

Oklahomans and Space

OKLAHOMA HISTORY CENTER EDUCATION DEPARTMENT



An astronaut explores outer space while on a spacewalk (image courtesy of National Aeronautics and Space Administration).

Do you dream of being an astronaut someday? There are boys and girls raised and educated in Oklahoma, maybe even from your hometown, who became astronauts! In fact, Oklahoma is the only state to have astronauts who have been involved in every phase of the United States's space program, demonstrating our state's lasting pioneer spirit as we continue to help explore the new frontier of space.

Many Oklahomans also contributed to the United States space programs as scientists, engineers, politicians, and more. Scientists study space in different ways. For example, pilots and **astronauts** can fly aircraft and travel to space in **rockets**. **Engineers** can help design and build communication technology, robots, and space vehicles, as well as program computers, and direct flight paths. Politicians and lawyers can help establish legislation and policies to support air and space travel and help fund new ideas and programs.

This e-exhibit allows you to meet astronauts and other Oklahomans who contributed to US space exploration. You also can learn more information about the history of space exploration and find some activities to do at home that might help inspire you to continue the legacy of Oklahomans in space.



Skylab 3 astronaut and Oklahoman Owen Garriott on a spacewalk (photo courtesy of National Aeronautics and Space Administration).



Space shuttle tiles, on loan courtesy of National Aeronautics and Space Administration.



Astronaut food, on loan courtesy of National Aeronautics and Space Administration.

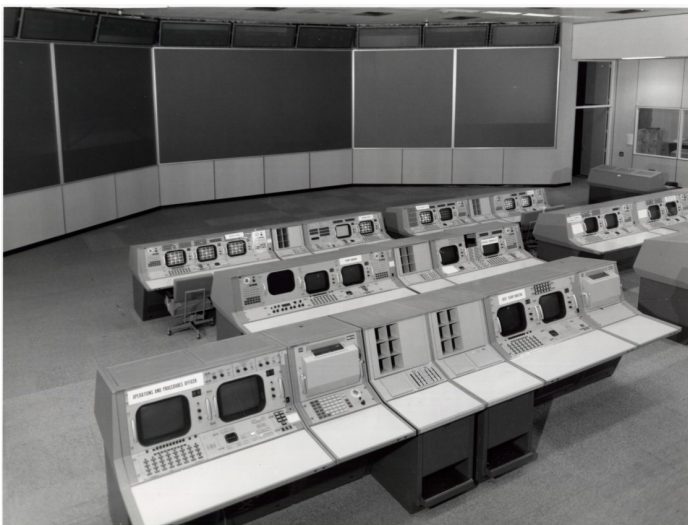
History of Space Exploration

Background

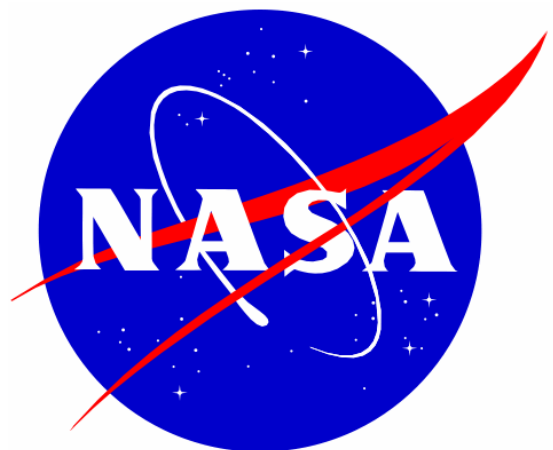
Space exploration began in the 1950s during a period called the **Cold War**. During this time, the United States and Russia, which was then in a group known as the Soviet Union, competed against each other. They both wanted to be perceived as the most powerful country in the world, and were developing increasingly stronger weapons. At the time, many Americans were afraid that the Soviets would attack the United States with these weapons, but this never came to pass.

The US and the Soviet Union also competed to have better technology, including the technology to explore space. This specific competition became known as the “**space race**.” In 1957, the Soviet Union launched the first man-made **satellite** into Earth’s orbit, called Sputnik. They would also launch the first human, Yuri Gagarin, into space. American politicians and scientists saw this as a crisis because they thought it meant that the Soviets might win the space race. The US government decided to commit more funds to space exploration. In 1958, the government created the National Aeronautics and Space Administration, or **NASA**, an independent agency of the federal government responsible for American space exploration, as well as **aeronautics** and space research.

Eventually, the United States and the Soviet Union decided that it would be easier if they worked together to explore space. This cooperation was a step towards the end of the Cold War and led to the world’s increasing collective knowledge about space, and space program development across the globe. When the Soviet Union dissolved into several countries in 1991, its space program mainly passed to Russia. The US and Russia would continue to work together with space shuttle and space station collaboration programs as well as with the present-day construction and development of the International Space Station.



Astronauts could not get to space without the help of many of the people like those who worked in this Mission Control Center in Houston, Texas (22311.S-64-33119, Jerry Elliott Collection, OHS).



NASA logo (image courtesy of National Aeronautics and Space Administration).

History of NASA

Soon after its creation, NASA planned to have human space flight. In 1961, Alan B. Shepard Jr. became the first American in space. John Glenn Jr. would then become the first US astronaut to orbit the Earth in 1962, and Edward H. White Jr. would become the first US astronaut to conduct a **spacewalk**. In 1961, President John F. Kennedy announced that the United States was going to land a man on the moon by the end of the decade. NASA established the Apollo program with the goal to fulfill this mission. The Apollo program was one of the largest non-military technological projects established by the United States government.

Neil Armstrong became the first human to walk on the moon on July 20, 1969. While taking his first step onto the moon's surface, Armstrong made one of the most famous statements in history: "That's one small step for man, one giant leap for mankind."

In 1975, for the first time, Americans and Soviets worked together in space. American astronauts from the Apollo program and Soviet Soyuz **cosmonauts** each launched from their own countries and met together in space. This marked the end of the space race, and was a major step towards the ending of the Cold War.

In 1973, NASA launched its first **space station**, known as Skylab. In 1981, the **space shuttle** became the first reusable spacecraft launched. In 1998, the American, Russian, Japanese, European, and Canadian space programs worked together to build the **International Space Station**, or ISS. The purpose of the ISS is to experiment with long-term stays in space with the hope of exploring the possibility of humans living permanently in space. Astronauts started living on the ISS in 2000, and the station is expected to operate through the year 2030. Over 200 people from 20 countries have visited the ISS, making it one of the largest signifiers of international technological cooperation both in (and above) the world.



The International Space Station as of October 4, 2018 (photo courtesy of National Aeronautics and Space Administration).



Space shuttle launch (photo courtesy of National Aeronautics and Space Administration).

Oklahoman Astronauts

Leroy Gordon Cooper Jr.



(Photo courtesy of National Aeronautics and Space Administration.)

Date of Birth: March 6, 1927

Oklahoma Connection: Born in Shawnee, Oklahoma

Missions: Mercury— Atlas 9
Gemini 5

Leroy Cooper's nickname was Gordo. His grandmother settled in Oklahoma in the 1880s and lived long enough to see him go to space. His father encouraged his love of flying, and by age eight, Cooper could fly his family's small airplane. By age twelve, he made his first solo flight. He joined the Marines in World War II and transferred to the Air Force in 1949, where he studied aeronautics and engineering. NASA selected him to be an astronaut in 1959 after a long series of physical and mental testing. He became one of the members of the Project Mercury astronauts, or the "Mercury Seven."

In 1963, Cooper flew the last and longest flight of the Mercury series on the spacecraft *Faith 7*, which lasted for 34 hours and 22 minutes. During re-entry to earth on *Faith 7*, the automatic controls failed and he had to manually take over flying. He landed successfully. Cooper helped prove that humans could survive in space long enough for a round trip to the moon when he and pilot Charles Conrad spent eight days in space on the Gemini 5 in 1965. He later would work as fellow Oklahoman astronaut Tom Stafford's backup commander on the Apollo 10 mission in 1969. In total, he spent 222 hours in space. Leroy Cooper Jr. died on October 4, 2004.



The Mercury 7 astronauts gathered in flight gear. Cooper is second from the left.
(Photo courtesy of National Aeronautics and Space Administration.)



Mercury astronauts (photo courtesy of National Aeronautics and Space Administration).



The original Mercury astronauts; Cooper is sitting to the far right (photo courtesy of National Aeronautics and Space Administration).



Leroy Gordon Cooper Jr. "Welcome Back to Earth" button (2003.095.004, Bill Moore Collection, OHS).



Oklahoma Senator Kerr with Leroy Gordon Cooper Jr. (middle) (22668.2, Carter Bradley Collection, OHS).

Thomas Patten Stafford



(Photo courtesy of National Aeronautics and Space Administration.)

