

= Neil Armstrong =

Neil Alden Armstrong ( August 5 , 1930 ? August 25 , 2012 ) was an American astronaut and the first person to walk on the Moon . He was also an aerospace engineer , naval aviator , test pilot , and university professor . Before becoming an astronaut , Armstrong was an officer in the U.S. Navy and served in the Korean War . After the war , he earned his bachelor 's degree at Purdue University and served as a test pilot at the National Advisory Committee for Aeronautics ( NACA ) High @-@ Speed Flight Station , where he logged over 900 flights . He later completed graduate studies at the University of Southern California .

A participant in the U.S. Air Force 's Man in Space Soonest and X @-@ 20 Dyna @-@ Soar human spaceflight programs , Armstrong joined the NASA Astronaut Corps in 1962 . He made his first space flight as command pilot of Gemini 8 in March 1966 , becoming NASA 's first civilian astronaut to fly in space . He performed the first docking of two spacecraft , with pilot David Scott . This mission was aborted after Armstrong used some of his reentry control fuel to prevent a dangerous spin caused by a stuck thruster , in the first in @-@ flight space emergency .

Armstrong 's second and last spaceflight was as commander of Apollo 11 , the first manned Moon landing mission in July 1969 . Armstrong and Lunar Module pilot Buzz Aldrin descended to the lunar surface and spent two and a half hours outside the spacecraft , while Michael Collins remained in lunar orbit in the Command / Service Module . Along with Collins and Aldrin , Armstrong was awarded the Presidential Medal of Freedom by President Richard Nixon . President Jimmy Carter presented Armstrong the Congressional Space Medal of Honor in 1978 . Armstrong and his former crewmates received the Congressional Gold Medal in 2009 .

Armstrong died in Cincinnati , Ohio , on August 25 , 2012 , at the age of 82 , after complications from coronary artery bypass surgery .

= = Early years = =

Neil Armstrong was born on August 5 , 1930 , to Stephen Koenig Armstrong and Viola Louise Engel in Auglaize County , near Wapakoneta , Ohio . He was of Scottish , Irish , and German ancestry , and had two younger siblings , June and Dean . Stephen Armstrong worked as an auditor for the Ohio state government ; the family moved around the state repeatedly after Armstrong 's birth , living in 20 towns . Neil 's love for flying grew during this time , having gotten off to an early start when his father took his two @-@ year @-@ old son to the Cleveland Air Races . When he was five , he experienced his first airplane flight in Warren , Ohio on July 20 , 1936 when he and his father took a ride in a Ford Trimotor , also known as the " Tin Goose " .

His father 's last move was in 1944 , back to Neil 's birthplace , Wapakoneta , in Auglaize County . Armstrong attended Blume High School and took flying lessons at the grassy Wapakoneta airfield . He earned a student flight certificate on his 16th birthday , then soloed later in August ; all before he had a driver 's license . Armstrong was active in the Boy Scouts and earned the rank of Eagle Scout . As an adult , he was recognized by the Boy Scouts of America with its Distinguished Eagle Scout Award and Silver Buffalo Award . On July 18 , 1969 , while flying towards the Moon inside the Columbia , Armstrong greeted the Scouts : " I 'd like to say hello to all my fellow Scouts and Scouters at Farragut State Park in Idaho having a National Jamboree there this week ; and Apollo 11 would like to send them best wishes " . Houston replied : " Thank you , Apollo 11 . I 'm sure that , if they didn 't hear that , they 'll get the word through the news . Certainly appreciate that . " Among the very few personal items that Neil Armstrong carried with him to the Moon and back was a World Scout Badge .

In 1947 , at age 17 , Armstrong began studying aeronautical engineering at Purdue University . He was the second person in his family to attend college . He was also accepted to the Massachusetts Institute of Technology ( MIT ) . The only engineer he knew ( who had attended MIT ) dissuaded him from attending , telling Armstrong that it was not necessary to go all the way to Cambridge , Massachusetts , for a good education .

His college tuition was paid for under the Holloway Plan . Successful applicants committed to two

years of study , followed by two years of flight training and one year of service in the U.S. Navy as an aviator , then completion of the final two years of their bachelor 's degree . Candidates had to promise to not marry until graduation , signed the " Aviation Guarantee " to serve on Active Duty for at least four years , and would not receive a promotion to Ensign until two years after they received their Midshipman 's warrant .

= = Navy service = =

Armstrong 's call @-@ up from the Navy arrived on January 26 , 1949 , requiring him to report to Naval Air Station Pensacola for flight training at age 18 . This lasted almost 18 months , during which he qualified for carrier landing aboard USS Cabot and USS Wright . On August 16 , 1950 , two weeks after his 20th birthday , Armstrong was informed by letter that he was a fully qualified Naval Aviator .

His first assignment was to Fleet Aircraft Service Squadron 7 at NAS San Diego ( now known as NAS North Island ) . Two months later he was assigned to Fighter Squadron 51 ( VF @-@ 51 ) , an all @-@ jet squadron , and made his first flight in a jet , an F9F @-@ 2B Panther , on January 5 , 1951 . In June , he made his first jet carrier landing on USS Essex and was promoted the same week from Midshipman to Ensign . By the end of the month , Essex had set sail with VF @-@ 51 aboard , bound for Korea , where its VF @-@ 51 would act as ground @-@ attack aircraft .

Armstrong first saw action in the Korean War on August 29 , 1951 , as an escort for a photo reconnaissance plane over Songjin . Five days later on September 3 , he flew armed reconnaissance over the primary transportation and storage facilities south of the village of Majon @-@ ni , west of Wonsan . While making a low bombing run at about 350 mph ( 560 km / h ) , Armstrong 's F9F Panther was hit by anti @-@ aircraft fire . While trying to regain control , he collided with a pole at a height of about 20 feet ( 6 m ) , which sliced off about three feet ( 1 m ) of the Panther 's right wing . Armstrong flew the plane back to friendly territory , but due to the loss of the aileron , ejection was his only safe option . He planned to eject over water and await rescue by Navy helicopters , and therefore flew to an airfield near Pohang , but his ejection seat was blown back over land . A jeep driven by a roommate from flight school picked Armstrong up ; it is unknown what happened to the wreck of No. 125122 F9F @-@ 2 .

