner, archive the scans on CDs, and put the original mission film back in the cold vault."

The effort to scan the historic imagery began in 2003. So far, 8,500 frames of original flight film have been scanned, and approximately 32,000 frames are left.

"Eventually, once all these are scanned, the goal is to transfer it to NARA so that it is maintained in the national archives as a federal record," Wilson said.

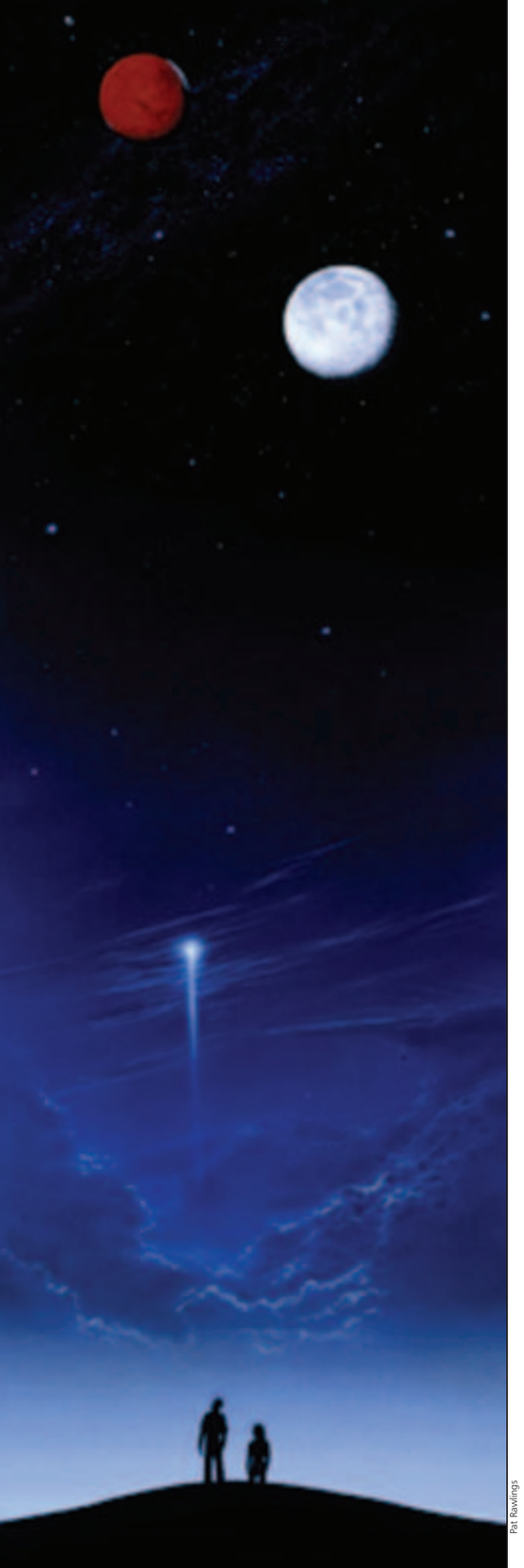
Thanks to the team's efforts, future generations will still see these unique photographs in their true colors.



20 July 1969 – Astronaut Edwin E. Aldrin, Jr., Lunar Module pilot of the first lunar landing mission, poses for a photograph beside the deployed United States flag during an Apollo 11 extravehicular activity on the lunar surface. The Lunar Module is on the left, and the footprints of the astronauts are clearly visible in the soil of the Moon. Astronaut Neil A. Armstrong, commander, took this picture with a 70mm Hasselblad lunar surface camera.

NASA AS11-40-5875

"The digital scanning process will not only help preserve the images for future generations, but make access to the imagery much easier via the Imagery Online Web site."



Pat Rawlings

THE MARS AND MOON GENERATIONS

Together at last

by Debbie Nguyen

NASA's Apollo Program tackled President John F. Kennedy's challenge to make Americans the first to land on the Moon. Thirty-five years later, some of those young Apollo engineers returned to the consoles in the historic Mission Control Center (MCC) – this time, to join another young group of engineers, whose mission will be to return to the Moon and venture on to Mars.

Johnson Space Center cooperative education students recently ventured to Flight Control Room 2 of the historic MCC to watch "Apollo 13," a co-op tradition that began several years ago. What they didn't know was that they were going to have some special guests that night – Apollo-era flight controllers. Those present were:

- Sy Liebergot, Apollo EECOM (Electrical, Environmental and Communications), who was played by Clint Howard in the movie
- John Jurgensen, who sat on console for the Apollo guidance computers and who worked mainly on Apollo 8
- Robert Nute, who had the console position for Flight Crew Experiments and worked in the Missions Support Room for the Flight Activities Officer
- Jack Knight, Telcom for Apollo 11 and Telemu for Apollo 12, who was responsible for the Lunar Module Electrical Power Systems, Environmental and Thermal Control Systems, Communication Systems (Apollo 11 only) and Mechanical Systems, and for Apollo 12 and subsequent Extravehicular Suit and Life Support Systems
- Frank Hughes, who trained the first Apollo astronauts as Chief of Space Flight Training

All are still working at JSC except for Hughes, who has retired and is now Vice President of Tietronix, a production company for training products.

"It's people like you who are going to make this happen," said Liebergot about the Vision for Space Exploration before the movie began.