Date of Birth: September 17, 1930

Oklahoma Connection: Born in Weatherford, Oklahoma

Missions: Gemini 6
Gemini 9
Apollo 11
Apollo-Soyuz

Stafford joined the US Naval Academy, and afterwards joined the US Air Force. His first flight was on the Gemini 6. He and his co-pilot Walter Schirra proved that it was possible for two spacecraft to fly near one another in order to dock, or connect with, another spacecraft. The Gemini 6 and their replacement, Gemini 7, had a successful rendezvous on December 15, 1965, coming within one foot of each other in space. Stafford's next mission came unexpectedly when the crew of Gemini 9 died tragically in a plane crash. Stafford was part of the backup crew that stepped up to continue the mission. While on the Gemini 9, his partner Eugene Cernan was doing a spacewalk when his face shield fogged over, and his communications system failed. Stafford was able to talk him back inside, saving Cernan's life. Later, astronauts would bring an anti-fog solution to treat their visors before spacewalks as a result of this occurrence.

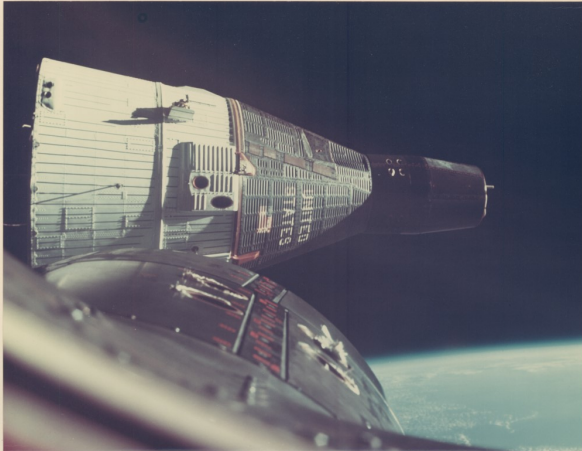
Stafford commanded the Apollo 10 mission in 1969, where he flew in the largest rocket ever built, the *Saturn V*. While in space, the rocket separated into a lunar **module** and a command module. Stafford and the lunar module would fly within 10 miles of the moon's surface. This flight helped prepare for the next mission to walk on the moon by mapping out the path that Apollo 11 would later take. For his last mission on Apollo-Soyuz, Stafford performed the first international rendezvous and docking, where three American astronauts met and worked together with two Russian cosmonauts. When they met, Stafford and Russian Alexei Leonov shook hands, known as the "Handshake in Space," which helped introduce the end of the Cold War and allowed the Russians and Americans to begin collaborating in space. Altogether, Stafford spent 507 hours and forty-three minutes in space.

Stafford Air & Space Museum

The Stafford Air & Space Museum is located in Weatherford, Oklahoma, Thomas P. Stafford's hometown.. The museum houses one of the finest collections of aviation and space flight exhibits in the central United States and features a large series of aeronautical and space artifacts. The museum features an exhibit area for the Gemini, Apollo, and space shuttle programs as well as artifacts from each mission. You can learn more about the museum at www.staffordmuseum.com.

Stafford touching Snoopy, the mission's mascot, for good luck (photo courtesy of National Aeronautics and Space Administration).



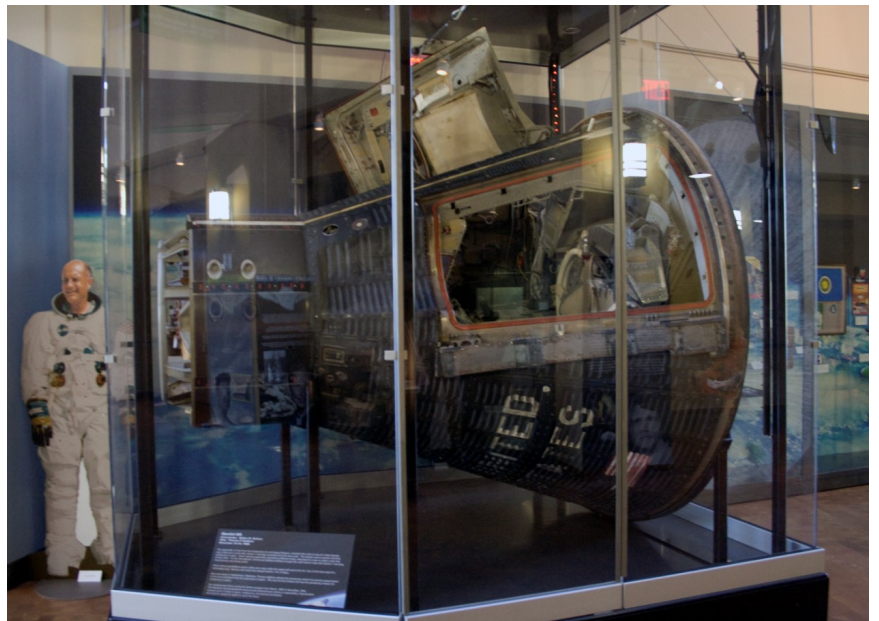


To Carter Bradley—
Best Wishes +
MANY THANKS FOR THE EFFORT
THAT YOU HAVE GIVEN TO OUR
COUNTRY'S SPACE PROGRAM.

Thomas P. Stafford
Gemini II, IX

Autographed picture of Gemini spacecraft by Thomas Stafford (22668.4, Carter Bradley Collection, OHS).

Gemini 6-A. *Oklahomans in Space* exhibit, Oklahoma History Center.



Stafford and Cosmonaut Leonov, 1975 (18220.111.0, Jerry Elliott Collection, OHS).

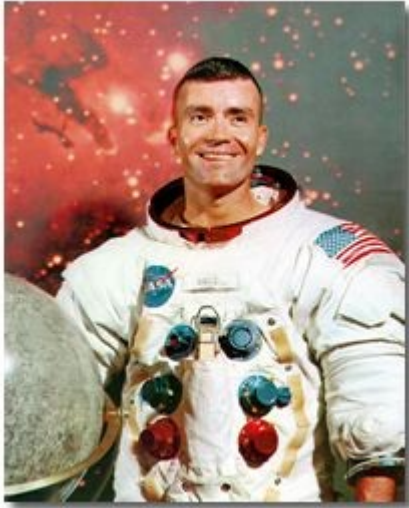


Thomas Stafford speaking at the Oklahoma Historical Society (19687.HS.OHS.EV.1.21, Chester R. Cowen Collection, OHS).

Astronauts during training, including Thomas Stafford (standing, left) (photo courtesy of National Aeronautics and Space Administration).



Fred Wallace Haise



(Photo courtesy of National Aeronautics and Space Administration.)

Date of Birth: November 14, 1933

Oklahoma Connection: Joined the Oklahoma Air National Guard and attended the University of Oklahoma

Missions: Apollo 13

Haise began his military career in 1952 as a Naval and Marine Corps pilot and afterwards joined the Oklahoma Air National Guard in 1957. He graduated from the University of Oklahoma in 1959, and would then work for the US Air Force and NASA. NASA selected him as an astronaut in 1966. He was the backup lunar module pilot for both Apollo 8 and Apollo 11, and was finally chosen as the main lunar module pilot for the Apollo 13 mission, along with Jim Lovell, the mission commander, and Jack Swigert, the command module pilot.

The mission was supposed to last ten days and they were to land on the moon, making Haise the sixth person to walk on the moon. However, just a few days into the mission, there was an explosion in the command module, and the astronauts noticed gas leaking into space. The service module oxygen tank had failed. This was very dangerous because the astronauts were 200,000 miles from Earth and were not sure if they would have enough power to make it home. The astronauts got out of the command module and closed it off, planning to use the lunar module as a “lifeboat.” They had to conserve electricity, food, and water to survive the rest of the way home. There were also problems with the navigation systems, but Haise was able to communicate with **Mission Control** to fly everyone back, and they landed on Earth safely. Despite this terrifying experience, Haise was disappointed that he did not make it to the moon.

In total, Haise spent 142 hours and fifty-four minutes in space. While he would not go to space again, he would later work on the Space Shuttle Program for NASA to help test how the shuttles would fly and land. In 1995, there was a movie made about the Apollo 13 flight, in which Haise is portrayed by actor Bill Paxton.



Apollo 13 crew; Fred Haise is on far right (photo courtesy of National Aeronautics and Space Administration).

The flight director watches Apollo 13 astronaut and lunar module pilot Fred Haise onscreen in the Mission Operations Control Room. Shortly after, an explosion occurred that risked the lives of the crew. (Photo courtesy of National Aeronautics and Space Administration).



Stuart Allen Roosa



(Photo courtesy of National Aeronautics and Space Administration.)