Armstrong flew 78 missions over Korea for a total of 121 hours in the air , most of which were in January 1952 . He received the Air Medal for 20 combat missions , a Gold Star for the next 20 , and the Korean Service Medal and Engagement Star . Armstrong left the Navy at age 22 on August 23 , 1952 , and became a lieutenant ( junior grade ) , in the U.S. Naval Reserve . He remained in the reserve for eight years , then resigned his commission on October 21 , 1960 .

= = College years = =

After his service with the Navy , Armstrong returned to Purdue , where his best grades came in the four semesters following his return from Korea . He had previously earned average marks , but his final GPA was 4 @.@ 8 out of 6 @.@ 0 . He pledged the Phi Delta Theta fraternity after his return and he wrote and co @-@ directed its musical as part of the all @-@ student revue ; he was also a member of Kappa Kappa Psi National Honorary Band Fraternity and a baritone player in the Purdue All @-@ American Marching Band . Armstrong graduated in 1955 with a Bachelor of Science degree in Aeronautical Engineering .

After returning to Purdue , he met Janet Elizabeth Shearon , who was majoring in home economics . According to the couple , there was no real courtship , and neither could remember the exact circumstances of their engagement , except that it occurred while Armstrong was working at the NACA 's Lewis Flight Propulsion Laboratory . They were married on January 28 , 1956 , at the Congregational Church in Wilmette , Illinois . When he moved to Edwards Air Force Base , he lived in the bachelor quarters of the base , while Janet lived in the Westwood district of Los Angeles . After one semester , they moved into a house in Antelope Valley . Janet never finished her degree , a fact she regretted later in life .

The couple had three children together : Eric , Karen , and Mark . In June 1961 , daughter Karen was diagnosed with a malignant tumor of the middle part of her brain stem ; X @-@ ray treatment slowed its growth , but her health deteriorated to the point where she could no longer walk or talk . Two @-@ year @-@ old Karen died of pneumonia , related to her weakened health , on January 28 , 1962 .

Armstrong later completed his Master of Science degree in Aerospace Engineering at the University of Southern California in 1970 . He would eventually be awarded honorary doctorates by several universities .

= = Test pilot = =

Following his graduation from Purdue , Armstrong decided to become an experimental research test pilot . He applied at the National Advisory Committee for Aeronautics ( NACA ) High @-@ Speed Flight Station at Edwards Air Force Base , which was later redesignated as the ? ? NASA Neil A. Armstrong Flight Research Center ? ? in 2014 . Although the committee had no open positions , it forwarded his application to the Lewis Flight Propulsion Laboratory in Cleveland , where Armstrong began working in March 1955 . Armstrong 's stint at Cleveland lasted a couple of months , and by July 1955 he had returned to Edwards AFB for a new job .

On his first day at Edwards , Armstrong was tasked his first assignments , which were to pilot chase planes during releases of experimental aircraft from modified bombers . He also flew the modified bombers , and on one of these missions had his first flight incident at Edwards . On March 22 , 1956 , Armstrong was in a Boeing B @-@ 29 Superfortress , which was to air @-@ drop a Douglas D @-@ 558 @-@ 2 Skyrocket . He sat in the right @-@ hand pilot seat while the left @-@ hand seat commander , Stan Butchart , flew the B @-@ 29 .

As they ascended to 30 @,@ 000 feet ( 9 @.@ 1 km ) , the number @-@ four engine stopped and the propeller began windmilling ( rotating freely ) in the airstream . Hitting the switch that would stop the propeller 's spinning , Butchart found the propeller slowed but then started spinning again , this time even faster than the other engines ; if it spun too fast , it would break apart . Their aircraft needed to hold an airspeed of 210 mph ( 338 km / h ) to launch its Skyrocket payload , and the B @-@ 29 could not land with the Skyrocket attached to its belly . Armstrong and Butchart brought the aircraft into a nose @-@ down alignment to increase speed , then launched the Skyrocket . At the instant of launch , the number @-@ four engine propeller disintegrated . Pieces of it damaged the number @-@ three engine and hit the number @-@ two engine . Butchart and Armstrong were forced to shut down the number @-@ three engine , due to damage , and the number @-@ one engine , due to the torque it created . They made a slow , circling descent from 30 @,@ 000 ft ( 9 @,@ 000 m ) using only the number @-@ two engine , and landed safely .

As a research pilot , Armstrong served as project pilot on the F @-@ 100 Super Sabre A and C variants , F @-@ 101 Voodoo , and the Lockheed F @-@ 104A Starfighter . He also flew the Bell X @-@ 1B , Bell X @-@ 5 , North American X @-@ 15 , F @-@ 105 Thunderchief , F @-@ 106 Delta Dart , B @-@ 47 Stratojet , KC @-@ 135 Stratotanker , and was one of eight elite pilots involved in the paraglider research vehicle program ( Paresev ) .

Armstrong 's first flight in a rocket plane was on August 15 , 1957 , in the Bell X @-@ 1B , to an altitude of 11 @.@ 4 miles ( 18 @.@ 3 km ) . The nose landing gear broke on landing , which had happened on about a dozen previous flights of the Bell X @-@ 1B due to the aircraft 's design . He later flew the North American X @-@ 15 seven times ; his penultimate flight reached an altitude of 207 @,@ 500 feet ( 63 @.@ 2 km ) .

Armstrong was involved in several incidents that went down in Edwards folklore and / or were chronicled in the memoirs of colleagues . The first occurred during his sixth X @-@ 15 flight on April 20 , 1962 , while Armstrong tested a self @-@ adjusting control system . He flew to a height of over 207 @,@ 000 feet ( 63 km ) , ( the highest he flew before Gemini 8 ) , but the aircraft nose was held up too long during descent and the X @-@ 15 bounced off the atmosphere back up to 140 @,@ 000 feet ( 43 km ) . At that altitude , the air is so thin that aerodynamic surfaces have almost no effect . He flew past the landing field at Mach 3 ( 2 @,@ 000 mph ( 3 @,@ 200 km / h ) ) at over

100 @, @ 000 feet ( 30 km ) in altitude , and ended up 40 miles ( 64 km ) south of Edwards . After sufficient descent , he turned back toward the landing area , and barely managed to land without striking Joshua trees at the south end . It was the longest X @-@ 15 flight in both time and distance from the ground track .