After the movie ended, the "Apollo men" answered questions and reminisced about how they overcame obstacles during the Moon missions. "Apollo 11 was a culmination of carefully planned, incremental steps," Liebergot said.

When asked how they celebrated after Apollo 13 "splashed down," the flight controllers all answered with "sleep."

"There was this huge sigh of relief, of course, but almost everyone had been working with little or no sleep, so when you heard that they were home and safe, you just slept," Jurgensen said.

"After watching the movie and then hearing the Apollo guys share their stories, it was like I was sitting in the middle of a haunted MCC," said first-time co-op Priscilla Celaya, who works in EVA and Spacesuit Systems and had never seen the movie before. "I felt like the room was haunted with a heroic story of brave space men traveling out of this world, their mission gone all wrong, and the persistent and determined flight control team to bring them home."

The 1995 film portrayed how NASA, through the dedication and leadership of people like Flight Director Gene Kranz, was able to bring home the crew of Apollo 13 – Astronauts James Lovell, Fred Haise and Jack Swigert – after their spacecraft suffered an explosion in orbit. Apollo 13 never landed on the Moon, but the crew was brought home safely through the determination and ingenuity of countless people on the ground. "Failure," as actor Ed Harris' Kranz said in the film, was simply "not an option."

As future generations of explorers are challenged with the Vision for Space Exploration to go to the Moon, Mars and beyond, they can look to the Apollo Program for inspiration, for it made the dream a reality when humans landed on the Moon more than 30 years ago.

NASA/Markowitz JSC2004E21283

A lunar reunion: Apollo Console Operators John Jurgensen, Robert Nute and Seymour (Sy) Liebergot reminisce about the Moon missions.

NASA/Markowitz JSC2004-00005

Co-ops Kenneth Armijo, Laura Brower, Chris Tanner and Jennifer Beall wait anxiously in the historical Mission Operations Control Room in Mission Control Center for "Apollo 13" to begin.

For more information on the Apollo Program, visit:
http://spaceflight.nasa.gov/history/apollo/index.html

Astronaut Neil A. Armstrong, Apollo 11 commander, descends the ladder of the Apollo 11 Lunar Module prior to making the first step by a human on another celestial body. This view is a black-and-white reproduction taken from a telecast by the Apollo 11 lunar surface camera during extravehicular activity.

Where were you?

20 July 1969

Johnson Space Center employees reflect on where they were when the Eagle landed.

On July 20, 1969, the human race accomplished its single greatest technological achievement of all time when a human first set foot on another celestial body.

Six hours after landing at 4:17 p.m. Eastern Daylight Time (with less than 30 seconds of fuel remaining), Neil A. Armstrong took the "Small Step" into our greater future when he stepped off the Lunar Module, named "Eagle," onto the surface of the Moon, from which he could look up and see Earth in the heavens as no one had done before him.

He was shortly joined by "Buzz" Aldrin, and the two astronauts spent 21 hours on the lunar surface and returned 46 pounds of lunar rocks. After their historic walks on the Moon, they successfully docked with the Command Module "Columbia," in which Michael Collins was patiently orbiting the cold but no longer lifeless Moon.

THAT SUMMER I was in between third and fourth grade and my family lived in southwest Houston. I had been following every Moon mission on TV and in the newspaper. I even put up a big picture of the Moon on the wall in my bedroom. On July 20, my parents, my brothers and I spent the day at Surfside Beach near Freeport. We all knew that this was the big day that Apollo 11 would attempt the first lunar landing. My father called us in from the water in the afternoon and we all gathered around the car and listened to the landing on the radio. That made us really look forward to the EVA coming up later that evening. We watched the first Moon walk that night on TV. I remember wishing that the TV picture from the Moon was better, but even so it was unforgettable. I had a real feeling of pride that our country had been able to achieve the goal we had set out to accomplish. It was incredible to watch men actually walking on another world. I guess I was pretty well hooked on the space program after that.

Bob Doremus
Space Shuttle Program Safety & Mission Assurance Office, NASA

16 July 1969, 9:32 a.m.

On schedule to within less than a second, Apollo 11 blasts off from Launch Pad 39A at Cape Kennedy, Fla., to start what is looked upon as the greatest single step in human history – a trip to the Moon, a manned landing and a return to Earth.

Strapped to their couches in the Command Module are Commander Neil A. Armstrong, civilian and ex-test pilot; Command Module Pilot Michael Collins; and Lunar Module Pilot Edwin E. (Buzz) Aldrin, Jr., the latter two officers of the U.S. Air Force.

From Launch Control the last words were: "Good luck and Godspeed."

(Inset) Members of the launch control team view the liftoff.

I was six years old when my parents woke my sister and me to watch the landing. Of course, I wanted to be an astronaut...

John Jurgensen, JSC-IM

I came here, to the "Manned Spacecraft Center," in 1967. Less than two years later, I was on the Apollo Guidance Computer Support console in the Mission Control Center during the Apollo 11 landing.

I remember my emotions during Lunar Descent very clearly, but I would have had a hard time articulating them even then, for they were like nothing I had felt before…or have felt since. It was simultaneously real and surreal. We had simulated descent many times; we knew what to expect; yet it was different this time. It felt unreal, as if I was observing myself, and the rest of us on console, as actors on a stage following a script. Then, when events did not follow the script, the right people quickly responded in the right way, and we continued with the script and landed.

