NASA EP-11

NATIONAL AERONAUTICS
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MANNED SPACE FLIGHT TEAM

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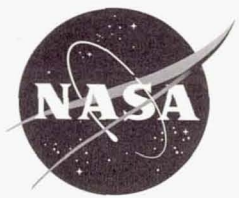


MANNED SPACE FLIGHT TEAM

The National Aeronautics and Space Administration has a 16-man flight personnel team at Manned Spacecraft Center in Houston, Tex. This team is composed of the Project Mercury astronauts, chosen in April 1959, plus additional astronauts, chosen by space officials in September 1962.

With Project Mercury nearing completion the entire group is working as an integrated team on the up-coming Project Gemini—a program designed to place two men in a spacecraft in orbit around the earth for periods of time which may reach two weeks.

While in orbit they will continue with the investigation begun in previous space flights of man's capability to perform in a weightless condition over extended periods of time; to determine psychological and physiological reactions of crew members to extended flights; to carry out scientific investigations of space; and to develop operational techniques of rendezvous and docking with a target vehicle in earth orbit, among other things.

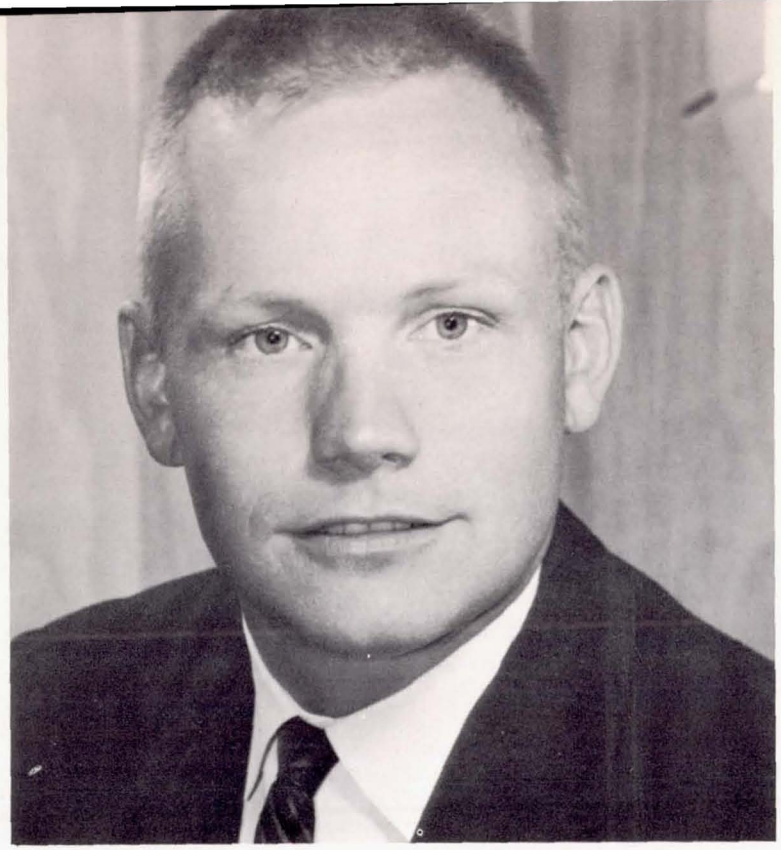
People often ask, "Why do men volunteer for an assignment like this?" No simple answer can be given, but many things all 16 men have in common may provide some clues.

They are all test pilots with much experience in testing high-performance aircraft. They all consider the space programs to be challenges to them as individuals, as well as national challenges. They are all eminently qualified for the missions ahead and each of them wants to make the first trip to the moon. Each feels that he will be able to add much to the knowledge of all through experiments in space travel. In short, they are dedicated to pioneering in the space effort and in offering their collective talent to the country as it strives to reach the national goal spelled out to the Congress by the President in May 1961—to send an American or Americans to the moon, and return them to the earth, in this decade.