Four days later , Armstrong was involved in a second incident , when he flew for the only time with Chuck Yeager . Their job , flying a Lockheed T @-@ 33 Shooting Star , was to evaluate Smith Ranch Dry Lake for use as an emergency landing site for the X @-@ 15 . In his autobiography , Yeager wrote that he knew the lake bed was unsuitable for landings after recent rains , but Armstrong insisted on flying out anyway . As they attempted a touch @-@ and @-@ go , the wheels became stuck and they had to wait for rescue . Armstrong tells a different version of events , where Yeager never tried to talk him out of it and they made a first successful landing on the east side of the lake . Then Yeager told him to try again , this time a bit slower . On the second landing , they became stuck and according to Armstrong , Yeager was in fits of laughter .

Many of the test pilots at Edwards praised Armstrong 's engineering ability . Milt Thompson said he was " the most technically capable of the early X @-@ 15 pilots . " Bill Dana said Armstrong " had a mind that absorbed things like a sponge . " Those who flew for the Air Force tended to have a different opinion , especially people like Yeager and Pete Knight , who did not have engineering degrees . Knight said that pilot @-@ engineers flew in a way that was " more mechanical than it is flying , " and gave this as the reason why some pilot @-@ engineers got into trouble : their flying skills did not come naturally .

A few weeks later on May 21 , 1962 , Armstrong was involved in what Edwards ' folklore called the " Nellis Affair . " He was sent in a Lockheed F @-@ 104 Starfighter to inspect Delamar Dry Lake in southern Nevada , again for emergency landings . He misjudged his altitude , and also did not realize that the landing gear had not fully extended . As he touched down , the landing gear began to retract ; Armstrong applied full power to abort the landing , but the ventral fin and landing gear door struck the ground , damaging the radio and releasing hydraulic fluid . Without radio communication , Armstrong flew south to Nellis Air Force Base , past the control tower , and wagged his wings , the signal for a no @-@ radio approach . The loss of hydraulic fluid caused the tail @-@ hook to release , and upon landing , he caught the arresting wire attached to an anchor chain , and dragged the chain along the runway .

It took thirty minutes to clear the runway and rig an arresting cable and Armstrong telephoned Edwards and asked for someone to collect him . Milt Thompson was sent in an F @-@ 104B , the only two @-@ seater available , but a plane Thompson had never flown . With great difficulty , Thompson made it to Nellis , but a strong crosswind caused a hard landing and the left main tire suffered a blowout . The runway was again closed to clear it , and Bill Dana was sent to Nellis in a T @-@ 33 Shooting Star , but he almost landed long ? and the Nellis base operations office decided that to avoid any further problems , it would be best to find the three NASA pilots ground transport back to Edwards .

Armstrong made seven flights in the X @-@ 15 from November 1960 to July 1962 . He reached a top altitude of 207 @, @ 500 feet ( 63 @. @ 2 km ) in the X @-@ 15 @-@ 3 , and a top speed of Mach 5 @. @ 74 ( 3 @, @ 989 mph ( 6 @, @ 420 km / h ) ) in the X @-@ 15 @-@ 1 ; he left the Dryden Flight Research Center with a total of 2 @, @ 400 flying hours . Over his career , he flew more than 200 different models of aircraft .

= = Astronaut career = =

In 1958 , Armstrong had been selected for the U.S. Air Force 's Man In Space Soonest program . In November 1960 , he was chosen as part of the pilot consultant group for the X @-@ 20 Dyna @-@ Soar , a military space plane under development by Boeing for the U.S. Air Force , and on March 15 , 1962 , he was selected by the U.S. Air Force as one of seven pilot @-@ engineers who would fly the space plane when it got off the design board .

In the months after the announcement that applications were being sought for the second group of NASA astronauts , Armstrong became more and more excited about the prospects of both the

Apollo program and of investigating a new aeronautical environment . Armstrong 's astronaut application arrived about a week past the June 1 , 1962 , deadline . Dick Day , with whom Armstrong had worked closely at Edwards , saw the late arrival of the application and slipped it into the pile before anyone noticed . At Brooks Air Force Base at the end of June , Armstrong underwent a medical exam that many of the applicants described as painful and at times seemingly pointless .

Deke Slayton called Armstrong on September 13 , 1962 , and asked whether he would be interested in joining the NASA Astronaut Corps as part of what the press dubbed " the New Nine " ; without hesitation , Armstrong said yes . The selections were kept secret until three days later , although newspaper reports had been circulating since earlier that year that he would be selected as the " first civilian astronaut . " Armstrong was one of two civilian pilots selected for the second group ; the other was Elliot See , also a former naval aviator . See was scheduled to command Gemini 9 , but died in a T @-@ 38 crash in 1966 that also took the life of crewmate Charles Bassett . Armstrong was the first American civilian in space , but the first civilian was Valentina Tereshkova of the Soviet Union , nearly three years earlier . A textile worker and amateur parachutist , she was aboard Vostok 6 when it launched on June 16 , 1963 .

= = = Gemini program = = =

= = = Gemini 8 = = =

The crew assignments for Gemini 8 were announced on September 20 , 1965 , with Armstrong as Command Pilot and David Scott as Pilot . Scott was the first member of the third group of astronauts to receive a prime crew assignment . The mission launched on March 16 , 1966 ; it was to be the most complex yet , with a rendezvous and docking with the unmanned Agena target vehicle , the second American extra @-@ vehicular activity ( EVA ) by Scott . In total , the mission was planned to last 75 hours and 55 orbits . After the Agena lifted off at 10 a.m. EST , the Titan II carrying Armstrong and Scott ignited at 11 : 41 : 02 am EST , putting them into an orbit from where they would chase the Agena .

The rendezvous and first @-@ ever docking between two spacecraft was successfully completed after 6 @.@ 5 hours in orbit . Contact with the crew was intermittent due to the lack of tracking stations covering their entire orbits . Out of contact with the ground , the docked spacecraft began to roll , and Armstrong attempted to correct this with the Orbital Attitude and Maneuvering System ( OAMS ) of the Gemini spacecraft . Following the earlier advice of Mission Control , they undocked , but found that the roll increased dramatically to the point where they were turning about once per second , which meant the problem was in their Gemini 's attitude control . Armstrong decided the only course of action was to engage the Reentry Control System ( RCS ) and turn off the OAMS . Mission rules dictated that once this system was turned on , the spacecraft would have to reenter at the next possible opportunity . It was later thought that damaged wiring made one of the thrusters become stuck in the on position .

