

Air and Space this Week

Item of the Week

THE LONELY SIX

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KEY WORDS: Apollo Command Module Pilot Collins Gordon Roosa Worden
Mattingly Evans

The Apollo Program had six successful Moon landings. Twelve astronauts on those missions walked on the Moon. But each mission also had a Command Module Pilot, who stayed in lunar orbit and was an important part of each mission's success. The last of the six CM pilots, Ken Mattingly of Apollo 16, passed away last week, on Halloween. I thought this would be a good time to salute the guys who helped make the lunar landings successful.

THE JOB OF THE COMMAND MODULE PILOT

Apollo spacecraft carried three astronauts, the Mission Commander (MC), the Lunar Module Pilot (LMP), and the Command Module Pilot (CMP). The first two would land on the Moon, but the Command Module Pilot's role was like that of a combat wingman, providing support necessary for the Moonwalkers to succeed. The CMP duties included navigation, monitoring systems, and communications with Mission Control. The CMP calculated and executed the maneuvers such as the trans-lunar injection, docking with the Lunar Module, the trans-Earth injection, precisely orienting the CM for re-entry, and ensuring the timely deployment of the parachutes.

The CMP was also in a difficult position emotionally, having to be prepared to return to Earth alone should the LM fail to return to lunar orbit. They were as isolated as any human had ever been when they were above the far side of the Moon on each solo orbit.

THE SIX

The six CMPs that supported Moonwalking Apollo missions are listed below, along with a biographical sketch.

Apollo 11: Michael Collins

Michael Collins' role in the first manned Moon landing, and his career, were worthy of its own [Item of the Week](#), so I will only give a rough outline of his remarkable career here. He was born on October 31, 2021, in Rome. His father was a military attaché, and as such young Michael lived in a number of interesting places in his youth. He graduated from West Point in 1952, but transferred to the Air Force when that opportunity arose, flying F-86 jets in the 1950s, and

surviving an emergency ejection in 1956. He went to the USAF's Experimental Flight Test Pilot School at Edward AFB in 1960, class 60C, which also included future astronauts Frank Borman, Jim Irwin, and Tom Stafford. He was flying some of the Air Force's hottest jets when John Glenn's orbital flight inspired him to apply for the astronaut program. He was not picked initially, but his second application was successful, and in June 1963, he became a member of the [third group of astronauts](#) NASA selected. His first assignment was on the *Gemini 7* back-up team (with Ed White), which set him up to be the pilot of *Gemini 10*, commanded by John Young. The mission plan was for Collins to dock with the *Agena 10* target vehicle, then use its engine to boost their orbit, then for him to dock with the *Agena 8* target vehicle, not previously visited due to the [problems encountered with Gemini 8](#). He conducted two EVAs during the flight, a first.

Collins was then transferred to the Apollo program and was slated to fly the second manned Apollo flight, but it was canceled as redundant, and after a shuffle, Collins was assigned to the *Apollo 8* prime crew. Then the Apollo 1 fire happened, and Collins had the sad task of informing Martha Chaffee that she was now a widow. Another reshuffle put him in command of *Apollo 9*, but a herniated disc required surgery and recuperation that bumped him to *Apollo 11*.

Deke Slayton offered to move Collins into the regular astronaut rotation, which would have meant he would be the back-up commander of *Apollo 14* and mission commander of *Apollo 17*. Collins replied he would decline future assignments if *Apollo 11* was successful. Gene Cernan was given those slots instead.

Of course, *Apollo 11* was successful, and the three astronauts involved went on an extended goodwill tour. After returning home, Collins was offered the position of Assistant Secretary of State for Public Affairs, which he accepted (while remaining in the Air Force Reserves). This was a difficult time for government officials, and Collins' Apollo fame did not overcome issues like Viet Nam, Kent State, etc.

Collins approached President Nixon and requested reassignment to become the first director of the Smithsonian National Air and Space Museum, which was quickly approved. NASM had been authorized, but not funded, decades before. Collins lobbied hard for the new museum, assisted greatly by Senator Barry Goldwater, a retired USAF Major General. Funding was finally approved on August 17, 1972. Funding was less than desired, and time was short, because NASM was going to be a centerpiece for the Nation's Bicentennial. Yeoman work by Collins and all concerned delivered the building on budget and ahead of schedule. NASA's *Viking 1* spacecraft was preparing to land on Mars at the time, and the ribbon-cutting ceremony was conducted with a replica of Viking's sample arm cutting the ribbon on command from the Viking spacecraft, then in orbit around Mars.