We accomplished not only my lifelong dream (well, almost… the footprints would be Neil's and Buzz's, not mine) and achieved what had been viewed as impossible since the first humans looked up at the Moon. We knew that humans would never view the Moon, or ourselves, in the same way again. We knew that we had made history. Emotions? Joy. Disbelief. Belief. Pride. Elation.

Matt Abbott, NASA, Flight Director

I was six years old when my parents woke my sister and me to watch the landing. Of course, I wanted to be an astronaut, but the other thing that I very clearly remember was wanting to work in Mission Control. The seed was planted that night and sixteen years later I worked my first console shift in "that room" during STS-61A. After many Shuttle flights as a Flight Dynamics Officer, I'm currently the Lead Flight Director for ISS Expedition 9. I guess that seed really took hold!

Joe Maloy, EX/Exploration Systems Engineering Office

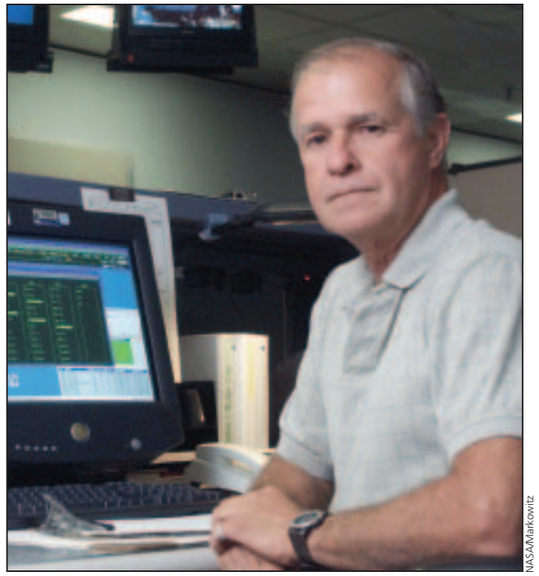
During the Apollo Program I was working at Lewis Research Center (now Glenn Research Center) in Cleveland, Ohio. I was living in a small two-bedroom apartment with my wife and our newborn son. The evening of the Moon landing my wife fell asleep while watching the TV coverage of the landing and I was taking care of the baby of six weeks. When Neil stepped onto the Moon I was holding my son and feeding him his bottle while watching TV. I recall holding my son so to face the TV and telling him that he was born in time to see one of the greatest events in history. Today and often at other times I can still remember that moment.

Stephen Vrana, JSC-NE

I was almost 13. I realized this was once in history, to see men on the Moon for the first time. We had visited JSC earlier. Mom's friend, Phyllis Ransdall, Gene Kranz's secretary, gave us Apollo training manuals. That and stories of space travel planted the

Mike Krueger
United Space Alliance
Simulation Controller

I was a 20-year-old Army helicopter pilot in Vietnam. I was flying Medevac missions in support of the 199th Light Infantry Brigade in an area in the Third Tactical Corps area know as the "Iron Triangle." I was listening to the radio commentary on a navigational radio that would pick up the Armed Forces Vietnam radio station. I just happened to be looking at the ground as Neil Armstrong was making his way to the surface of the Moon and saw a soldier step on a land mine. I immediately changed course, landed and picked up the one that stepped on the mine and another trooper that was close to him that was also injured. As I was taking off with the seriously injured soldiers on board, I could hear Armstrong in my earphones saying his one small step thing, and I couldn't help but think about the one small step that the young man I had just picked up would never forget. He lost a leg and a hand, and never had any idea of what was taking place a world away.



NASA/Markowitz

I just happened to be working at Mission Control the evening when the Eagle landed. Astronaut Glenn and I were chatting while...

desire to "reach for the Moon," to set out on a voyage of exploration as did Columbus centuries before.

As I awaited their exit from the LEM, Mom said "OK, time for bed!" I couldn't believe it. Here it was, the first ever lunar landing, and she was telling me to go to bed. Dad told her "Oh, let him watch it. This happens only once." Fortunately, the voice of wisdom prevailed. The ghostly images of people on another world for the first time were a marvel, and no other generation had, or would, experience them again. It was a great time to be alive.

Eileen Smith, SAIC

I was 18, living in Dickinson, Texas. We moved here in 1963 from Cape Canaveral. My father transferred for the opening of MSC. He worked in Flight Acceleration, Building 29 centrifuge.

On that day he said, "This is it – the big one." We huddled around the TV, watching the capsule land – waiting what seemed an eternity for someone to emerge. When Armstrong finally appeared, this was history but little did I know what was on the horizon, yet to come. His words, "one small step," give me goosebumps to this day.

It was an exciting time in aerospace. I remember admiration that my father worked in the hub. I have photos of him taken with the early astronauts during testing. After he retired, I began my "hereditary" career in 1974 with Philco Ford. It's been a magnificent ride – one I wouldn't change for any other career.

Ron Lerdal, NASA White Sands Test Facility

When the Eagle landed I had sat our then 4-month-old son in front of the television so he could eventually tell folks that he was a witness to this most momentous event in all of recorded history. Since then his love of history has taken him to the other side of the world, but he cannot seem to remember watching the lunar landing. Thanks for helping me to make the connection. Some day I will have him convinced that the lunar landing was not filmed in Arizona and that we really did go to the Moon.