Throughout the astronaut office there were a few people , most notably Walter Cunningham , who publicly stated that Armstrong and Scott had ignored the malfunction procedures for such an incident , and that Armstrong could have salvaged the mission if he had turned on only one of the two RCS rings , saving the other for mission objectives . These criticisms were unfounded ; no malfunction procedures were written and it was possible to turn on only both RCS rings , not just one or the other . Gene Kranz wrote , " the crew reacted as they were trained , and they reacted wrong because we trained them wrong . " The mission planners and controllers had failed to realize that when two spacecraft are docked together , they must be considered to be one spacecraft .

Armstrong himself was depressed that the mission had been cut short , canceling most mission objectives and robbing Scott of his EVA .

= = = Gemini 11 = = =

The last assignment for Armstrong in the Gemini program was as the back @-@ up Command Pilot for Gemini 11 , announced two days after the landing of Gemini 8 . Having trained for two flights , Armstrong was quite knowledgeable about the systems and was more in a teaching role for the rookie backup Pilot , William Anders . The launch was on September 12 , 1966 , with Pete Conrad and Dick Gordon on board , who successfully completed the mission objectives , while Armstrong served as CAPCOM .

Following the flight , President Lyndon B. Johnson asked Armstrong and his wife to take part in a 24 @-@ day goodwill tour of South America . Also on the tour , which took in 11 countries and 14 major cities , were Dick Gordon , George Low , their wives , and other government officials . In Paraguay , Armstrong impressed dignitaries by greeting them in their local language , Guarani ; in Brazil he talked about the exploits of the Brazilian @-@ born Alberto Santos @-@ Dumont , who was regarded as having beaten the Wright brothers with the first flying machine with his 14 @-@ bis .

= = = Apollo program = = =

On January 27 , 1967 , the date of the Apollo 1 fire , Armstrong was in Washington , D.C. , with Gordon Cooper , Dick Gordon , Jim Lovell and Scott Carpenter for the signing of the United Nations Outer Space Treaty . The astronauts chatted with the assembled dignitaries until 6 : 45 p.m. when Carpenter went to the airport , and the others returned to the Georgetown Inn , where they each found messages to phone the Manned Spacecraft Center . During these telephone calls , they learned of the deaths of Gus Grissom , Ed White and Roger Chaffee . Armstrong and the group spent the rest of the night drinking scotch and discussing what had happened .

On April 5 , 1967 , the same day the Apollo 1 investigation released its report on the fire , Armstrong assembled with 17 other astronauts for a meeting with Deke Slayton . The first thing Slayton said was , " The guys who are going to fly the first lunar missions are the guys in this room . " According to Eugene Cernan , Armstrong showed no reaction to the statement . To Armstrong it came as no surprise ? the room was full of veterans of Project Gemini , the only people who could fly the lunar missions . Slayton talked about the planned missions and named Armstrong to the backup crew for Apollo 9 , which at that stage was planned to be a medium Earth orbit test of the Lunar Module @-@ Command / Service Module combination . After design and manufacturing delays in the Lunar Module ( LM ) , Apollo 9 and Apollo 8 swapped crews . Based on the normal crew rotation scheme , Armstrong would command Apollo 11 .

To give the astronauts experience with how the LM would fly on its final landing descent , NASA commissioned Bell Aircraft to build two Lunar Landing Research Vehicles , later augmented with three Lunar Landing Training Vehicles ( LLTV ) . Nicknamed the " Flying Bedsteads " , they simulated the Moon 's one @-@ sixth of Earth 's gravity by using a turbofan engine to support the remaining five @-@ sixths of the craft 's weight . On May 6 , 1968 , about 100 feet ( 30 m ) above the ground , Armstrong 's controls started to degrade and the LLTV began banking . He ejected safely ( later analysis suggested that if he had ejected half a second later , his parachute would not have opened in time ) . His only injury was from biting his tongue . Even though he was nearly killed , Armstrong maintained that without the LLRV and LLTV , the lunar landings would not have been successful , as they gave commanders valuable experience in the behavior of lunar landing craft .

= = = Apollo 11 = = =

After Armstrong served as backup commander for Apollo 8 , Slayton offered him the post of commander of Apollo 11 on December 23 , 1968 , as Apollo 8 orbited the Moon . In a meeting that was not made public until the publication of Armstrong 's biography in 2005 , Slayton told him that although the planned crew was Armstrong as commander , lunar module pilot Buzz Aldrin and command module pilot Michael Collins , he was offering the chance to replace Aldrin with Jim Lovell . After thinking it over for a day , Armstrong told Slayton he would stick with Aldrin , as he had no difficulty working with him and thought Lovell deserved his own command . Replacing Aldrin with

Lovell would have made Lovell the Lunar Module Pilot , unofficially the lowest ranked member , and Armstrong could not justify placing Lovell , the commander of Gemini 12 , in the number 3 position of the crew .

A March 1969 meeting between Slayton , George Low , Bob Gilruth , and Chris Kraft determined that Armstrong would be the first person on the Moon , in some part because NASA management saw Armstrong as a person who did not have a large ego . A press conference held on April 14 , 1969 , gave the design of the LM cabin as the reason for Armstrong 's being first ; the hatch opened inwards and to the right , making it difficult for the lunar module pilot , on the right @-@ hand side , to exit first . Slayton added , " Secondly , just on a pure protocol basis , I figured the commander ought to be the first guy out ... I changed it as soon as I found they had the time line that showed that . Bob Gilruth approved my decision . " At the time of their meeting , the four men did not know about the hatch consideration . The first knowledge of the meeting outside the small group came when Kraft wrote his 2001 autobiography .

On July 16 , 1969 , Armstrong received a crescent Moon carved out of Styrofoam from the pad leader , Guenter Wendt , who described it as a key to the Moon . In return , Armstrong gave Wendt a ticket for a " space taxi " " good between two planets " .