Collins became a Smithsonian Undersecretary in 1978, and retired from the Air Force in 1982 with the rank of Major General. He formed a consulting company, and wrote several books about Apollo and his career. He died on April 28, 2021, and his ashes were interred at Arlington. The prestigious NASM Trophy was renamed in his honor in 2020.

Apollo 12: Richard F. Gordon Jr.

Richard Francis Gordon Jr. was born on October 5, 1929, in Seattle. He attended the University of Washington, graduating in 1951 with a B.S. in Chemistry. He then joined the U.S. Navy and earned his pilot wings in 1953. In 1957, he attended the Navy's Test Pilot School at Patuxent River, and served as a test pilot until 1960, flying a number of aircraft. He was the first project test pilot for the F4H-1 Phantom II, and would later participate in the introduction of the F4H-1 in the fleet. He would win the 1961 Bendix Trophy race flying the F4H-1, setting a transcontinental speed record, going coast-to-coast in 2 hours, 47 minutes.

Like many of his pilot compatriots, he became interested in NASA's astronaut program, and applied for Group 2 in 1962. He was not selected then, but was picked for Group 3 a year later. His first assignment was back-up pilot for *Gemini 8*, and his first flight was as pilot of *Gemini 11*. Pete Conrad commanded that flight, and it must have been like old-home week, since Conrad and Gordon had been roommates when they earlier served together on the aircraft carrier, *USS Ranger*! Gordon performed two Spacewalks on *Gemini 11*, which was a successful flight.

Gordon was then assigned to be back-up CMP for the flight of *Apollo 9*, which put him in position to be the CMP for *Apollo 12*. His pal, Pete Conrad, and my personal hero, Al Bean, were the Moonwalkers on that mission, which [was saved](#) after its Saturn V was hit by lightning seconds after launch by a quick-thinking engineer and Al Bean knowledge of CM systems. Gordon was then assigned as back-up mission commander for *Apollo 15*, and would have been the mission commander for *Apollo 18*, if it had flown.

After Apollo, Gordon joined NASA's Astronaut Office and became the Chief of Advanced Programs in 1971, where he worked on the development of the Space Shuttle.

He retired from NASA and the Navy in January, 1972. Like many other astronauts, he held a number of executive/board positions in aerospace-related companies, but there was one post that was different than most; he served as Executive VP of the New Orleans Saints NFL team from 1972-1976!

Richard Gordon passed away on November 6, 2017, and is buried at Arlington.

Apollo 14: Stuart Allen Roosa

Most astronauts and famous aviators fell in love with airplanes and flight at an early age. Not so Stuart Roosa. He was born on August 16, 1933, in Durango, Colorado, which no doubt gave him a youthful favorable impression of mountains and forests. The rest of his childhood was spent in Oklahoma. He must have picked up the aviation bug along the way, because after high school, he went to Oklahoma State, the University of Arizona, and the University of Colorado (Boulder) before graduating with a B.S. in Aeronautical Engineering. After graduation, he became a smokejumper for the U.S. Forest Service. From there, he entered the Aviation Cadet Program at Williams AFB in Arizona. After commissioning, he attended the USAF Aerospace Research Pilot School, and became a fighter pilot at Langley AFB, flying the F-84F and F-100 Super Saber aircraft. His next billet was as a test pilot at Edwards. He applied to become a NASA astronaut, and was accepted into Astronaut [Group 5](#).

Roosa had the bad duty of being the CAPCOM for the Apollo 1 fire, on January 27, 1966. The astronaut schedule was disrupted by the *Apollo 13* mission, and Roosa ended up as the CMP for the *Apollo 14* mission. He was assigned to be the back-up CMP for *Apollo 16* and *17* (the schedule was scrambled there a bit, too, because the last three Apollo Moon flights were canceled and NASA felt that they had to send a professional geologist (Harrison Schmitt) to the Moon at least once, on *Apollo 17*).

Roosa combined his early love for forestry and his work as a smoke jumper with being an astronaut. At the urging of the US Forest Service, he carried a number of seeds from pine, sycamore, sweet gum, redwood, and fir trees on *Apollo 14*. They were germinated upon their return to Earth and planted in a number of different locations across the USA as part of our Bicentennial Celebration. They are now known as “Moon Trees!” The initial planting sites were not particularly well-documented, but once NASA realized how broadly they had been distributed, they rolled up their collective sleeves and found many of the Moon Trees.