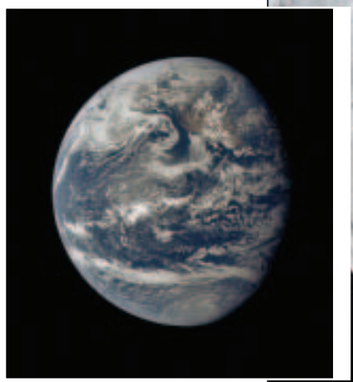
Interesting that at the time the Eagle landed I was teaching Air Force officers how to operate Minuteman missile systems, and now as a NASA engineer I am participating in some testing of a Minuteman system component.

Harold Ferrese, Facility Manager, NACA/NASA

In 1962, I was working in the Administrative Division at the Temporary Headquarters in Houston, Texas. I just happened to be working at Mission Control the evening when the Eagle landed. Astronaut Glenn and I were chatting while walking down one of the aisles in Mission Control. I wondered what an opportune time it would be to ask John Glenn himself what he thought about the landing and that he was not a part of it. After all, he was the first American in orbit.

18 July 1969, 4:40 p.m.

One of the clearest television transmissions ever sent from space is begun, with the spacecraft 175,000 nautical miles from Earth and 48,000 from the Moon. It lasts one hour and 36 minutes.



At the tender age of nine years, I was in my space jammies, seated motionless on my rec-room sofa in our Earthbound house...

Mark A. Bowman, Hardware Engineering Integration, International Space Station Payloads Office

On Sunday, July 20, 1969, I was a nine-year-old boy living with my family in Seattle, Wash. Dad worked for North American Rockwell, and he was on a temporary assignment as a tech rep to Boeing on the 747 program. Mom gave me special permission to stay home from evening church services to watch the landing and the first lunar EVA. Since most of our belongings were in storage, Dad and I watched the whole thing on a portable black-and-white TV with a nine-inch screen (at the time quite a novelty). We watched with particular interest, because prior to moving to Seattle, Dad had spent five years working on Apollo GSE. I was an avid space nut, and was glued to the TV watching the coverage for every spaceflight. I dreamed of some day working for NASA and flying in space. One out of two ain't bad.

D. Smith, Software Administrator

My father had sparked my interest in our nation's space program when I was about five years old. He bought me a set of small science-related books that included a model of the Gemini and Apollo spacecraft. We always looked forward to watching the news coverage of NASA events. When the Eagle landed I was nine years old and living in N.C. My father and I had stayed up late that night to see history being made. I had fallen asleep on the couch beside my dad, but he woke me up because he knew I wanted desperately to watch. Little did I know that 30 years later I would be working here at JSC and actually meet Neil Armstrong and shake his hand.

Roger H. Weiss, Technical Integration Specialist, International Space Station Payloads Office, SAIC

At the tender age of nine years, I was in my space jammies, seated motionless on my rec-room sofa in our Earthbound house in Wilmette, Ill., along with Mom, Dad, older brother and sister all watching without blinking, waiting without patience, and wishful without reservation about the wildly exciting (albeit fuzzy) black-and-white video images of Neil Armstrong descending Eagle's ladder right before our dazzled eyes. Young as I was, having witnessed launches and splashdowns on grainy closed-circuit TVs in school, I innately understood the colossal significance of this world-shaking event, with help from Dad's enthusiasm ensuring that I forever comprehended the impact of this ultra-historic footstep. Like countless others, that single occurrence launched my passion to embrace exploration however/wherever/whenever possible. And, 9037 days later as a NASA worker, I had the privilege of shaking the First Man's hand here in Houston, introducing him to my sons – and thanking him – for all he has achieved for humankind.

NASA/Markowitz

Karina Shook
EVA Instructor/ Flight Controller

I was born nearly two years after the Apollo 11 Moon landing. Of all the historical events that I wish I could have witnessed, that's at or near the top of the list. I can read all kinds of books and accounts of how things were back then, but I still have questions about what it was really like. Sometimes I try to draw parallels or comparisons between the early programs and what I've experienced with the Shuttle and ISS programs, but it's difficult to do when I don't really know what it was like during those early days. I envy those who saw it, and envy even more those who were able to participate in it.

I think of it as a time when the U.S. space program was really rolling – less bureaucracy, better funding, and a real drive to get the job done. I hope that the near future will be an equally exciting time at NASA, given realistic yet challenging goals and proper funding.

At the time, I didn't understand what was so interesting about the fuzzy, black-and-white images on the screen. Now, I'm glad my mom...

William K. Dwyer, JSC Avionic Systems Division

On the evening of the Apollo 11 landing, a good friend from college and I and our wives were getting ready for the formal social event that was part of our graduation from Navy Officer Candidate School in Newport, R.I. Our wives had moved to Newport and rented a very small and inexpensive third floor apartment in an old home there in town. On this evening, we were granted leave from the Navy base to prepare for the evening. As the four of us scooted around each other and the ironing board while preparing for the formal social that night, we watched the Apollo 11 activities on a nine-inch, black-and-white TV that we had bought at a garage sale there in town. Needless to say, we were late to the social, but then, so were a lot of other people.

Sonia Ried James, Design Engineer, Lockheed Martin

I was on the island of Japan in 1969 with my parents and seven-year-old big brother. My dad was working with some Japanese rocket scientists for NASA/JSC. I remember sitting in a chair in front of the neighbor's television set, while my Mom kept turning my head to face the TV screen so I wouldn't miss mankind's historic first steps on the Moon. At the time, I didn't understand what was so interesting about the fuzzy, black-and-white images on the screen. Now, I'm glad my mom knew how important it was to watch Neil Armstrong step out onto the Moon. Today, I'm privileged to work onsite at the JSC, and to have been able to help design hardware that has flown in space.