No one member of the group can be named as an average astronaut. However, the average has been taken of some of the vital statistics of members of the 16-man team and the following determined—the average height of the group is 5 feet 10 inches; the average weight is 160½ pounds; the average age is 35 years; and the average flight time logged is more than 1,200 hours in conventional aircraft and more than 1,800 hours in jet aircraft.

Additionally, each man of the group has at least one degree in science or engineering. Each has a number of hobbies (with a minimum of time to spend on them) and generally participates in at least one of them to maintain top physical condition.

Many have participated in Boy Scout activities, both in active and consulting roles; are active in community affairs; and are active in professional organizations such as the American Rocket Society, the Society of Experimental Test Pilots and the Institute of Aerospace Sciences.

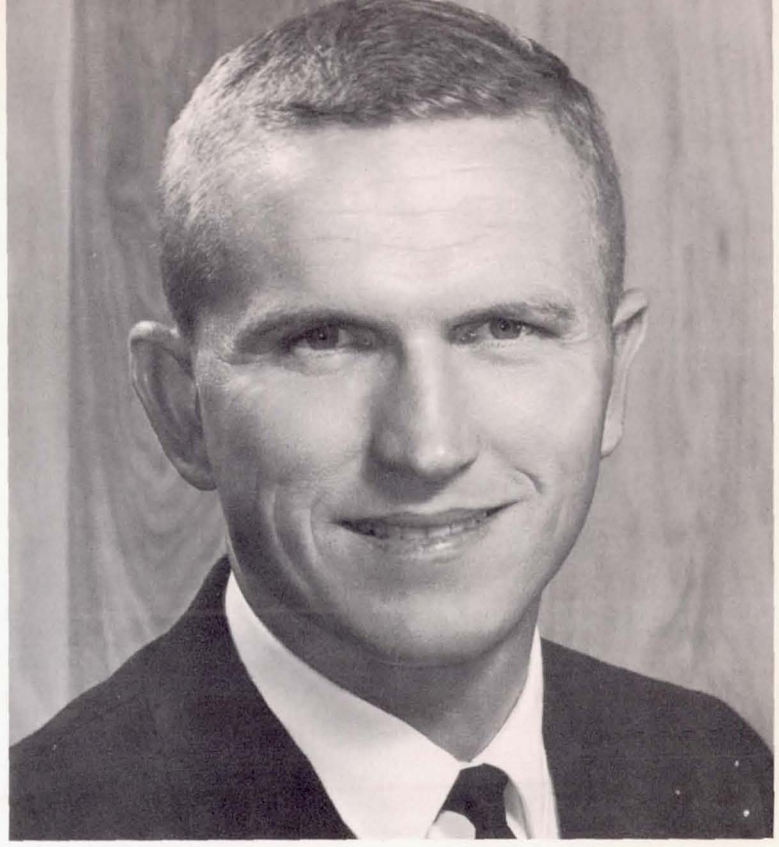


NEIL A. ARMSTRONG, a native of Wapakoneta, Ohio, was graduated from Purdue University in 1955 with a bachelor of science degree in aeronautical engineering and has since attended the University of California on a part-time basis working toward a master's degree in mathematics. Armstrong was a Naval aviator from 1949 until 1952, and, during his last two years of that service, flew 78 combat missions in the Korean action. Following graduation from Purdue, the 32-year-old test pilot worked for NASA's Lewis Flight Propulsion Laboratory, then at Edwards Air Force Base as an aeronautical research engineer for NASA.

He has participated in flight-test work on the F–100, F–104, B–47, F–102 and the X–15. He is a senior member of the American Rocket Society, a member of the Experimental Test Pilots Association, and a member of the Institute of Aerospace Sciences. He was the recipient of the 1962 Institute of Aerospace Sciences Octave Chanute Award.

Armstrong is the son of Mr. and Mrs. Steven Armstrong of Wapakoneta, and is married to the former Jane Elizabeth Shearon of Chicago, Ill. They have one son, Eric, 5.