Roosa retired from NASA and the Air Force in 1976, he held a number of senior positions in aerospace and other companies, including being the head of the Gulf Coast Coors beer distributing. He was in a number of organizations, including the Explorers Club and the Hunting Hall of Fame. He died young, in 1994, and is buried at Arlington.

Apollo 15: Alfred Merrill Worden

Al Worden was born on February 7, 1932, on a farm near Jackson, Michigan. He disliked farm life, but, like Stuart Roosa, he wasn't interested in aviation, at least at first. He started his undergraduate work at the University of Michigan, but was able to secure an appointment to West Point after his freshman year. He graduated in 1955, a time that allowed him, like Collins, to jump to the newly-created U.S. Air Force. He quickly learned to fly, and fly well, and became a test pilot, not with the USAF, but as part of an exchange program with the RAF's Empire Test Pilot's School. He applied to be an astronaut, and would have been chosen for Group 3, but he could not accept, because he could not transfer from test pilot school. He applied to NASA again when he was free to do so, and was accepted into Group 5, the same as Roosa, in 1966. He became deeply involved in the upgrades to the CM necessitated by the Apollo 1 fire, and became a member of the support crew for what became *Apollo 9*. His first flight assignment was the back-up crew for *Apollo 12*, which allowed him to become the CMP for *Apollo 15*. That mission went well, except for one important incident. The LM failed to separate from the CM as planned, requiring Worden to enter the docking tunnel to fix a disconnected umbilical, solving the problem. After Scott and Irwin descended to the surface, Worden altered the orbit of the CM to allow for better data acquisition. During the return to Earth, Worden made an EVA to retrieve film cannisters from the Service Module. It's still the most-distant-from-Earth EVA ever made. Worden also took his scientific training much more seriously than most (*i.e.* Shepard and Mitchell, see [here](#), page 112.), working with Farouk El-Baz, who would become the founder of the Center for Earth and Planetary Studies at NASM, to be able to effectively identify selenological points of interest from orbit. Worden was also a big believer in public outreach

and support for STEM education, especially for younger students, and actually appeared on the *Mr. Rogers' Neighborhood* both before and after his Apollo flight.

After NASA, Worden held a number of executive positions, ran for Congress, became deeply involved with the Mercury Seven Foundation, wrote two books, and served as technical consultant on the 2018 biopic, *First Man*, about Neil Armstrong. He died on March 18, 2020, at Sugarland, Texas

Apollo 16: Ken Mattingly

Thomas Kenneth Mattingly II was born on March 17, 1936, in Chicago. He WAS interested in aviation early in life, probably in large part because his father worked for Eastern Airlines. After high school, he earned a B.S. in Aeronautical Engineering at Auburn. He was commissioned in the Navy in 1958, took flight training, and won his wings in 1960. He flew the A-1H Skyraider while assigned to the *USS Saratoga*, then moved to the A-3B Skywarrior on the *USS Franklin D. Roosevelt*.

Mattingly accompanied a pilot friend who had been assigned to take arial photos of the launch of the *Gemini 3* spacecraft. He wanted to go to the Navy's test pilot school at Paxtuxent, but the *Roosevelt's* schedule did not permit it. So he switched gears and applied for the USAF's Research Pilot School at Edwards AFB, and was accepted. Upon graduation, he was given the choice of either applying to NASA or the Air Force's Manned Orbiting Laboratory Program. He applied to MOL, and was not accepted; a good thing for him, because MOL would soon be canceled. He applied to NASA, and was accepted into Group 5 in April, 1969.

Mattingly's first job at NASA was as part of the support crew for *Apollo 8*, serving as one of the CAPCOMs. He was then slated to be the CMP of *Apollo 14*, but his crew was switched with *Apollo 13's* original crew to allow Al Shepard to take additional training (he'd had a long layoff from flight operation for medical reasons). Mattingly was exposed to rubella just prior to launch, so back-up CMD Jack Seigert took his slot on *Apollo 13*. His experience with the *Apollo 13* CM proved invaluable during the rescue operation that ensued, especially in helping Lovell's crew manage their dwindling power resources.