= = = = = Voyage to the Moon = = = = =

During the Apollo 11 launch , Armstrong 's heart reached a top rate of 110 beats per minute . He found the first stage to be the loudest ? much noisier than the Gemini 8 Titan II launch ? and the Apollo CSM was relatively roomy compared to the Gemini capsule . This ability to move around was suspected to be the reason why none of the Apollo 11 crew suffered from space sickness , while members of previous crews did . Armstrong was especially happy , as he had been prone to motion sickness as a child and could experience nausea after doing long periods of aerobatics .

The objective of Apollo 11 was to land safely rather than to touch down with precision on a particular spot . Three minutes into the lunar descent burn , Armstrong noted that craters were passing about two seconds too early , which meant the Eagle would probably touch down beyond the planned landing zone by several miles . As the Eagle 's landing radar acquired the surface , several computer error alarms appeared . The first was a code 1202 alarm , and even with their extensive training , neither Armstrong nor Aldrin was aware of what this code meant . They promptly received word from CAPCOM Charles Duke in Houston that the alarms were not a concern ; the 1202 and 1201 alarms were caused by an executive overflow in the lunar module computer . As described by Buzz Aldrin in the documentary In the Shadow of the Moon , the overflow condition was caused by his own counter @-@ checklist choice of leaving the docking radar on during the landing process , so the computer had to process unnecessary radar data and did not have enough time to execute all tasks , dropping lower @-@ priority ones . Aldrin stated that he did so with the objective of facilitating re @-@ docking with the CM should an abort become necessary , not realizing that it would cause the overflow condition .

When Armstrong noticed they were heading towards a landing area which he believed was unsafe , he took over manual control of the LM , and attempted to find an area which seemed safer , taking longer than expected , and longer than most simulations had taken . For this reason , there was concern from mission control that the LM was running low on fuel . Upon landing , Aldrin and Armstrong believed they had about 40 seconds worth of fuel left , including the 20 seconds worth of fuel which had to be saved in the event of an abort . During training , Armstrong had landed the LLTV with less than 15 seconds left on several occasions , and he was also confident the LM could survive a straight @-@ down fall from 50 feet ( 15 m ) if needed . Analysis after the mission showed that at touchdown there were 45 to 50 seconds of propellant burn time left .

The landing on the surface of the Moon occurred several seconds after 20 : 17 : 40 UTC on July 20 , 1969 , at which time one of three 67 @-@ inch ( 1 @-@ 7 m ) -long probes attached to three of the Lunar Module 's four legs made contact with the surface , a panel light inside the LM lit up , and Aldrin called out , " Contact light . " Armstrong shut the engine off and said , " shutdown . " As the LM settled onto the surface , Aldrin said , " Okay . Engine stop " , then they both called out some

post @-@ landing checklist items . After a ten @-@ second pause , Duke acknowledged the landing with , " We copy you down , Eagle . " Armstrong announced the landing to Mission Control and the world with the words , " Houston , Tranquility Base here . The Eagle has landed . " Aldrin and Armstrong celebrated with a brisk handshake and pat on the back before quickly returning to the checklist of tasks needed to ready the lunar module for liftoff from the Moon should an emergency unfold during the first moments on the lunar surface . After Armstrong had confirmed touch @-@ down , Duke re @-@ acknowledged , and expressed the flight controllers ' anxiety : " Roger , ... Tranquility . We copy you on the ground . You got a bunch of guys about to turn blue . We 're breathing again . Thanks a lot . " During the landing , Armstrong 's heart rate , at one point , reached 160 beats per minute , according to the NASA Apollo 11 Mission Report .

= = = = = First Moon walk = = = = =

Although the official NASA flight plan called for a crew rest period before extra @-@ vehicular activity , Armstrong requested that the EVA be moved to earlier in the evening , Houston time . Once Armstrong and Aldrin were ready to go outside , Eagle was depressurized , the hatch was opened and Armstrong made his way down the ladder first .

At the bottom of the ladder Armstrong said , " I 'm going to step off the LEM now " ( referring to the Apollo Lunar Module ) . He then turned and set his left boot on the lunar surface at 2 : 56 UTC July 21 , 1969 , then spoke the famous words , " That 's one small step for [ a ] man , one giant leap for mankind . "

Armstrong prepared his famous epigram on his own . In a post @-@ flight press conference , he said that he decided on the words " just prior to leaving the LM [ lunar module ] . " In a 1983 interview in Esquire Magazine , Armstrong explained to George Plimpton : " I always knew there was a good chance of being able to return to Earth , but I thought the chances of a successful touchdown on the moon surface were about even money ? fifty ? fifty ... Most people don 't realize how difficult the mission was . So it didn 't seem to me there was much point in thinking of something to say if we 'd have to abort landing . " In 2012 , brother Dean Armstrong claimed that Neil had shown him a note with a draft of the line months before the launch , although historian Andrew Chaikin , who had interviewed the astronaut in 1988 for his book A Man on the Moon , disputed that he had ever claimed coming up with the line spontaneously during the mission .

Recordings of Armstrong 's transmission do not evidence the indefinite article " a " before " man " , though NASA and Armstrong insisted for years that static had obscured it . Armstrong stated he would never make such a mistake , but after repeated listenings to recordings , he eventually admitted he must have dropped the " a " . He later said he " would hope that history would grant me leeway for dropping the syllable and understand that it was certainly intended , even if it was not said ? although it might actually have been " .

It has since been claimed that acoustic analysis of the recording reveals the presence of the missing " a " ; Peter Shann Ford , an Australia @-@ based computer programmer , conducted a digital audio analysis and claims that Armstrong did , in fact , say " a man " , but the " a " was inaudible due to the limitations of communications technology of the time . Ford and James R. Hansen , Armstrong 's authorized biographer , presented these findings to Armstrong and NASA representatives , who conducted their own analysis . Armstrong found Ford 's analysis " persuasive . " However , the article by Ford was published on Ford 's own web site rather than in a peer @-@ reviewed scientific journal , and linguists David Beaver and Mark Liberman wrote of their skepticism of Ford 's claims on the blog Language Log . Thus , NASA 's transcript continues to show the " a " in parentheses .

When Armstrong made his proclamation , Voice of America was rebroadcast live via the BBC and many other stations worldwide . The estimated global audience at that moment was 450 million listeners , out of a then estimated world population of 3 @.@ 631 billion people .