Neil Armstrong's special assignment is to monitor the development, design and use of trainers and simulators, including new training requirements not associated with specific mission simulators.



FRANK BORMAN, a major in the United States Air Force, was born in Gary, Ind. He attended the United States Military Academy at West Point, N.Y., and was graduated in 1950 with a bachelor of science degree. He received his master's degree in aeronautical engineering from California Institute of Technology, Pasadena, in 1957. From 1957 until 1960 he was instructor of Thermodynamics and Fluid Mechanics at the Military Academy.

Prior to selection as an astronaut in September 1962, he served as an instructor at the Aerospace Research Pilot School at Edwards Air Force Base, where he prepared and delivered academic lectures, simulator briefings, and flight-test briefings on the theory and practice of spacecraft testing. He kept abreast of developments in manned spacecraft and consulted with engineers and test pilots in collecting material for use in the continuous revision of the course curriculum.

Borman, 34, is the son of Mr. and Mrs. Edwin Borman of Phoenix, Ariz., and is married to the former Susan Bugby of Verona, N.J. They have two sons—Frederick, 11, and Edwin, 9.

Frank Borman's special assignment is to concentrate on the booster design and development program, especially booster-abort systems, and the development of abort-preventing procedures for mission success.

M. SCOTT CARPENTER, a lieutenant commander in the United States Navy, was chosen as a Project Mercury astronaut in April 1959. He piloted the Aurora 7 spacecraft on a three-orbit flight of the earth May 24, 1962. Carpenter was born in Boulder, Colo.

He entered Colorado College in 1943 to participate in the Navy's V–5 program, and after a year there had successive training at St. Mary's Pre-Flight School at Moraga, Calif., and Ottumwa, Iowa. When the V–5 program ended at the close of World War II, he entered the University of Colorado at Boulder, and joined the Navy for flight training in 1949.

In November 1951, he was assigned to Patrol Squadron 6, based at Barbours Point, Hawaii, and during the Korean conflict he engaged in antisubmarine shipping surveillance and aerial mining activities with that squadron in the Yellow Sea, South China Sea and the Formosa Strait. In November 1954, he entered the Navy Test Pilot School at Patuxent River, Md., and following his graduation was assigned to the Electronics Test Division.

Carpenter, 37, is married to the former Rene Louise Price of Boulder and the couple have four children—Mark, Jay, Kristen, and Candace. His father, M. S. Carpenter, lives at Palmer Lake, Colo.

Scott Carpenter's special assignment is the lunar excursion module (LEM) of the Apollo project.

CHARLES CONRAD, JR., a Navy lieutenant, was born in Philadelphia, Pa., in 1930. He attended Princeton University and was graduated with a bachelor of science degree in aeronautical engineering.

Following graduation, he entered the Navy, and later attended the Navy Test Pilot School at Patuxent River, Md. From 1959 until 1961 he was a flight instructor and performance engineer at the Naval Air Station there.

Conrad is a member of the Institute of Aerospace Sciences and an associate member of the Society of Experimental Test Pilots.

His last assignment, prior to being chosen as one of the astronauts last September, was as Safety Officer for Fighter Squadron 142 and before that time he was an F4H instructor at the Naval Air Station, Miramar, Calif.

Conrad is the son of Charles Conrad of Sarasota, Fla., and Mrs. Frances V. Sargent of Haverford, Pa. He is married to the former Jane DuBose of San Antonio, Tex. The Conrads have four sons—Pete, 8, Thomas, 5, Andrew, 3, and Christopher, 2.