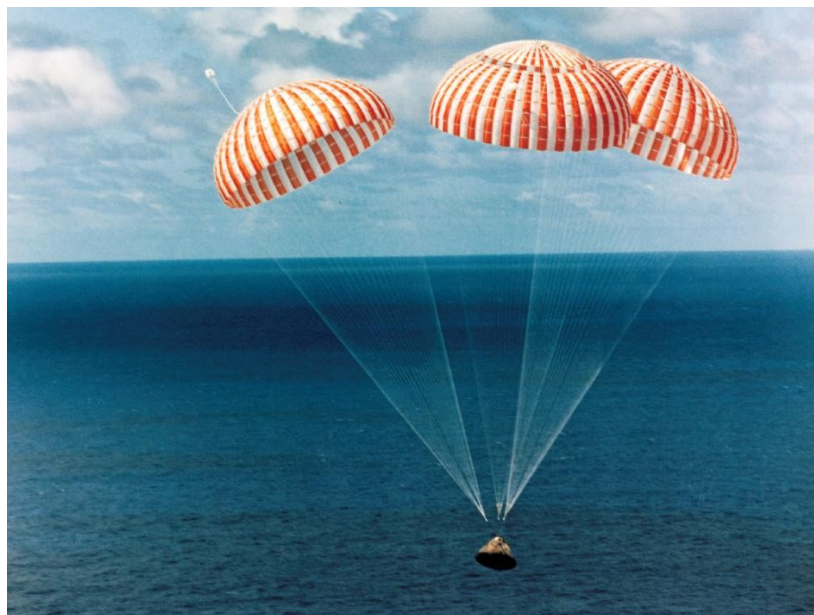
Date of Birth: August 16, 1933

Oklahoma Connection: As a boy, he and his family moved from Colorado to Claremore, Oklahoma, where he attended high school. He also attended Oklahoma A&M College (now Oklahoma State University).

Missions: Apollo 14

“Stu” Roosa always wanted to be a pilot when he grew up. As a teenager, he worked for the US Forest Service fighting fires. He later joined the US Air Force and would get his degree in aeronautical engineering. Roosa became an astronaut in 1966, where he served as a support crew member for Apollo 9. He then served as the command module pilot on Apollo 14 with Alan Shepard as commander and Edgar Mitchell as the lunar module pilot, which went to the moon in 1971. Roosa flew in lunar **orbit** by himself for thirty-three hours while Shepard and Mitchell walked on the moon.

As part of the Apollo 14 mission, Roosa brought tree seeds into space for a project by the US Forest Service and NASA. The seeds were later planted back on Earth and were known as “Moon Trees.” Roosa would later serve as the backup command module pilot for Apollo 16 and Apollo 17, but would not return to space. He later worked on the Space Shuttle Program. In total, he spent 217 hours in space. Stuart Roosa died on December 12, 1994.



The Apollo 14 command module with astronaut Stuart A. Roosa landing in the Pacific Ocean (photo courtesy of National Aeronautics and Space Administration).

Owen Kay Garriott



(Photo courtesy of National Aeronautics and Space Administration.)

Date of Birth: November 22, 1930

Oklahoma Connection: Born in Enid, Oklahoma

Missions: Skylab 3
STS-9/Spacelab 1

In high school, Garriott worked at a radio station as an engineer and earned his amateur radio license. He attended the University of Oklahoma, where he studied electrical engineering and joined the US Navy ROTC. Garriott would then serve as an electronics officer in the Navy until 1956. He earned his Ph.D. from Stanford University in 1960 in electrical engineering and would teach the subject there as well.

In 1965, NASA chose Garriott as one of the first scientist-astronauts. He flew on the *Saturn* I-B rocket in 1973 for the Skylab-3 mission, where he conducted many experiments, including solar observations and medical experiments. He was a mission specialist alongside five other crew members, the largest group yet to fly into space, on the STS-9 *Columbia* in 1983 for the new laboratory called Spacelab. Over seventy different experiments and tests were conducted in just ten days. Also on this mission, Garriott conducted the first human amateur radio operation in space using his own radio call letters, W5LFL. You can listen to some examples of his transmissions at aa5tb.com/satellite.html. Altogether, he spent 1,674 hours and fifty-six minutes in space.

Garriott would also serve as director of Science and Applications, assistant director of Space Science, and program specialist for the Space Shuttle Program for NASA until his retirement in 1986. In 2008, his son Richard became the first American son of an astronaut to fly in space when he visited the International Space Station. Owen Garriott died on April 15, 2019.



Owen Garriott, back (22311.S.72.17482, Jerry Elliott Collection, OHS).



Garriott on an EVA to deploy a sunshade on Skylab (photo courtesy of the National Aeronautics and Space Administration).

William Reid Pogue



(Photo courtesy of National Aeronautics and Space Administration.)

Date of Birth: January 23, 1930

Oklahoma Connection: Born in Okemah, Oklahoma

Missions: Skylab 4

Bill Pogue was born in Okemah, Oklahoma and grew up in Sand Springs, Oklahoma. He studied education at Oklahoma Baptist University and got his Masters of Science degree from Oklahoma A&M (now Oklahoma State University) in mathematics. In 1951, he joined the US Air Force and fought in the Korean War. From 1955 to 1957, Pogue was a member of the elite US Air Force Thunderbirds, and would also teach at the Air Force Academy. In 1966, he was chosen to be an astronaut. After working as support crew for several Apollo missions, Pogue became a pilot for the third mission to Skylab 4 and went to space on the *Saturn* I-B rocket in 1973. This was the last and longest of the Skylab missions, and the astronauts performed many medical experiments and exercise tests, and extensive observations of the sun through Skylab's Apollo Telescope Mount.

Altogether, Pogue spent 2,017 hours in space. He would later work in several other aerospace-related fields, including working as a consultant for the International Space Station. William Pogue died on March 3, 2014.



Pogue is balanced on one finger in zero-gravity by another astronaut (photo courtesy of National Aeronautics and Space Administration).



Presentation flag carried on Skylab 2 by William Pogue to commemorate all the American Indian tribes in Oklahoma (1974.007, Col. William R. Pogue Collection, OHS).

Shannon Wells Lucid



(Photo courtesy of National Aeronautics and Space Administration.)

Date of Birth: January 14, 1943

Oklahoma Connection: Raised in Bethany, Oklahoma

Missions: Discovery STS-51G
Atlantis STS-34
Atlantis STS-43
Columbia STS-58
Atlantis STS-76

Shannon Lucid's parents were missionaries in China when Lucid was born in Shanghai. Her parents came back to the United States, and Lucid grew up in Bethany, Oklahoma. She attended the University of Oklahoma and received her B.S., M.S., and Ph.D. in biochemistry. While in college, Lucid took flying lessons and later worked as a research associate for the Oklahoma Medical Research Foundation.

In 1978, NASA selected her as one of the first American female astronauts. She would fly on five missions and conduct many biomedical experiments and satellite launches. Her fifth and final mission was as a board engineer on the Russian Space Station, *Mir*. On this mission, her return was delayed by six weeks, making her *Mir* stay a total of 188 days and four hours. She set the record for the most hours in orbit by a non-Russian, and the record for the most hours in orbit by a woman.

In 2002, Lucid would move to work in NASA management, serving as their chief scientist, as well as a lead capsule commander at Mission Control for many Space Shuttle missions. Her lifetime of work at NASA and record-setting achievements made her a role model for many young girls around the world.



Shannon Lucid's polo shirt (1999.057.001, Shannon Lucid Collection, OHS).



First female astronaut candidates, 1978 (Lucid on far left) (photo courtesy of National Aeronautics and Space Administration).

John Bennett Herrington



(Photo courtesy of National Aeronautics and Space Administration.)

Date of Birth: September 14, 1958

Oklahoma Connection: Born in Wetumka, Oklahoma

Missions: Endeavour STS-113

John Herrington is a Chickasaw Indian. He earned a degree in mathematics from the University of Colorado and later joined the Navy and learned to fly airplanes. He then earned his master's degree in aeronautical engineering from the US Navy Postgraduate School. Herrington flew in the shuttle *Endeavor* to the International Space Station as a mission specialist, where he installed new parts on the space station. Herrington was the first member of an American Indian tribe to go to space. He took items with him into space that were significant to American Indian history and culture, including an arrowhead, three eagle feathers, and a Chickasaw Nation flag.

Herrington spent 330 hours and forty-seven minutes in space, including almost twenty hours of **extravehicular activity (EVA)** outside the space station. His spacewalks were commemorated on the 2019 design for the Native American \$1 coin, which features Sacagawea on the reverse side.

THE DAILY OKLAHOMAN



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION PHOTOS

Oklahoma native John Herrington, center, poses for a group photo with his STS-113 Space Shuttle crew prior to a training session in a facility at the Johnson Space Center in Houston. From the left are astronauts James Wetherbee, mission commander, Christopher (Gus) Loria, pilot, Michael Lopez-Alegria and Herrington, mission specialists, Kenneth Bowersox, International Space Station mission commander, cosmonaut Nikolai Budarin and astronaut Donald Thomas, both space station flight engineers.