Missing *Apollo 13* did not affect Mattingly's place in the astronaut rotation, making him the prime CMD for *Apollo 16*. He ably handled the spacecraft and its on-orbit data acquisition program, and made an EVA similar to that Wordon made on *Apollo 15*.

After Apollo, Mattingly served in a variety of positions within NASA helping develop the Space Shuttle. He commanded STS-4 in June, 1982, and STS-51C, the first classified DoD Shuttle mission, in January, 1985. He retired from NASA after that flight, and retired from the Navy in 1986, with the rank of Rear Admiral (Upper Half). He was Director of Grumman's Space Station Support Division, then headed General Dynamics' Atlas booster program, then became Lockheed Martin's VP in charge of the development of the X-33. He last week died in Arlington, VA, on **October 31, 2023** (his passing prompted this particular Item topic).

Apollo 17: Ronald Evans

Ronald Ellwin Evans was born in St. Francis, Kansas, on November 10, 1933. His family had to move to Topeka while Ron was in high school, in order to secure medical care for his brother, Larry, who had liver cancer. When Larry died, Ron's parents divorced, a family double-whammy. His other brother, Dale, found solace in football, and he ended up playing for the Denver Broncos. Ron's happy place was studying electrical engineering, and he was accepted at the University of Kansas. Money was an issue, but his joining the Naval ROTC program helped reduce the cost of his education. He would graduate with a B.S. in Electrical Engineering in June, 1956.

Evans' first ROTC summer program was aboard the famous battleship, the *USS Washington*. His second summer was spent at NAS Corpus Christi. That's when he fell in love with aviation. The Navy offered Evans a commission after graduation, and put him to work on flight training. He flew progressively-powerful aircraft, got married, and was designated a Naval Aviator on April 12, 1957. His first squadron assignment was with VF-142, based at NAS Miramar when not aboard the carrier *USS Ranger*. They were flying the antiquated NA F J-3 Fury attack planes, but they would soon get the much-better Vought FBU Crusader. When the Crusaders became available, most of the squadron was based elsewhere, but five pilots remained, including Evans. to break in the rookies that would soon join them. The new VF-142 moved over to the carrier *USS Oriskany*, for a back-to-back cruise. Evans became a flight instructor after that.

Evans entered the Naval Postgraduate School in California in 1962; his classmates included four future astronauts and the pilot who, as a POW in Hanoi, coined the name of his prison, the "Hanoi Hilton." He applied for the Astronaut Corps, and made several "cuts," but was not accepted. He went back to Monterey, took a Russian language course, and finished up an M.S. in Aeronautical Engineering, in 1964. He then rejoined his combat squadron, VF-124, on a combat tour flying the Crusader off the *USS Ticonderoga*.

Evans' next cruise with *Ticonderoga* was a combat deployment off the coast of Viet Nam. He survived a mid-air collision on a training flight and a crash landing with a live bomb aboard that he couldn't jettison. He would fly a total of 112 combat missions, win a Navy Commendation Medal, and eight Air Medals. And he received a notice from NASA to report to Houston as a finalist for Astronaut selection. He was accepted into Group 5 in April, 1966. He became a CSM specialist, and was on the support crew for Apollo 1, and then for *Apollo 7* and *11*. He was a CAPCOM for *Apollo 7*, *11*, and *14*.

Michael Collins was in the rotation to become the CMP for *Apollo 14*, but he declined further flights. In the shuffle that followed, Gene Cernan was named as back-up Mission Commander for *Apollo 14*, with Evans as CMP, which put them in line as prime crew members for *Apollo 17*. Joe Engle would have been the back-up LMP, but was bumped when it became clear that *Apollo 17* would be the final slot and NASA really wanted to send a professional geologist, Harrison Schmitt, to the Moon.

Apollo 17 was launched on December 7, 1972. It was the scientists' last chance to get lunar materials from the surface, and there was a much greater emphasis on science on this mission relative to those previous. Evans altered the orbit of the CSM to best acquire data, including a

tricky change-of-plane maneuver. He set the record, still standing of course, for the most hours spent in lunar orbit: 147h, 43m, 37s. [I note this because it's germane to the upcoming solar eclipse. Eclipse hounds keep track of how long they have spent "immersed in the Moon's umbra." Evans has them all beat, in spades!]