About 20 minutes after the first step , Aldrin joined Armstrong on the surface and became the second human to set foot on the Moon , and the duo began their tasks of investigating how easily a person could operate on the lunar surface . Early on , they unveiled a plaque commemorating their



flight , and also planted the flag of the United States . The flag used on this mission had a metal rod to hold it horizontal from its pole . Since the rod did not fully extend , and the flag was tightly folded and packed during the journey , the flag ended up with a slightly wavy appearance , as if there were a breeze . Shortly after their flag planting , President Richard Nixon spoke to them by a telephone call from his office . The President spoke for about a minute , after which Armstrong responded for about thirty seconds .

In the entire Apollo 11 photographic record , there are only five images of Armstrong partly shown or reflected . The mission was planned to the minute , with the majority of photographic tasks to be performed by Armstrong with a single Hasselblad camera .

After helping to set up the Early Apollo Scientific Experiment Package , Armstrong went for a walk to what is now known as East Crater , 65 yards ( 59 m ) east of the LM , the greatest distance traveled from the LM on the mission . Armstrong 's final task was to remind Aldrin to leave a small package of memorial items to deceased Soviet cosmonauts Yuri Gagarin and Vladimir Komarov , and Apollo 1 astronauts Gus Grissom , Ed White and Roger B. Chaffee . The time spent on EVA during Apollo 11 was about two and a half hours , the shortest of any of the six Apollo lunar landing missions ; each of the subsequent five landings were allotted gradually longer periods for EVA activities ? the crew of Apollo 17 , by comparison , spent over 22 hours exploring the lunar surface .

In a 2010 interview , Armstrong explained that NASA limited his Moon walk to two hours because they were unsure how the spacesuits would handle the extreme temperature of the Moon .

In 2013 , Popular Science 's photo gallery included a photo that Armstrong took of Aldrin but his own image is visible on Aldrin 's helmet as one of the best astronaut selfies .

===== Return to Earth =====

After they re @-@ entered the LM , the hatch was closed and sealed . While preparing for the liftoff from the lunar surface , Armstrong and Aldrin discovered that , in their bulky spacesuits , they had broken the ignition switch for the ascent engine ; using part of a pen , they pushed the circuit breaker in to activate the launch sequence . The lunar module then continued to its rendezvous and docked with Columbia , the command and service module . The three astronauts returned to Earth and splashed down in the Pacific Ocean , to be picked up by the USS Hornet .

After being released from an 18 @-@ day quarantine to ensure that they had not picked up any infections or diseases from the Moon , the crew were feted across the United States and around the world as part of a 45 @-@ day " Giant Leap " tour . Armstrong then took part in Bob Hope 's 1969 USO show , primarily to Vietnam .

Later from October 29 ? 31 , 1969 he and the rest of the Apollo 11 astronauts visited the city of Tehran , capital of Iran , where he met Shah Mohammad Reza Pahlavi and the rest of the nation 's royal family .

In May 1970 , Armstrong traveled to the Soviet Union to present a talk at the 13th annual conference of the International Committee on Space Research ; after arriving in Leningrad from Poland , he traveled to Moscow where he met Premier Alexei Kosygin . He was the first westerner to see the supersonic Tupolev Tu @-@ 144 and was given a tour of the Yuri Gagarin Cosmonaut Training Center , which Armstrong described as " a bit Victorian in nature " . At the end of the day , he was surprised to view delayed video of the launch of Soyuz 9 ? it had not occurred to Armstrong that the mission was taking place , even though Valentina Tereshkova had been his host and her husband , Andriyan Nikolayev , was on board .

== Life after Apollo ==

=== Teaching ===

Armstrong announced shortly after the Apollo 11 flight that he did not plan to fly in space again . He was appointed Deputy Associate Administrator for aeronautics for the Office of Advanced Research

and Technology , Advanced Research Projects Agency ( ARPA ) , but served in this position for only a year , and resigned from it and NASA as a whole in 1971 .

He accepted a teaching position in the Department of Aerospace Engineering at the University of Cincinnati , having decided on Cincinnati over other universities , including his alma mater , Purdue , because it had a small aerospace department ; he hoped that the faculty members would not be annoyed that he came straight into a professorship with only the USC master 's degree . He began the work while stationed at Edwards years before , and finally completed it after Apollo 11 by presenting a report on various aspects of Apollo , instead of a thesis on the simulation of hypersonic flight . The official job title he received at Cincinnati was University Professor of Aerospace Engineering . After teaching for eight years , he resigned in 1979 without explaining his reason for leaving .

= = = NASA accident investigations = = =

Armstrong served on two spaceflight accident investigations . The first was in 1970 , after Apollo 13 , where as part of Edgar Cortright 's panel , he produced a detailed chronology of the flight . Armstrong opposed the report 's recommendation to re @-@ design the service module 's oxygen tanks , the source of the explosion . In 1986 , President Ronald Reagan appointed him to the Rogers Commission which investigated the Space @-@ shuttle Challenger disaster of that year . As vice @-@ chairman , Armstrong was in charge of the operational side of the commission .

= = = Business activities = = =

After Armstrong retired from NASA in 1971 , he acted as a spokesman for several businesses . The first company to successfully approach him was Chrysler , for whom he appeared in advertising starting in January 1979 . Armstrong thought they had a strong engineering division , plus they were in financial difficulty . He later acted as a spokesman for other companies , including General Time Corporation and the Bankers Association of America . He acted as a spokesman for U.S. businesses only .

Along with spokesman duties , he also served on the board of directors of several companies , including Marathon Oil , Learjet , Cinergy ( Cincinnati Gas & Electric Company ) , Taft Broadcasting , United Airlines , Eaton Corporation , AIL Systems and Thiokol . He joined Thiokol 's board after he served on the Rogers Commission ; the Space Shuttle Challenger was destroyed due to a problem with the Thiokol @-@ manufactured solid rocket boosters . He retired as chairman of the board of EDO Corporation in 2002 .

= = = North Pole expedition = = =

In 1985 , professional expedition leader Mike Dunn organized a trip to take the then " greatest explorers " to the North Pole . The group included Armstrong , Edmund Hillary , Hillary 's son Peter , Steve Fossett , and Patrick Morrow , and arrived on April 6 , 1985 . Armstrong said he was curious to see what the North Pole looked like from ground level , as he 'd only seen it from the Moon .