Bonnie Kennedy, Secretary to the Deputy Director, Office of Procurement

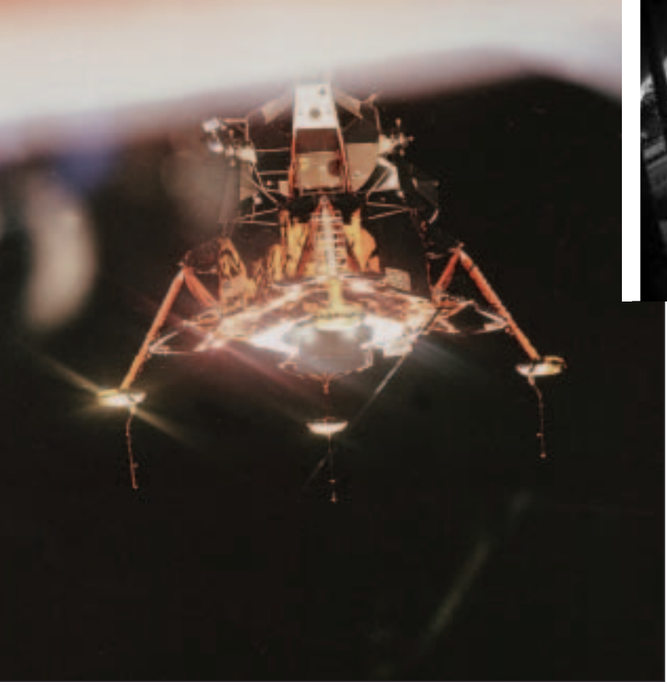
In 1969 I was living in Fort Wayne, Ind., and had been closely following the space program. With the impending Moon landing we knew this event justified the purchase of a color TV. We threw all caution to the wind and did it the all-American way and CHARGED it.

The day before the scheduled landing we proudly brought home our new TV and invited several of our friends for a Moon landing party. Ten of us sat around the new color TV eagerly waiting for the landing and discussed how our future would be affected. You can imagine our surprise when this historical event was broadcast in BLACK and WHITE. However, the significance of the event overshadowed our disappointment of a color transmission.

On that day never in my wildest dreams could I have thought eventually I would be part of NASA and its history.

Jeff Ashby, NASA, Astronaut

I was working as a dishwasher at a restaurant in Colorado. The restaurant owner walked into the kitchen and told me to remove my apron and go to the dining room. There was a small



20 July 1969, 1:47 p.m.

The Lunar Module "Eagle" carrying Neil Armstrong and Edwin Aldrin, after separating from the Command Module "Columbia." Michael Collins, aboard the Columbia, took this picture of the LM as it prepared for its descent to the Moon.

(Inset, above) This interior view of the Apollo 11 Lunar Module shows Astronaut Edwin E. (Buzz) Aldrin, Jr., Lunar Module pilot, during the lunar landing mission.

I don't recall anyone else around as I watched the grainy images that night – I was singularly focused on taking it all in, and the...

TV on the fireplace mantle, and I stood in a mixed group of staff and customers while we watched the grainy, black-and-white video of Neil Armstrong stepping from the LM ladder to the lunar surface. I remember thinking that Neil had a much better job than I did.

John Connolly, currently detailed to NASA HQ, Project Constellation Office

My brother Kevin had the honor (he would argue with this) of being born on July 20. As a nine year old in 1969, I honored his third birthday by placing a Lunar Module model on his birthday cake. He didn't care much for this, and the moment was captured in a picture that ran in the local paper. I was fully aware what was to transpire later that Sunday evening, and though only heading to fifth grade, I sensed it was big. I don't recall anyone else around as I watched the grainy images that night - I was singularly focused on taking it all in, and the television was the only light on in the entire house. My brother may debate me, but to me, that night was Christmas, and birthdays and the Fourth of July all rolled into one.

John Rivers, DO4

On the day of the Apollo 11 landing (it was Sunday afternoon in Houston), the second Floor MOCR was open to employees who weren't working the mission, which I wasn't. The big plot board was up and we could monitor the Flight and Air/Ground loops, so we were able to follow all the proceedings. The first words spoken from the lunar surface were "OK, Engine Stop" by Buzz Aldrin. At that point everyone jumped to their feet, yelling at the top of their lungs.

Silvia Molano, Human Resources Specialist, AH8/HR Employment Operations

I was out of school for the summer and spending a few days at my aunt's. My older cousin insisted that I stay up late and watch the adventure unfold on TV.

Growing up in a family of immigrants, we were awestruck by the achievements of the space program, and landing humans on the Moon opened our eyes to how far knowledge and hard work could take you. Our parents couldn't afford color TVs and late-model cars, but we had access to opportunities to learn and contribute to our nation's future.

I am the second individual in my family to obtain a college degree. The cousin who cheered along with me when Armstrong and Aldrin set foot on the Moon was the first. My parents were never more proud of me than when I told them I was going to work at NASA.