Excerpt from *The Daily Oklahoman* article "First Indian in space began journey in state," from Tuesday, September 10, 2002.

Oral Histories

You can read the transcripts of oral history interviews with these Oklahoman astronauts at this website:

historycollection.jsc.nasa.gov/JSCHistoryPortal/history/oral_histories/participants_full.htm

[Leroy “Gordo” Cooper](#)

[Thomas P. Stafford](#)

[Fred W. Haise](#)

[Owen K. Garriott](#)

[William R. Pogue](#)

[Shannon W. Lucid](#)

Oklahoman Space Exploration Contributors

Astronauts could not travel to space without the hard work of scientists, engineers, mathematicians, physicists, computer scientists, pilots, and others. While there are many astronauts from Oklahoma, lots of other Oklahomans have worked for NASA and the air and space industry and contributed to the effort to explore and study space.

For example, Jeffrey Morgan Moore, who attended the University of Oklahoma, is a scientist who studies rocks and soil from Mars and Jupiter. Carol Ann McLemore, from Tulsa, Oklahoma, is a NASA engineer who helped design the International Space Station and is researching technologies for potential settlement of the Moon, Mars, and beyond. Charles R. Thomas, from Ada, Oklahoma, was a computer programmer and worked on the Apollo program. Gary L. Tesch from El Reno, Oklahoma, served as a lawyer for NASA. Velma Clark, from Custer City, Oklahoma, wrote, proofread, and edited early NASA engineering handbooks.



(Photo courtesy of National Aeronautics and Space Administration.)

James Edwin Webb

Oklahoma Connection: Moved to Oklahoma in 1953

James Webb was a former Marine and lawyer who was the director of the Bureau of Budget and Under Secretary of State in Harry Truman's administration. He moved to Oklahoma City in 1953 to work for Kerr-McGee, an energy company. As a community leader, he established the Frontiers of Science Foundation, which helped promote science education in schools. In 1961 he became the **administrator** of NASA under President John F. Kennedy. He served until 1968, and played a huge role in helping to get the first man on the moon through his work with Washington, DC, lawyers and politicians to help fund NASA and establish bonds with the community.

Jerry Chris Elliott

Oklahoma Connection: Born in Oklahoma City, Oklahoma



Jerry Elliott with Iron Eyes Cody and the Apollo-Soyuz docking module (22311.80.11.3.7, Jerry Elliott Collection, OHS).

Jerry Elliott is a Cherokee and Osage Indian. As a child, he had a vision that he would help get people to the moon. His grandfather often told him stories about his time as an aircraft engineer for Wiley Post. Elliott attended the University of Oklahoma to study physics, and became a Guidance Engineer for NASA in 1966. He worked on the Gemini, Apollo, and Space Shuttle programs, resulting in a career lasting 40 years. He fulfilled his vision in 1969 when he was working in Mission Control when Apollo 11 landed on the moon.

Elliott received numerous awards and commendations throughout his career, including the Presidential Medal of Freedom for his work returning the Apollo 13 astronauts. He led many design and project engineering efforts for NASA, and also founded the American Indian Science and Engineering Society.



(Photo courtesy of National Aeronautics and Space Administration.)

Donna Shirley

Oklahoma Connection: Born in Pauls Valley, Oklahoma, in 1941

Donna Shirley dreamed of going to Mars as a little girl and was interested in aviation from a young age. She enrolled in the University of Oklahoma's engineering program in 1958, but her college advisor told her that "girls can't be engineers." However, she persevered and finally received her B.A. in aerospace engineering in 1965. Shirley worked for the Jet Propulsion Lab in California helping to design landing proposals for a Mars mission, where she was the only female engineer out of nearly 2,000 engineers.

In 1994 she became the Mars Program Manager in the Office of Mars Exploration, and helped land the first rover on Mars in 1997. Her work as the program manager for the program landed her national and international attention. In 1998, Shirley retired from NASA and served as assistant dean at the University of Oklahoma's College of Engineering, the same place she had once been told that "girls can't be engineers."

Wiley Hardeman Post

Oklahoma Connection: Moved to Oklahoma in 1907

Wiley Post wanted to become a pilot from the age of fourteen, even acting as a parachute jumper for a flying circus. When he eventually purchased his own plane, he flew for oil companies, and was hired to fly full time by an oilman named F. C. Hall. He bought Post his own plane to fly in 1930, named after Hall's daughter, Winnie Mae. Post is best known for setting a record for flying around the world in the *Winnie Mae*, doing so in eight days, fifteen hours, and fifty-one minutes.

Post also wanted to fly higher than anyone had before. He could not do so safely in the *Winnie Mae*, because it was made of wood, and the pressure in the air was too strong to allow the plane to keep him safe at extreme **altitudes**. He contacted the B. F. Goodrich Company to design him a suit that would allow him to fly higher into the **atmosphere**. The suit would be made up of multiple layers and included parachute fabric, rubberized lining, and an aluminum diving helmet. In 1934, Wiley Post flew the *Winnie Mae* to 40,000 feet, and later flew to as high as 50,000 feet.

Wiley Post made it possible for astronauts to survive in space by helping to develop the first pressurized suit. His suit is what set the model to design the suits that astronauts wear. Tragically, Post and comedian Will Rogers died in a plane crash on August 15, 1935. While his flying career was short, Wiley Post set records and introduced designs whose impacts can still be seen today.



Wiley Post in his pressurized suit (23115-AL-19-4, Arch Dixon Collection, OHS.)

Geraldyn “Jerrie” Cobb



(Photo courtesy of National Aeronautics and Space Administration.)

Oklahoma Connection: Born in Norman, Oklahoma, in 1931

Jerrie Cobb learned to fly her father’s plane by age twelve, and became a pilot by age sixteen. By age nineteen, she was a certified flight instructor, and by twenty-one, she was flying fighter planes and bombers to Air Force bases around the world. Cobb went on to set world records in flight speed, distance, and altitude, even becoming the first woman to fly in the Paris Air Show, the world’s largest air exposition.

In 1960, when NASA was performing medical tests to determine who would be the first astronauts on the Mercury flight program, they decided to invite women to take the same tests. Cobb became the first woman astronaut trainee in 1960, and passed all three phases of testing with flying colors. She also became a

consultant for the future use of women astronauts alongside famed aviator Jacqueline Cochran, and testified in Washington, DC to lobby for their inclusion. In 1963, NASA decided to officially cancel the female astronaut testing program. Cobb resigned and became a humanitarian aid worker to South America, winning many awards for her work.

While she never made it to space, Cobb is often referred to as one of the first female astronauts. The first woman to go to space, Soviet cosmonaut Valentina Tereshkova, even said that Cobb was one of her role models. Jerrie Cobb passed away on March 18, 2019, and is remembered today for her tenacity and pioneering spirit.



(Photo courtesy of National Aeronautics and Space Administration.)



Jerrie Cobb after setting world record, from the *Oklahoma Times* newspaper (2012.201.B0138.0280, Oklahoma Publishing Company Photography Collection, OHS).

Programs

Mercury Program

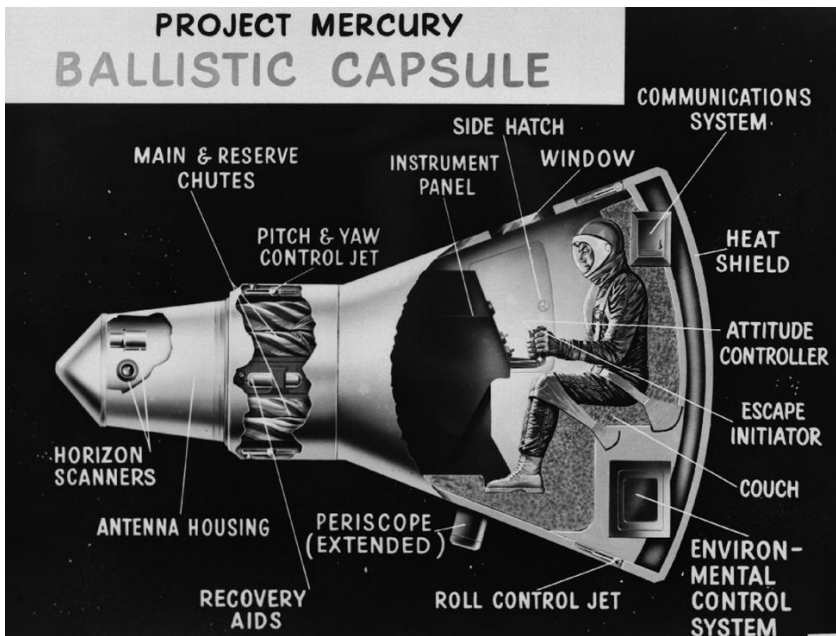


Faith 7 mission patch (photo courtesy of National Aeronautics and Space Administration).