= = = Television and film = = =

In 2010 , he voiced the character of Dr. Jack Morrow in Quantum Quest : A Cassini Space Odyssey , a 2010 animated educational sci @-@ fi adventure film initiated by JPL / NASA through a grant from Jet Propulsion Lab . Between 1991 and 1993 , he hosted First Flights with Neil Armstrong , an aviation history documentary series on A & E.

= = = Personal life = = =

Unlike former astronauts who actively sought political careers after leaving NASA ( such as U.S.

Senators John Glenn ( D @-@ OH , 1974 ? 1999 ) and Harrison Schmitt ( R @-@ NM , 1977 ? 1983 ) ) , Armstrong was approached by political groups from both parties , but declined all offers . He described his political leanings as favoring states ' rights and opposing the United States acting as the " world 's policeman " .

In the late 1950s , Armstrong applied at a local Methodist church to lead a Boy Scout troop . When asked for his religious affiliation , he labeled himself as a deist . His mother later said that Armstrong 's religious views caused her grief and distress in later life as she was more religious . His official biography also describes him as a deist .

In 1972 , Armstrong was welcomed into the town of Langholm , Scotland , the traditional seat of Clan Armstrong ; he was made the first freeman of the burgh , and happily declared the town his home . The Justice of the Peace read from an unrepealed 400 @-@ year @-@ old law that required him to hang any Armstrong found in the town .

In the fall of 1979 , Armstrong was working at his farm near Lebanon , Ohio . As he jumped off of the back of his grain truck , his wedding ring caught in the wheel , tearing off the tip of his ring finger . He collected the severed digit and packed it in ice , and surgeons reattached it at the Jewish Hospital in Louisville , Kentucky . In February 1991 , a year after his father had died , and nine months after the death of his mother , he suffered a mild heart attack while skiing with friends at Aspen , Colorado .

Armstrong married his first wife Janet Shearon on January 28 , 1956 . Their first son Eric was born in 1957 , followed by daughter , Karen , in 1959 . Karen died of a brain tumor in January 1962 , and the couple 's second son Mark was born in 1963 . Armstrong 's first wife , Janet , divorced him in 1994 , after 38 years of marriage . He had met his second wife , Carol Held Knight ( b . 1945 ) , in 1992 at a golf tournament , where they were seated together at the breakfast table . She said little to Armstrong , but two weeks later she received a call from him asking what she was doing ? she replied she was cutting down a cherry tree ; 35 minutes later Armstrong was at her house to help out . They were married on June 12 , 1994 , in Ohio , and then had a second ceremony , at San Ysidro Ranch , in California . He lived in Indian Hill , Ohio .

Armstrong is generally referred to as a " reluctant " American Hero . John Glenn , the first American to orbit Earth , recalled Armstrong 's legendary humility . " He didn 't feel that he should be out huckstering himself , " the former Ohio senator told CNN . " He was a humble person , and that 's the way he remained after his lunar flight , as well as before . "

After 1994 , Armstrong refused all requests for autographs because he found that his signed items were selling for large amounts of money and that many forgeries were in circulation ; any requests that were sent to him received a form letter in reply , saying that he had stopped signing . Although his no @-@ autograph policy was well known , author Andrew Smith observed people at the 2002 Reno Air Races still trying to get signatures , with one person even claiming , " If you shove something close enough in front of his face , he 'll sign . " He also stopped sending out congratulatory letters to new Eagle Scouts , because he believed these letters should come from people who know the Scouts personally .

Use of Armstrong 's name , image , and famous quote caused him problems over the years . MTV wanted to use his quote for its now @-@ famous identity depicting the Apollo 11 landing when it launched in 1981 , but he refused . Armstrong sued Hallmark Cards in 1994 after they used his name and a recording of the " one small step " quote in a Christmas ornament without permission . The lawsuit was settled out of court for an undisclosed amount of money which Armstrong donated to Purdue .

In May 2005 , Armstrong became involved in an unusual legal dispute with his barber of 20 years , Mark Sizemore . After cutting Armstrong 's hair , Sizemore sold some of it to a collector for \$ 3 @ , @ 000 without Armstrong 's knowledge or permission . Armstrong threatened legal action against Sizemore unless he returned the hair or donated the proceeds to a charity of Armstrong 's choosing . Sizemore , unable to retrieve the hair , decided to donate the proceeds to the charity of Armstrong 's choice .

Since the early 1980s , Armstrong has been the subject of a hoax saying that he converted to Islam after hearing the adhan , the Muslim call to prayer , while walking on the Moon . The Indonesian

singer Suhaemi wrote a song called " Gema Suara Adzan di Bulan " ( " The Resonant Sound of the Call to Prayer on the Moon " ) which described Armstrong 's conversion ; the song was discussed widely in various Jakarta news outlets in 1983 . Other similar hoax stories were seen in Egypt and Malaysia . In March 1983 , the U.S. State Department responded by issuing a global message to Muslims saying that Armstrong " has not converted to Islam " . However , the hoax was not completely quieted ; it surfaced occasionally for the next three decades . A part of the confusion stems from the similarity between Armstrong 's American residence in Lebanon , Ohio , and the country Lebanon which has a majority population of Muslims .

= = Illness and death = =

Armstrong underwent vascular bypass surgery on August 7 , 2012 , to relieve blocked coronary arteries . Although he was reportedly recovering well , he developed complications in the hospital and died on August 25 , in Cincinnati , Ohio . After his death , Armstrong was described , in a statement released by the White House , as " among the greatest of American heroes ? not just of his time , but of all time " . The statement further said that Armstrong had carried the aspirations of the United States ' citizens and that he had delivered " a moment of human achievement that will never be forgotten . "

His family released a statement describing Armstrong as a " reluctant American hero [ who had ] served his nation proudly , as a navy fighter pilot , test pilot , and astronaut ... While we mourn the loss of a very good man , we also celebrate his remarkable life and hope that it serves as an example to young people around the world to work hard to make their dreams come true , to be willing to explore and push the limits , and to selflessly serve a cause greater than themselves . For those who may ask what they can do to honor Neil , we have a simple request . Honor his example of service , accomplishment and modesty , and the next time you walk outside on a clear night and see the moon smiling down at you , think of Neil Armstrong and give him a wink . " This prompted many responses , including the Twitter hashtag " # WinkAtTheMoon " .