Evans was promoted to Captain after *Apollo 17* returned to Earth, and would soon be named as back-up CMP for the *Apollo-Soyuz Test Project*. He would retire from the Navy in 1976, but remained at NASA where he participated in the development of the Space Shuttle. He retired from NASA on March 8, 1977. He held a few positions in aerospace afterward, but the most lucrative deal he was involved with was consulting on the creation of a Space-related theme park in Japan. He suffered a heart attack and died in his sleep on April 7, 1990; he was only 56. He's buried in Paradise Valley, Arizona.

FOUR MORE CMPs PAVED THE WAY

Just because I've focused on the six CMPs who flew on Moon landing missions, doesn't mean that the other Apollo CMPs didn't contribute mightily! Three pre-*Apollo 11* CMPs ended up as mission commanders for subsequent Apollo missions.

***Apollo 7's* CMP was Donn Fulton Eisele.** He had been part of the Apollo 1 crew, but was hurt in a training accident and Roger Chaffee replaced him on White's crew. Eisele slipped to being the CMP on the first manned Apollo flight, which after the Apollo 1 disaster became *Apollo 7*, with Wally Schirra as MC and "pilot" Walter Cunningham (*Apollo 7* had no LM, therefore, could not have an LMP). He was named the back-up CMP for *Apollo 10*, but resigned from the Corps in 1970. He became the technical assistant for crewed spaceflight at NASA's Langley Research Center, a post he held until he retired from the Air Force and NASA in 1972.

***Apollo 8's* CMP was James Lovell,** who was a Naval Aviator and test pilot prior to NASA service. He applied for Project Mercury, but was not selected. When the second astronaut selection process began in 1962, he applied a second time, and was selected into Group 2, aka the "Next Nine" (after the "Original Seven"). He was back-up pilot for *Gemini 4*, pilot of *Gemini 7* (a two-week mission with recently-deceased Frank Borman), back-up command pilot for Gemini 8, and was command pilot on *Gemini 12* (which had Buzz Aldrin as pilot). A number of issues arose with *Apollo 8* and *9*, the upshot of which was that Lovell was named the CMP of the *Apollo 8* mission and would be the Mission Commander for *Apollo 13*, and eventually would be portrayed in the movies by Tom Hanks. [NASM has both the *Gemini 4* and *Gemini 7* capsules, the former at the original building and the latter at the Udvar-Hazy Center. I always included Gemini 7 to visitors when I got the chance, and I always got a kick out their reaction when I asked them if they'd like to spend two weeks in that very small capsule.]

***Apollo 9's* CMP, David Randolph Scott,** followed a career path similar to some related above: West Point, transfer to the Air Force, fighter training, test pilot school, and flight test. He had been assigned to be an inaugural professor at the newly-completed Air Force Academy, but managed to get his orders changed to Edwards AFB. Scott graduated first in his class at the test pilot school there, and was selected to the Aerospace Research Pilot School were those

intended to become astronauts trained. He applied to join Group 3 when the opportunity opened in 1963, and was selected. He served as one of the CAPCOMs on *Geminis 4* and *5*.

Scott's flying credentials were superb, to the point that NASA named him to the prime *Gemini 8* crew even though he had never served on a back-up crew first. That mission was aborted partway through due to a thruster malfunction that [almost killed him and Command Pilot Neil Armstrong](#). He was named back-up pilot for *Apollo 1*, and in the shuffle after the fire he ended up as the CMP for *Apollo 9*, a "test pilot's dream" check out of the entire Apollo system in Earth orbit. The crew battled motion sickness, but the flight was a success. Scott was named back-up commander for *Apollo 12*, and therefore, was named prime crew Mission Commander for *Apollo 15*. Scott took an aggressive approach to the science on *Apollo 15*, taking time to train with his crew with Cal Tech geologist Lee Silver, and becoming a big proponent of the Hadley Rille landing site, an interesting volcanic terrain.

After *Apollo 15*, Scott was a special assistant to the *Apollo-Soyuz Test Project*. He eventually became the Director of NASA's Dryden Flight Research Center on April 18, 1975, a post that required him to retire from the Air Force, which he did with the rank of Colonel.

Scott the only former Apollo CMP still alive; I didn't include him in the Lonely Six because *Apollo 9* was not a Moon landing mission and never left Earth orbit. Today, Scott resides in LA with his second wife, Margaret Black-Scott, who was the vice-chairman of the investment firm, Morgan Stanley.