Tony Butina Sr., L&M Manager, ISS

I was a 23-year-old Marine Sergeant in Chu Lai, Republic of Viet Nam, with the 1st Marine Aircraft Wing. I still remember that it was another hot and sticky day in Viet Nam. I had been

R. Matthew Ondler

Deputy Division Chief
Aeroscience and Flight Mechanics Division

I was six years old watching on my parents black-and-white television at 1443 E. Third Street in Casper, Wyo. It is one of the most vivid memories of childhood and was undoubtedly the moment that started me on this path. I actually remember having a feeling of anxiety because I thought I had missed out on the greatest adventure in the history of mankind. Here we were putting a man on the Moon and I was stuck in the first grade. I couldn't wait to grow up and be part of it. Later I realized there was still some adventure left and many dreams yet to realize. And on those days when the bureaucracy and politics particularly wear, I think it is still that moment, which is so indelibly etched in my psyche, that keeps me part of our grand endeavor. It is still that idea of adventure planted in that awestruck little boy that keeps me chasing these dreams.

NASA/Markowitz

Growing up in a family of immigrants, we were awestruck by the achievements of the space program, and landing humans on...

there four months and had seen the story on the Armed Forces Television Network. I remember seeing the story and then walking outside and looking at the sand and wondering if the Moon surface was like sand. It is still a very clear picture in my mind. And back then I would have never dreamed that some day I would work for NASA.

Laura Vincent, USA/SFOC Comm-NSS Training Group

July 1969: I was nine years old and we were in the process of moving from our house in Weschester, Calif., to Lomita, Calif. But I remember watching a black-and-white TV for hours on the front room floor while pictures and reports showed Neil Armstrong step out of the Lunar Module and make his "one small step for man…one giant leap for mankind." And the following days where Buzz Aldrin and Neil Armstrong explored the Moon for the first time, with Michael Collins circling around then in the ship they would return to Earth. Looking back, I believe this is where the seed was planted to wonder about the Moon, stars and planets and begin my quest to explore them throughout school. Thus knowledge of God's universe became a lure that eventually landed me at NASA, JSC 17 years later. Hopefully the current programs are starting the quest to return and maintain our vision and quest to future generations.

Ellen A. Gillis, Publicist, Astronaut Appearances Office

I was 10 years old and was staying with my cousins at their beach house in South Jersey. As my family and I gathered in front of the TV, a huge electrical storm formed way out over the ocean, so as we waited for Neil Armstrong to come out of the LM, we watched the lightning dance across the sky. Over the TV commentary you could hear my grandmother say, "You know, every time we send astronauts into space, we have the worst weather!" Then Neil Armstrong descended from the LM, and we collectively held our breath as he first stepped onto the Moon. I realized then that we would never look at the Moon the same way again: There were men on another planet, looking back at us while we watched them on TV! I feel that same excitement when the ISS passes overhead with our friends and coworkers inside. The legacy continues…

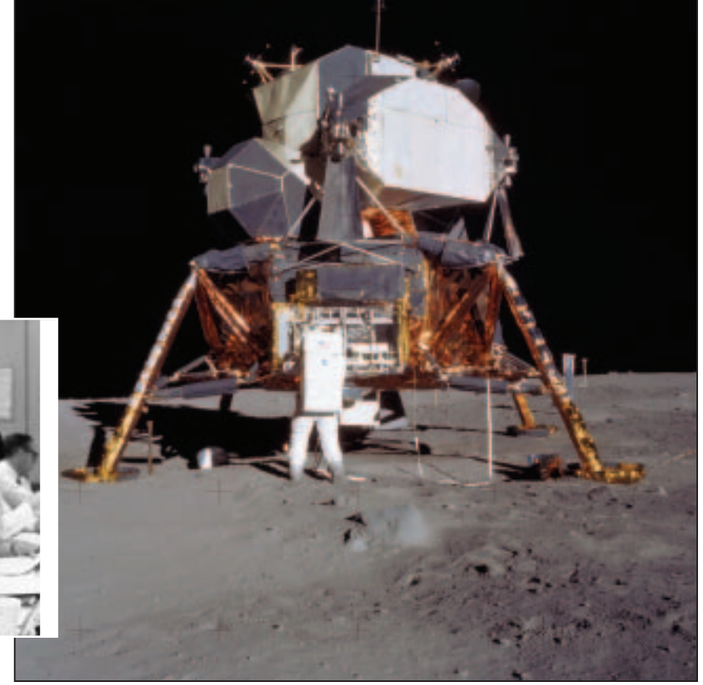
Debra Gatti, NASA, Program Analyst

I was twelve years old and living in Omaha, Neb., when Apollo 11 landed on the Moon. My father was in the USAF, stationed at Offutt AFB. He and my mom had gone to dinner at the Officers' Club and were watching it on a TV there. I was at home with my little brother Randy and my best friend Millie. We made marshmallow treats to celebrate the event, and sat on the couch in the TV room. We watched Neil Armstrong slowly place his foot on to the surface of the Moon. It seemed to me that

20 July 1969, 4:18 p.m.

The craft settles down with a jolt almost like that of a jet landing on a runway. It is at an angle of no more than four or five degrees on the right side of the Moon as seen from Earth. Armstrong immediately radios Mission Control: "The Eagle has landed."

(Inset) Flight controllers watch in anticipation as the Lunar Module makes its descent to the lunar surface.



I thought, maybe someday it will really be like "Lost in Space," and we would travel throughout the universe. It was magical...

time stood still, and I realized that most of the people in the world that had TVs were doing the same thing I was doing: watching a human from our planet enter into another world. I thought, maybe someday it will really be like "Lost in Space," and we would travel throughout the universe. It was magical.