Armstrong 's colleague on the Apollo 11 mission , Buzz Aldrin , said that he was " deeply saddened by the passing . I know I am joined by millions of others in mourning the passing of a true American hero and the best pilot I ever knew . I had truly hoped that on July 20th , 2019 , Neil , Mike and I would be standing together to commemorate the 50th Anniversary of our moon landing ... Regrettably , this is not to be . " Apollo 11 Command Module pilot Michael Collins said , of Armstrong , " He was the best , and I will miss him terribly . " NASA Administrator Charles Bolden said that : " As long as there are history books , Neil Armstrong will be included in them , remembered for taking humankind 's first small step on a world beyond our own " .

A tribute was held in Armstrong 's honor on September 13 at Washington National Cathedral , whose Space Window depicts the Apollo 11 mission and holds a sliver of Moon rock amid its stained @-@ glass panels . In attendance were Armstrong 's Apollo 11 crewmates , Michael Collins and Buzz Aldrin ; Eugene A. Cernan , the Apollo 17 mission commander and last man to walk on the Moon ; and former Senator and astronaut John Glenn , the first American to orbit the Earth . In a eulogy , Charles Bolden said , " Neil will always be remembered for taking humankind 's first small step on a world beyond our own , but it was the courage , grace , and humility he displayed throughout this life that lifted him above the stars . " Eugene Cernan recalled Armstrong 's low @-@ fuel approach to the Moon : " When the gauge says empty we all know there 's a gallon or two left in the tank ! " Diana Krall sang the song " Fly Me to the Moon " . Michael Collins led prayers . Aldrin and Collins left immediately after the event . The Apollo 15 commander , David Scott , spoke to the press ; he recalled the Gemini 8 mission with Armstrong when he spoke , possibly for the first time , about an incident in which glue spilled on his harness and prevented it from locking correctly minutes before the hatch had to be sealed or the mission aborted . Armstrong then called on back @-@ up pilot Pete Conrad to solve the problem , which he did , to continue the mission without stopping the countdown clock . " That happened because Neil Armstrong was a team player , he always worked on behalf of the team . "

On September 14 , Armstrong 's cremated remains were scattered in the Atlantic Ocean during a

burial @-@ at @-@ sea ceremony aboard the USS Philippine Sea . Flags were flown at half @-@ staff on the day of Armstrong 's funeral .

= = Legacy = =

Armstrong received many honors and awards , including the Presidential Medal of Freedom , the Congressional Space Medal of Honor , the Robert H. Goddard Memorial Trophy , the Sylvanus Thayer Award , the Collier Trophy from the National Aeronautics Association , and the Congressional Gold Medal . The lunar crater Armstrong , 31 mi ( 50 km ) from the Apollo 11 landing site , and asteroid 6469 Armstrong are named in his honor . Armstrong was also inducted into the Aerospace Walk of Honor , the National Aviation Hall of Fame , and the United States Astronaut Hall of Fame . Armstrong and his Apollo 11 crewmates were the 1999 recipients of the Langley Gold Medal from the Smithsonian Institution .

Throughout the United States , there are more than a dozen elementary , middle and high schools named in his honor , and many places around the world have streets , buildings , schools , and other places named for Armstrong and / or Apollo . In 1969 , folk songwriter and singer John Stewart recorded " Armstrong " , a tribute to Armstrong and his first steps on the Moon . Purdue University announced in October 2004 that its new engineering building would be named Neil Armstrong Hall of Engineering in his honor ; the building cost \$ 53 @. @ 2 million and was dedicated on October 27 , 2007 , during a ceremony at which Armstrong was joined by fourteen other Purdue Astronauts . In 1971 , Armstrong was awarded the Sylvanus Thayer Award by the United States Military Academy at West Point for his service to the country . The Armstrong Air and Space Museum , in Armstrong 's hometown of Wapakoneta , Ohio , and the airport in New Knoxville , where he took his first flying lessons when he was fifteen , were named after him .

Armstrong 's authorized biography , *First Man : The Life of Neil A. Armstrong* , was published in 2005 . For many years , Armstrong turned down biography offers from authors such as Stephen Ambrose and James A. Michener , but agreed to work with James R. Hansen after reading one of Hansen 's other biographies .

In a 2010 Space Foundation survey , Armstrong was ranked as the # 1 most popular space hero , and in 2013 , *Flying* magazine ranked him at # 1 on its list of the " 51 Heroes of Aviation " .

The press often asked Armstrong for his views on the future of spaceflight . In 2005 , Armstrong said that a manned mission to Mars will be easier than the lunar challenge of the 1960s : " I suspect that even though the various questions are difficult and many , they are not as difficult and many as those we faced when we started the Apollo [ space program ] in 1961 . " In 2010 , he made a rare public criticism of the decision to cancel the Ares 1 launch vehicle and the Constellation Moon landing program . In an open public letter also signed by Apollo veterans Jim Lovell and Gene Cernan , he noted , " For The United States , the leading space faring nation for nearly half a century , to be without carriage to low Earth orbit and with no human exploration capability to go beyond Earth orbit for an indeterminate time into the future , destines our nation to become one of second or even third rate stature " . Armstrong had also publicly recalled his initial concerns about the Apollo 11 mission , when he had believed there was only a 50 percent chance of landing on the Moon . " I was elated , ecstatic and extremely surprised that we were successful " , he later said .

On November 18 , 2010 , at age 80 , Armstrong said in a speech during the Science & Technology Summit in The Hague , Netherlands , that he would offer his services as commander on a mission to Mars if he were asked .

In September 2012 , the US Navy announced that the first Armstrong @-@ class oceanographic research ship is named RV Neil Armstrong . The ship , christened on March 28 , 2014 , was launched on March 29 , 2014 , passed sea trials August 7 , 2015 and delivered to the Navy on September 23 , 2015 . It is a modern oceanographic research platform capable of supporting a wide range of oceanographic research activities conducted by academic groups .

The Space Foundation named Neil Armstrong as a recipient of its 2013 General James E. Hill Lifetime Space Achievement Award .