The Mercury program was the first American effort to send humans into space, and lasted from 1961 to 1963. NASA chose the seven astronauts who would first go into space in 1959, six months after it was founded. They had to go through rigorous testing and flight practices, and were known as the Mercury Seven. The astronauts were shot into space in a single **capsule** on a rocket that could only hold one person, who had to stay sitting down the whole time. Two of the six flights in the Mercury program were **suborbital** flights, where they would reach space and immediately return. Four flights entered full orbit around the Earth.

Leroy Gordon Cooper Jr. of Shawnee, Oklahoma, was an astronaut for the Mercury program. He flew on the *Faith 7* on May 15, 1963. The *Faith 7* was the last and longest flight of all the Mercury missions, and flew around the Earth twenty-two times. Cooper said they were “saving the best for last.” At the end of the flight, the automatic system return failed, but he was able to use his piloting skills to get back to Earth safely.

The Mercury program was very important to NASA, and helped them create plans for future missions. They learned how to put a human into orbit, how to live and work in space, how to communicate with spacecraft, and how to optimize spacecraft equipment.



Drawing of the Mercury Capsule. Only one astronaut could fit in the capsule. (image courtesy of National Aeronautics and Space Administration).



Mercury Atlas 9, also called *Faith 7*, launching. (photo courtesy of National Aeronautics and Space Administration).

Gemini Program

The Gemini program was the second phase of NASA's space program. Its purpose was to prepare to go to the moon. NASA wanted to see if humans could survive long enough in space for the round trip to the moon, which was about two weeks. They also wanted to see how humans would survive and work in spacesuits outside of the spaceship. Finally, they wanted to see how two modules would hook up and disconnect with each other in space, because the Apollo spacecraft would have multiple parts that needed to perform this task. Two people could fly in the Gemini spacecraft. There were ten manned missions in the Gemini program from 1965 to 1966.

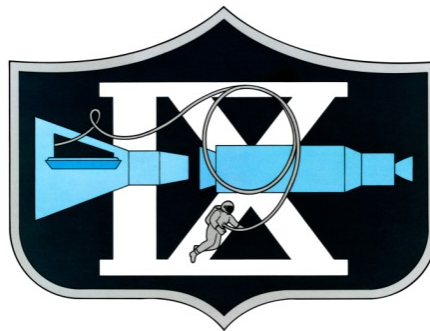
Leroy Gordon Cooper Jr. commanded the Gemini 5. It launched on August 21, 1965. The Gemini 5 helped to prove that people could live in space at least eight days, which was about long enough to make it to the moon. Thomas Stafford flew in the Gemini 6-A that launched on December 15, 1965, with Walter Schirra. They flew within a foot of the Gemini 7, proving that spacecraft could fly close together in space, which was necessary for learning how to rendezvous and dock. Thomas Stafford flew again in the Gemini 9-A when the original crew died in a plane crash. The spacecraft launched on June 3, 1966.



Gemini 5 mission patch
(photo courtesy of National
Aeronautics and Space
Administration).



Gemini 6 mission patch
(photo courtesy of National
Aeronautics and Space
Administration).



Gemini 9 mission patch (photo
courtesy of National Aeronautics and
Space Administration).



Gemini space suit used for testing (loan from Kansas Cosmosphere and Space Center, Inc., *Oklahomans and Space* exhibit, OHS).



Gemini 9 spacecraft launch, 1966 (22311.S-66-34098, Jerry Elliott Collection, OHS).

Apollo and Apollo-Soyuz Program

The goals of the Apollo program were to land a human on the moon for the first time and to investigate how humans could live and work on the moon. The Apollo spacecraft was made up of three parts. Three astronauts flew and lived in the Command Module, while the Service Module provided the technology to control the craft's **propulsion** and flight. The Lunar Module would be the module that landed on the moon, carrying two astronauts to perform lunar experiments and exploration. The other astronaut would be orbiting the moon in the Command Module waiting for them. When they were ready to leave, the Lunar Module would return them to the Command Module for the three astronauts to fly home. The Apollo program would make a total of eleven spaceflights and have twelve astronauts walk on the moon from 1968 to 1972.

Thomas Stafford of Weatherford, Oklahoma, was the commander on Apollo 10 that launched on May 18, 1969. The crew of the Apollo 10 orbited the moon and tested the Lunar Module. On the Apollo 11 mission, Neil Armstrong and Buzz Aldrin were the first people to walk on the moon when they landed on July 20, 1969. Fred Haise was the Lunar Module pilot for Apollo 13, which launched April 11, 1970. This infamous flight became dangerous when an explosion happened in the spacecraft, and the crew had to abandon their mission and turn around. Haise overcame dangerous odds and helped fly the spacecraft and crew safely back to Earth. Stuart Roosa from Claremore, Oklahoma, was the Command Module pilot for Apollo 14, which launched January 31, 1971. Apollo 14 was the third spacecraft to land on the moon.



Apollo 10 mission patch (photo courtesy of National Aeronautics and Space Administration).



Apollo 14 mission patch (photo courtesy of National Aeronautics and Space Administration).



Apollo 13 mission patch (photo courtesy of National Aeronautics and Space Administration).

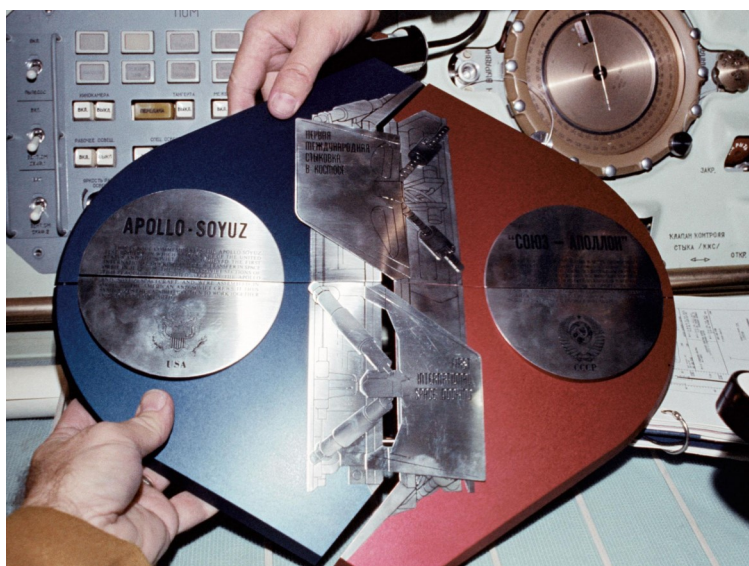
Thomas Stafford was also the commander for the Apollo-Soyuz Test Project, which launched July 15, 1975. This was the first mission where Americans and Soviets worked together, which helped to settle some of the tension caused by the Cold War. You can watch a video of the two crafts docking and the astronauts and cosmonauts shaking hands at <https://www.youtube.com/watch?v=es7Br9kJBbo>.



Apollo-Soyuz mission patch (photo courtesy of National Aeronautics and Space Administration).



The Saturn 1-B rocket launching the Apollo-Soyuz mission (18220.12.o, Jerry Elliott Collection, OHS).



Commemorative plaque to symbolize cooperation between US and the Soviet Union (photo courtesy of National Aeronautics and Space Administration).

Skylab Program



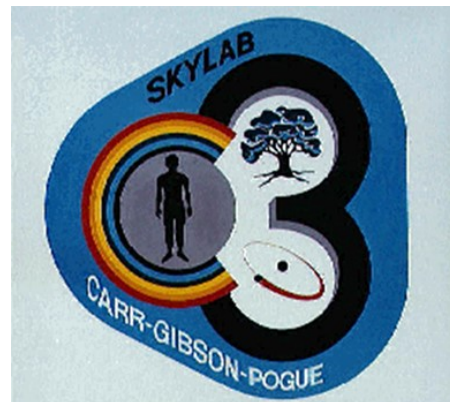
Full view of Skylab in orbit (photo courtesy of National Aeronautics and Space Administration).

Skylab was America's first space station. It launched on May 14, 1973, and was occupied until February, 1974. It continued to orbit the Earth until 1979. Its main purpose was to study the long-term effects of living in space, as well as to perform many science experiments and spacewalks in zero-gravity. Skylab contained a solar observatory and telescope that were used to take thousands of pictures and scans of the **solar system**. The main living space doubled as a workshop. Skylab hosted three different manned missions, called SL-2, SL-3, and SL-4. Each mission consisted of three astronauts. SL-2 would stay in space for twenty-eight days, SL-3 for sixty days, and SL-4 for eighty-four days.

Owen Garriott of Enid, Oklahoma, was the scientist pilot for Skylab 3, which launched on July 28, 1973. He and the crew performed many biology and physics experiments and added solar shades to the outside of the space station. William Pogue from Sand Springs, Oklahoma, was the command module pilot for the Skylab 4, which launched on November 16, 1973. Pogue participated in two spacewalks, and helped perform extensive repairs on the solar observatory's telescope mount.