John Hirasaki, ARES Corporation

July 20, 1969, remains quite vivid in my memory because Dr. Bill Carpentier and I were sitting inside of the Mobile Quarantine Facility (MQF) on the hanger deck of the USS Hornet, the Primary Recovery Ship for the Apollo 11 mission. At that time, I was working for NASA in the Landing and Recovery Division as a Recovery Engineer responsible for the testing and operational qualification of the MQF for the Apollo Program and was selected to be quarantined with the Apollo 11 crew following their return from the Moon.

Prior to the Apollo 11 mission, four of us (Randy Stone, Ralph Culbertson, Frank Janes and myself) from the Landing and Recovery Division had volunteered to serve as a Recovery Engineer to be quarantined with the Apollo crew for lunar landing missions. We all knew that there was some personal risk if there was a lunar contamination source that was hazardous to humans but, realizing that the risk was small, we all had an intense desire to participate in one of the greatest exploration programs to be undertaken by mankind.

Mike Groat, Systems Engineer, Lockheed Martin

What have the Moon landings meant to me? How have the landings affected my everyday life? Ever since I've been old enough and educated enough to know better, I've been nothing but inspired by the Moon voyages. The Moon landings were accomplished when the odds were stacked against them. The technology used was barely enough to get the job done. If it hadn't been for the people involved, both on the ground and in the spacecraft, it never would have happened. They were determined to do something that shouldn't have been possible. When I think about that, it makes my everyday life not seem so difficult or impossible. Even when I don't have all the necessary tools and resources, I know with some creative thinking and lots of determination I can still finish a job.

Craig Dinsmore, Chief, EC5/EVA and Space Suit Systems Branch, Crew and Thermal Systems Division, NASA

I was nine years old and my dad worked for TRW here at JSC. I was in my bedroom at our house in League City and I remember him coming in and saying to my sister and me, "Come on kids, it's time." We all sat down on the floor in front of the black-and-white TV and I remember the ghostly images and the beeps of the side tones as Neil Armstrong and Buzz Aldrin descended the LM ladder and moved and spoke strangely on another world. At the time, the importance of the event didn't register with

NASA/Markowitz

John R. (Jack) Garman

Director, Enterprise Solutions Central Operations, Lockheed Martin Information Technology

I was 24 years old, just three years out of college, and in the control center at the "AGC Support" SSR position (years later the "DPS" MOCR position). During the landing one moment stands out, even more than the pesky alarm codes that momentarily put a number of us squarely "on the spot." It was Buzz Aldrin's voice saying "we've got dust now" as they neared the lunar surface. I had participated in endless simulations – seeing the landing through the flight computer's "eyes" and hearing the astronauts in their rhythm of activities and callouts. While we certainly knew that day was the "real thing," his remark jerked me into higher reality. It was almost like a play with dress rehearsals, and this was "opening night." But...one of the stars changed their lines, and the enormity of the moment hit me. It became really real – heart-thumping, stomach-aching, real!

I remember wondering if the astronauts were cold. When Neil Armstrong set foot on the Moon, my shiver bumps got shiver bumps.

me, and I realize now that my mom and dad were ten or twelve years younger than I am now. That event was the very reason that my family had moved to Texas three years earlier, and it's the reason why I'm here at JSC today.

Dawn Ward, AST/PTT Project Manager, NASA

It was the summer between high school and college. I had a job as a lifeguard at the White Sands Missile Range, N.M., Officers' Club. There was a party celebrating the landing and I had volunteered to guard for it. About ten minutes before Neil Armstrong was scheduled to walk on the Moon, I cleared the pool. I ran inside the bar to watch, since it had the only TV. I was wet and freezing in the air conditioning. I remember wondering if the astronauts were cold. When Neil Armstrong set foot on the Moon, my shiver bumps got shiver bumps. That was the proudest I have ever been to be an American. When I went back out to the pool I looked up, and there was the fat crescent Moon hanging in the empty desert sky. It looked so incredibly far away. I have never looked at the Moon again without an echo of that summer's Moon in my heart.

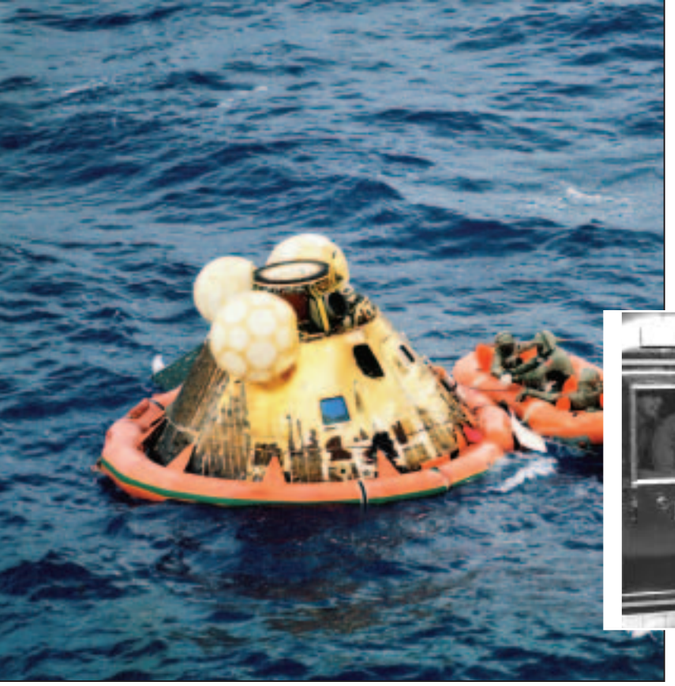
Dr. Anthony J. Vanchu, Director, JSC Language Education Center, TechTrans International, Inc.