Apollo 10's John Watts Young was born on September 24, 1930, in San Francisco. Times were tough for the Youngs during the Depression, and the family was further disrupted by his father becoming a SeaBee after Pearl Harbor. Young did very well in high school in Orlando, especially in sports, and he graduated in 1948. He attended Georgia Tech on a Naval ROTC scholarship, and on one of his midshipman summer cruises, he worked with future *Apollo 10* crewmate, Thomas Stafford. He graduated second in his class with a B.S. in Aeronautical Engineering in 1952, and was commissioned into the Navy as an ensign. He applied for aviation school, but was assigned to be a destroyer gunnery officer, and served a tour of duty in the Sea of Japan during the Korean Conflict. In May, 1953, he was assigned to the NAS Pensacola flight school and completed training to become a helicopter pilot, receiving his wings at the end of 1954. He was assigned to the carrier *USS Coral Sea* and sent on a tour of the Mediterranean Sea during the Suez Crisis. After that, he transitioned to the *Crusader* and made another Med cruise, this time on the *USS Forrestal*. He was then selected for Class 23 at the Naval Test Pilot School in early 1959. He graduated second in his class and was sent to work on the Phantom II's weapons system, working alongside future astronaut James Lovell. He set several time-to-climb records in the Phantom II, and then was selected for Astronaut Group 2 in September, 1962. His first assignment was pilot of *Gemini 3*, a second shakedown trip for the Gemini capsule, under the command of Gus Grissom. The flight was a success, and Gus and John became the back-up crew for *Gemini 6*, and Young was command pilot for *Gemini 10*, with Mike Collins as pilot. After the Gemini program ended, Young was assigned to the second planned crewed Apollo mission, but the schedule was disrupted by the Apollo 1 fire. He was assigned to the *Apollo 7* back-up crew as CMP, which put him in line to be CMP for *Apollo 10*, the Moon landing

dress rehearsal. His next spot in Slayton's rotation scheme had him as back-up Mission Commander of *Apollo 13*, and after that, Mission Commander for *Apollo 16*. The *Apollo 16* mission was almost a complete success, marred only by Young's tripping over a cable attached to the Lunar Heat Flow experiment, ruining the device.

John Young's post-Apollo assignment was Chief of the Space Shuttle Branch of the Astronaut Office. His group recommended a number of design changes that benefited Shuttle operations. He became Chief of the Astronaut Office in January, 1974, overseeing the end of the Skylab Program and the Apollo-Soyuz Test Project, and a number of Shuttle missions, including commanding the very first Shuttle flight, launched on April 12, 1981. He also commanded STS-9 and was deeply involved in the changes in the Shuttle necessitated by the *Challenger* disaster. His final NASA billet had him working on the Shuttle-Mir Program and the design of the *International Space Station*. He retired from NASA on December 31, 2004. He passed away on January 5, 2018, in Houston, at age 87, and is buried at Arlington.

FIVE OTHERS ASTRONAUTS SAW THE FAR SIDE

The nature of the CMP's role gave each of the Lonely Six a lot of time to see the far side of the Moon with their own eyes. Of course, the Moon walkers saw a lot of the far side, too, as did the whole crew of *Apollo 8* and, sadly, *Apollo 13* (although they only got a fly-by). So not counting the "far siders" mentioned above, five others became "far siders," too: *Apollo 8*'s Frank Borman and William Anders, *Apollo 10*'s Tom Stafford, and *Apollo 13*'s Jack Swigert and Fred Haise.

Of course, the Apollo program was a huge national effort, and while the Apollo astronauts were "the tip of the spear," their successes could not have happened without the dedicated efforts of the entire NASA team. As only NASA can!

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THE LONELY SIX

Michael Collins

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Richard F. Gordon Jr.

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Ronald Ellwin Evans Jr.

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DIDJA KNOW?

I find it an amazing coincidence that the day Gene Cernan made the most recent human footprint on the Moon (for now!), December 14, 1972, was ten years to the day after NASA's first successful planetary mission, *Mariner 2*, a fly-by of Venus in 1962. What a Decade!

By the way, useful research is still being done with geological materials brought back from the Moon by the Apollo astronauts. Recent detailed examination of particulate surface material brought back from the Moon by the *Apollo 17* astronauts in 1972, FIFTY YEARS AGO(!), shows that the age of crystals of zircon in the material was 4.46 billion years, meaning the Moon has to be at least that old. The previous "no less than" age of the Moon was pegged at 4.425 billion years. For more info, see [here](#).

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