Skylab 3 mission patch (photo courtesy of National Aeronautics and Space Administration).



Skylab 4 mission patch (photo courtesy of National Aeronautics and Space Administration).

Space Shuttle Program and the International Space Station



Space shuttle *Columbia* (photo courtesy of National Aeronautics and Space Administration).

The space shuttle was America's first reusable spacecraft, officially called Space Transportation Systems (STS). Five shuttles were constructed initially, but two were lost in tragic accidents along with their crew: the *Challenger* shuttle in 1986, and the *Columbia* shuttle in 2003. Space shuttles are launched with two reusable rocket boosters and a disposable large fuel tank, and can carry up to eight astronauts. Space shuttles are able to re-enter Earth's atmosphere and perform a gliding landing like an airplane, unlike the ocean splashdowns in previous spacecraft. Flights were used for astronaut transportation, payload delivery, and the pickup of objects in orbit. Space shuttles transported many pieces of the International Space Station into space, as well as the Hubble Space Telescope. The first space shuttle launch was on April 12, 1981, and the last flight was on July 8, 2011.

The International Space Station, or ISS, is an orbiting system designed as a long-term space for humans to live and work. Sixteen countries had a hand in helping build and maintain the ISS and people from twenty different countries have stayed on board, making it one of the largest and most expensive cooperative technologic projects in the world. Construction on the ISS began in 1998, and occupation by humans began on November 2, 2000. The space station has been continuously occupied ever since, and is planned to last until 2030. Experiments and projects performed on the ISS have led to many groundbreaking discoveries, and continue to this day.

Many Oklahomans have been a part of the Space Shuttle and ISS missions. Owen Garriott became the first person to operate a HAM radio from space on the STS-9 mission, which launched on November 28, 1983. Shannon Lucid flew on many shuttle missions and spent a significant amount of time on the International Space Station's predecessor, the Russian space station *Mir*. John Herrington performed three spacewalks while on the STS-113 mission, which launched on the shuttle *Endeavor* on November 23, 2002.



STS-9 patch (photo courtesy of National Aeronautics and Space Administration).



STS-113 patch (photo courtesy of National Aeronautics and Space Administration).



STS-4 patch (photo courtesy of National Aeronautics and Space Administration).

Glossary

administrator: A person who is in a position of authority, or who manages people, practices, and policies

aeronautics: The science or practice of traveling through the air

altitude: The height of an object in relation to sea or ground level

astronaut: A person who is trained to travel into space

atmosphere: The gases that are held close to the surface of a planet by the force of gravity

capsule: A space vehicle, usually with a flattened cone shape, that carries explorers to space and back to Earth

Cold War: The state of political hostility that existed between the United States and the Soviet Union and their allies

cosmonaut: The word used by the Soviet Union and Russia for a person who is trained to travel into space

engineer: A person who designs and builds complex products, machines, systems, or structures

extravehicular activity (EVA): Any time an astronaut gets out of a vehicle in space, usually to perform experiments or repairs. Also referred to as a **spacewalk**

International Space Station (ISS): A large modular space station in Earth's orbit that was constructed cooperatively by many nations and acts as a long-term scientific laboratory and home for astronauts around the world

Mission Control: A facility that manages and communicates with space flights from the ground, usually located at or near the launch site

module: A self-contained unit of a spacecraft

National Aeronautics and Space Administration (NASA): The United States government agency that directs all public exploration and travel in space

orbit: A repeating path that one object in space takes around another

propulsion: To push or drive an object forwards or upwards

rocket: A manmade craft capable of leaving Earth

satellite: A small object that orbits around larger objects in space, and can be either natural or manmade

solar system: A set that includes a star and all of the matter that orbits it, including planets, moons, asteroids, comets, and other objects

space race: The race between the United States and the Soviet Union to be the first nation to reach Earth's moon

space shuttle: A spacecraft designed to transport people and cargo between Earth and space that can be used repeatedly

space station: A large spacecraft that is used as a long-term base for humans to live and work

spacewalk: Any time an astronaut gets out of a vehicle in space, usually to perform experiments or repairs. Also referred to as **extravehicular activity (EVA)**

suborbital: A flight that does not reach a high enough altitude to pull into Earth's orbit

Activities

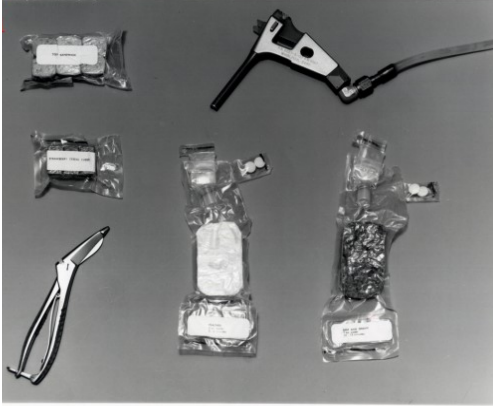
Fact or Fiction?

Facts are something that actually occurred. Fiction is something that we create using our imagination. Sometimes authors use facts from history and then use their imagination to create a story based on those facts.

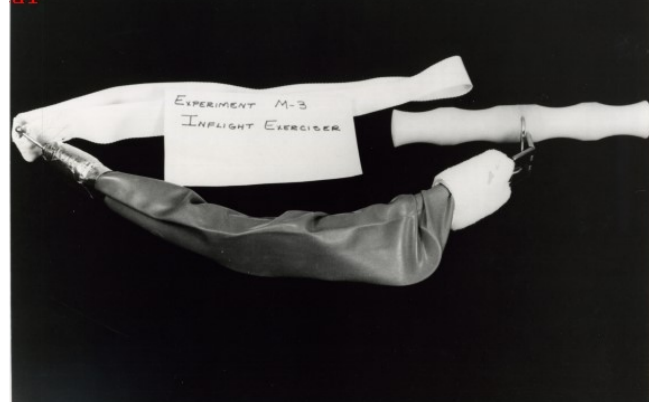
Choose one of the astronauts from this website. First, research the astronaut using this website, other websites, and books. Use the facts you find mixed with your imagination to create a short story about the astronaut's time in space. Write your story using two different colors. Use one color when writing down facts that actually occurred. Use the other color for the parts of the story that you create. One sentence may have two different colors. Read the story out loud to a friend and have them try and guess what is fact and what is fiction!

What to Take?

Below are typical items taken on space missions, including dehydrated food and an exercise band. Astronauts will also bring personal items with them to space, like journals, flags, or toys. Because it takes so much fuel to transport people and objects into space and space station living quarters are so tight, every ounce of weight and free space counts, so personal objects often have to be quite small and compact.



Dehydrated food and a water gun to rehydrate it from the Gemini-Titan 4 (22311.S-65-22240, Jerry Elliott Collection, OHS).



A bungee cord used by astronauts on the Gemini-Titan 4 for exercise (22311.S-65-19590, Jerry Elliott Collection, OHS).

What would you need to take with you on your trip to space to survive? What would you want to take with you for when you are bored or lonely? Draw items that you would need or want to take with you to space in the box below or on your own sheet of paper!

Be a Journalist from the Past

The general public has always followed the space program's progression and achievements in the media, especially on television. People would crowd around their televisions to watch early spacecraft launches, or to see history being made in footage transmitted from the moon.

Choose an Oklahoman astronaut and one of the missions they went on. Research that mission on this website or through other resources. Then, prepare and perform a television news story presentation or write a newspaper article about the mission.

Consider some of these questions when creating your news story:

Who are the astronauts on the spacecraft?

What is the name of the spacecraft?

Where is the spacecraft headed? What is its goal?

How did the launch happen – was it successful?

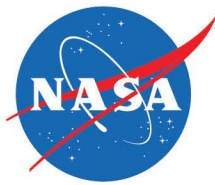
Why is the launch important?

In addition, think about the questions you would ask the astronauts on the spacecraft for an interview. What would you be most interested to know about their time on the mission? What types of questions do you think people would enjoy watching or reading about this program? Write at least three potential interview questions below:

Front page of *The Sapulpa Daily Herald* after the historic moon landing in July, 1969.

The Sapulpa Daily Herald (Sapulpa, Okla.), Vol. 54, No. 276, Ed. 1 Monday, July 21, 1969 (courtesy of the Oklahoma Digital Newspaper Program).