I was all of 12 years old, returning from a trip with my mother to visit relatives in the Soviet Union (the first such trip for both of us). Our return flight from Paris to New York was delayed and we arrived later than expected. After we had gone through customs and met my father and sister, who had come to get us, we then passed through a large arrivals hall before going outside to get to the car. In that hall, I remember seeing a large TV screen showing live images of the Moon landing. Even in my travel-weary stupor, I remember us all standing there for several minutes to watch history being made.

What makes this particularly noteworthy for me is that my current work at JSC is in the capacity as a Russian language instructor and director of the JSC Language Education Center. It seems that even then, my love of studying foreign languages and my love of space exploration were somehow connected.

Tracy Calhoun, DX34 - Photo/TV

I was six years old when we first landed on the Moon. I was sitting on my sister's lap as my family watched TV in the den. Years later, after I moved to Houston and started work as a Flight Controller, my sister and I compared memories of that moment. She mentioned that during the Moon landing I pointed at the TV and said, "I want to do that." I assumed that I pointed at the astronauts. She corrected me, saying that I pointed at the images of Mission Control. I have to admit that most of my family's tales are exaggerations for the sake of good story telling, but I have a suspicion that I was nerdy even at age six.



24 July 1969, 12:51 p.m.

Spacecraft splashes down 825 nautical miles southwest of Honolulu and about 13 nautical miles from the recovery ship, the USS Hornet.

(Inset) President Richard M. Nixon was in the central Pacific recovery area to welcome the Apollo 11 astronauts aboard the USS Hornet. Already confined to the Mobile Quarantine Facility are (left to right) Neil A. Armstrong, commander; Michael Collins, command module pilot; and Edwin E. (Buzz) Aldrin Jr., lunar module pilot.

…because of what you have done the heavens have become part of man's world…For one priceless moment in the whole history of man all of the people on this Earth are truly one. *President Richard M. Nixon*

13 August 1969
New York City welcomes the Apollo 11 crew in a showering of tickertape down Broadway and Park Avenue in a parade termed the largest in the city's history. Pictured in the lead car, from the right, are Astronauts Neil A. Armstrong, Michael Collins and Edwin E. (Buzz) Aldrin Jr.

NASA/Markowitz JSC2004E24810

The Moon People Some of the faces behind the success of Neil Armstrong's landing on the Moon during Apollo 11 can still be found at JSC today. Left to right: Bob Nute, Earl Thompson, Jay Greene, Ben Ferguson, Donald Ward, Diane Robinson, Jack Knight, David Whittle and Jack Garman

Bernie Roan, JSC Chief Counsel

I was three weeks into "Swab Summer," the Coast Guard Academy boot camp program. With a full day of PT, classes, military indoctrination and intramural sports, we weren't allowed to see the actual landing. I heard about it from a classmate while playing football that afternoon. He was spreading the word to all the sports fields. Later that evening all 440 of the incoming class crammed in front of a few TVs in the cadet barracks to watch the landing replay and the "small step." I think it was the only TV I saw that entire summer. There must have been 150 of us watching the same TV, but you could hear a pin drop for the hour or so we were allowed to stay up past "Taps." When it happened, there wasn't a cheer; it was more of a roar. Twenty-five years later I became part of NASA.

Jack L. Colopy, NASA

After my two years aboard a Navy destroyer, I came to Houston for a family visit instead of going straight to work for IBM at Cape Canaveral, where I had my first real job waiting for me. While here I was introduced to a V.P. with Lockheed. He offered me a job here, working for Lockheed in Bldg. 12. I was so impressed I didn't feel that I could reject the offer. I stayed. Back then Bldg. 12 was just one big computer and I worked in the tape library, giving me access to Mission Control and history.

I not only remember holding my breath at critical moments, the elation of a successful landing and liftoff from the Moon, the safe ride home and the splashdown and recovery. I also remember, "kinda sorta," the biggest "Splashdown Party" this area has ever seen; second only to Apollo 13.

Bob Hoyt, GFE Safety & Mission Assurance

When Neil Armstrong, Buzz Aldrin and Michael Collins made their historic journey to the Moon, I was on one of my own greatest adventures. I was a 14-year-old Boy Scout and was in the middle of a two-week canoe trip across the Finger Lakes in New York State. We ported, plodded and paddled across two of the lakes and had set up in a campground on Lake Seneca. As the sun began to set, word began spreading around the camp that a local resident had invited everyone to his farmhouse to watch the broadcast of the Apollo mission. He did not have great television reception, but he brought his TV onto the front porch and for several hours we sat, completely enthralled by what was happening above us. I remember looking at the Moon and, for a brief moment, had an adventure inside of an adventure.

NOTE: Apollo 11 images used in this story were found on the following Web sites:

http://io.jsc.nasa.gov/browser.cfm?catid=10

http://spaceflight.nasa.gov/gallery/images/apollo/apollo11/ndxpage1.html

http://www.hq.nasa.gov/office/pao/History/ap11ann/kippsphotos/apollo.html