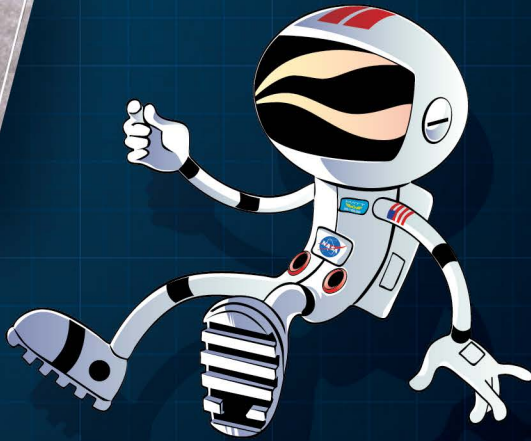
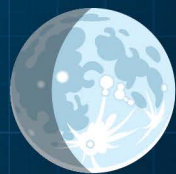
UPPER



LOWER



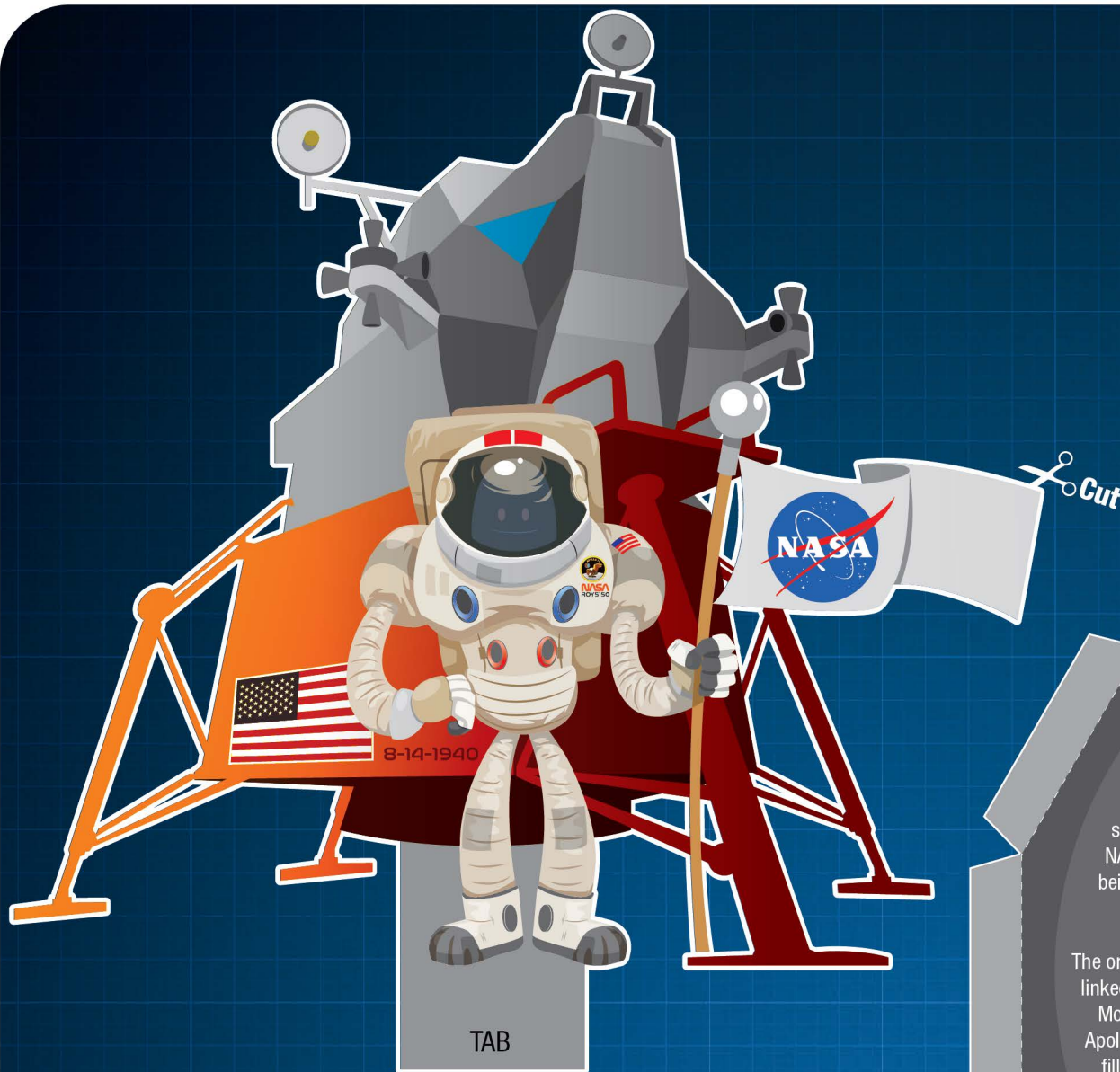
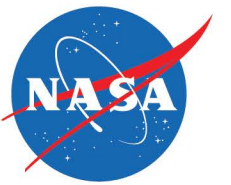
STAND / BASE



NASA APOLLO
THE MOON

CUTTING TOOLS: Scissors
ADHESIVE: Clear Tape

CUT LINE
FOLD LINE



UPPER

APOLLO 50th ANNIVERSARY

From October 2018 through December 2022, NASA will mark the 50th anniversary of the Apollo Program that landed a dozen Americans on the Moon between July 1969 and December 1972.

The arc through the word "Apollo" represents Earth's limb, or horizon, as seen from a spacecraft. It serves as a reminder of how the first views of Earth from the Moon – one of NASA's crowning achievements – forever transformed the way we see ourselves as human beings. It also affirms NASA's intention to continue pushing the boundaries of knowledge and delivering on the promise of American ingenuity and leadership in space.

The original Apollo emblem, adopted by the program in 1965, used drawings of the Moon and Earth linked by a double trajectory to portray President John F. Kennedy's goal of "putting a man on the Moon and returning him safely to the Earth" by the end of the 1960s. In a similar fashion, the Apollo 50th anniversary logo describes a contemporary goal, with images of the Moon and Mars filling the first and second "O's," respectively, and the phrase "Next Giant Leap" beneath the word "Apollo." Neil Armstrong declared his first step onto the lunar surface from the ladder of the Eagle lander on July 20, 1969, to be "one small step for a man, one giant leap for mankind." Today, NASA is working to return astronauts to the Moon to test technologies and techniques for the next giant leaps – challenging missions to Mars and other destinations in deep space.

For more information about Apollo's 50th anniversary and NASA's plan for the future, visit:
<http://www.nasa.gov/apollo50>.

INSTRUCTIONS

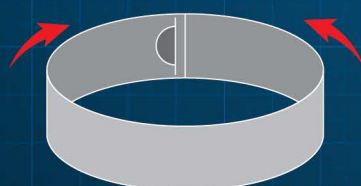
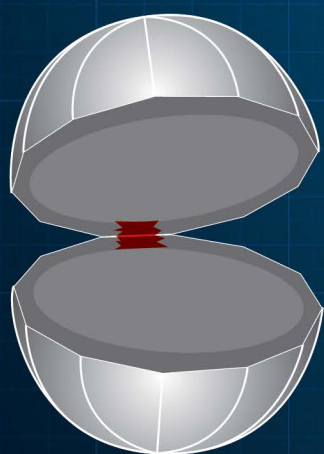
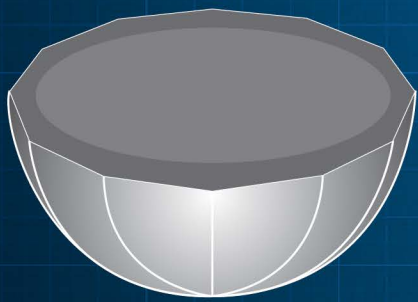
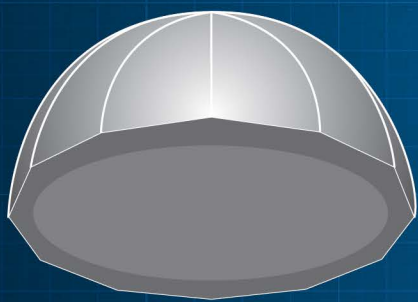
Tape the parts of the upper half together so that its shape is semispherical. To fit the parts together correctly, gently fold the tabs inward, then align the surface features while holding the upper half base down with your finger and gently pulling on the tabs. Assemble the lower half in the same way.

Tape the upper half and the lower half together at the joint labeled "A."

ADDING THE APOLLO LANDER

Cut out the Astronaut and Lander. Make cut line on the upper half to insert the tab.

THE APOLLO STAND
Insert the tab into the slot.



NASA APOLLO
THE MOON

CUTTING TOOLS: Scissors
ADHESIVE: Clear Tape

CUT LINE ————
FOLD LINE - - - - -



LOWER



Make a Pinwheel Galaxy pinwheel

A galaxy in your hand



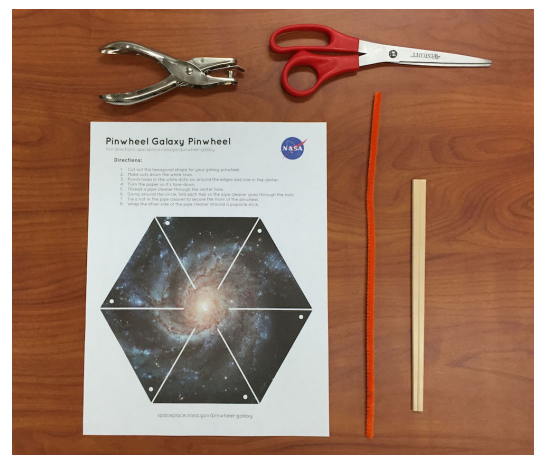
The Pinwheel Galaxy is a spiral-shaped galaxy about 21 million light years away from Earth. Scientists call this swirling galaxy M101.

You can find it in the constellation Ursa Major, or the "Big Dipper," in the Northern Hemisphere. With a nice, dark sky, you can see it with binoculars or a small telescope.

For those of us who can't see it in the night sky, we can have the next best thing: a Pinwheel Galaxy pinwheel!

What you need:

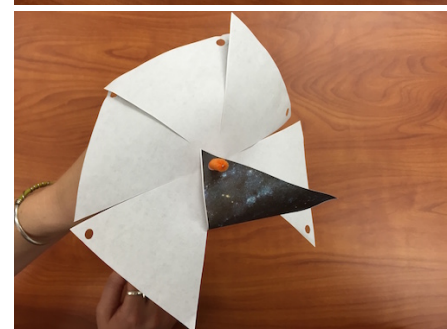
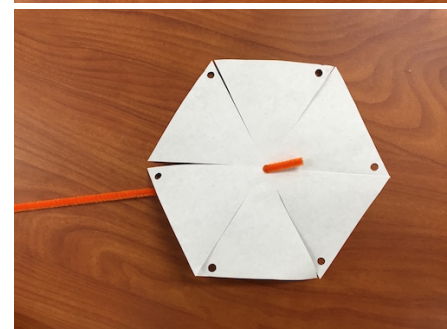
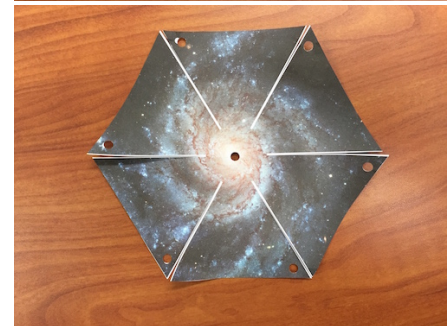
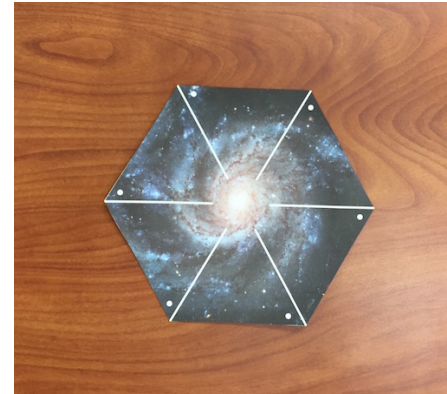
- Pinwheel Galaxy Printout (last page)
- Pipe cleaner
- Popsicle stick or chopsticks
- Scissors
- Single hole puncher



Find this activity online and learn more by visiting NASA Space Place: <http://spaceplace.nasa.gov/pinwheel-galaxy>
Find more fun activities at <http://spaceplace.nasa.gov/menu/do>.

What to do:

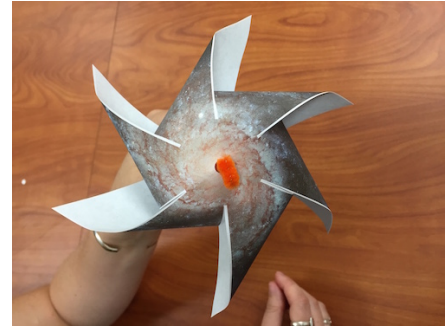
1. Cut out the hexagonal shape for your galaxy pinwheel.
2. Cut along the white lines.
3. Punch holes in the white dots: six around the edges and one in the center. You may have to fold the hexagon over to reach the center.
4. Turn the paper so it's face-down and thread the pipe cleaner through the center hole.



5. Going around the circle, fold each flap so the pipe cleaner goes through the hole.



6. Tie a knot in the pipe cleaner to secure the front of the pinwheel.



7. Wrap the other side of the pipe cleaner around a popsicle stick. Don't make it too tight, or it won't be able to move.



8. Blow on it and watch the galaxy spin!



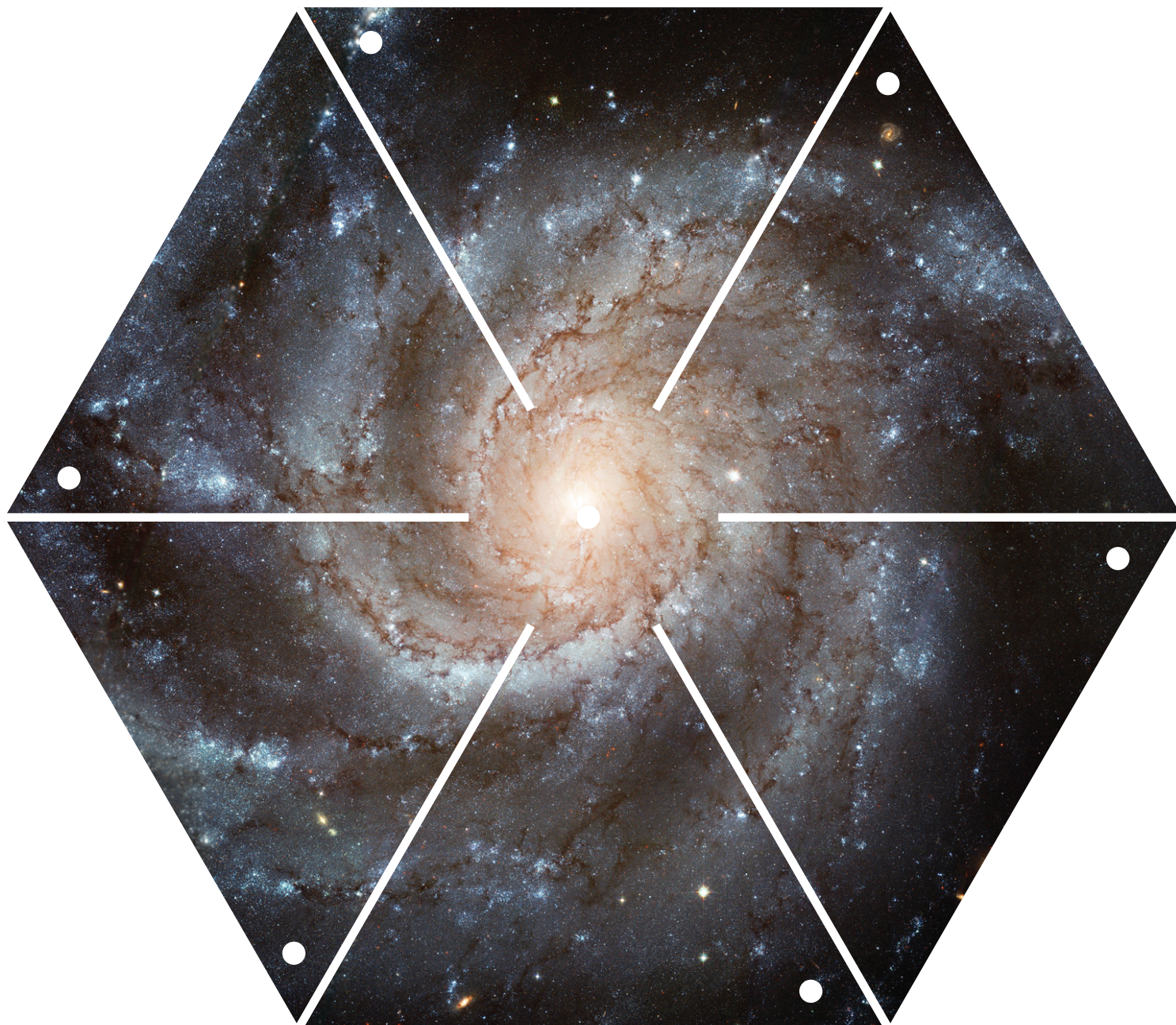
Pinwheel Galaxy Pinwheel

Full directions: spaceplace.nasa.gov/pinwheel-galaxy



Directions:

1. Cut out the hexagonal shape for your galaxy pinwheel.
2. Make cuts down the white lines.
3. Punch holes in the white dots: six around the edges and one in the center.
4. Turn the paper so it's face-down.
5. Thread a pipe cleaner through the center hole.
6. Going around the circle, fold each flap so the pipe cleaner goes through the hole.
7. Tie a knot in the pipe cleaner to secure the front of the pinwheel.
8. Wrap the other side of the pipe cleaner around a popsicle stick.



spaceplace.nasa.gov/pinwheel-galaxy

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