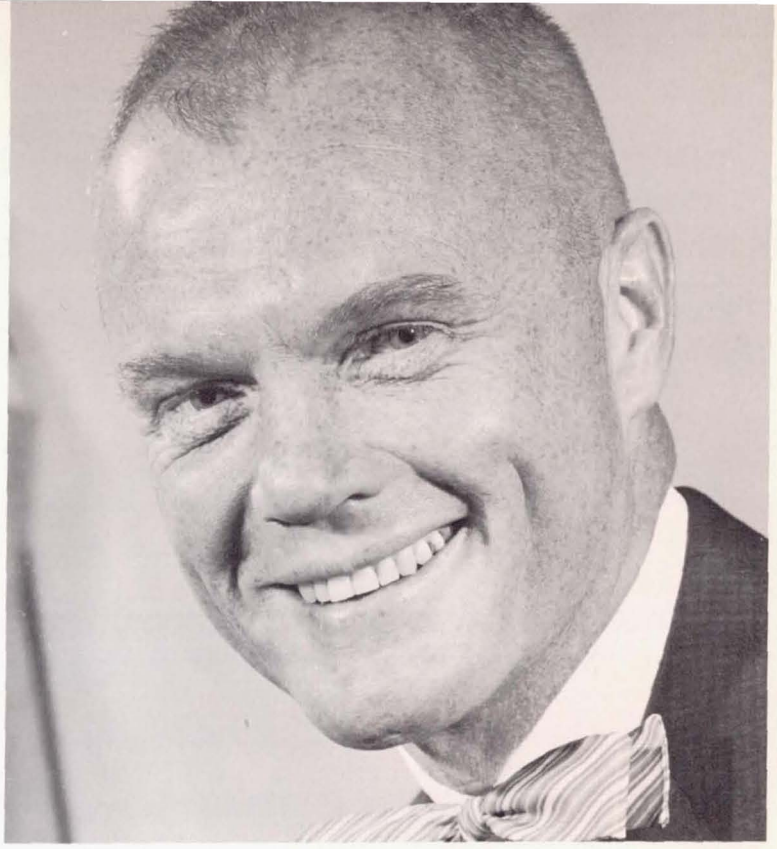
Charles Conrad's special assignment is to specialize in cockpit layouts, instrument displays and pilot controls, to insure that systems "displays" are appropriately integrated into cockpit panels.

Mercury Astronaut **L. GORDON COOPER, JR.,** a major in the Air Force, born in Shawnee, Okla., in 1927, was selected to fly the Mercury-Atlas 9 one-day mission. He served in the Marine Corps, attended the Naval Academy Preparatory School, was a member of the Presidential Honor Guard in Washington, D.C., and attended the University of Hawaii for three years before receiving an Army commission. He transferred to the Air Force and was called to active duty in 1949 for flight training.

Assigned to the 86th Fighter-Bomber Group at Munich, Germany, he attended the European Extension of the University of Maryland, later attended the Air Force Institute of Technology at Wright-Patterson Air Force Base, and received a bachelor's degree in aeronautical engineering. Next, Cooper was assigned to the Air Force Experimental Flight Test School at Edwards Air Force Base, Calif. After graduation he joined the Performance Engineering Branch of the Flight Test Division.

His mother, Mrs. L. Gordon Cooper, lives at Carbondale, Colo. He is married to the former Trudy Olson of Seattle, Wash., and the Coopers have two daughters—Camala and Janita.

Gordon Cooper's special assignment consists of pilot phases of Project Mercury.



Astronaut **JOHN H. GLENN, JR.,** the first American astronaut to orbit the earth is a native of Cambridge, Ohio. He attended Muskingum College prior to entering the Naval Aviation Cadet Program and later attended the University of Maryland.

The 41-year-old Glenn, a Marine lieutenant colonel, joined Fighter Squadron 155 in the Marshall Islands in 1943 and flew 59 combat missions. During the Korean action, he flew 63 missions with Marine Fighter Squadron 311, and 27 while an exchange pilot with the Air Force.

Glenn attended Test Pilot School at Patuxent River, Md., was project officer on a number of aircraft, later was assigned to the Fighter Design Branch of the Navy Bureau of Aeronautics in Washington. He has been awarded the Distinguished Flying Cross five times; holds the Air Medal with 18 clusters. In July 1957, while project officer of the F8U, he set a transcontinental flight record from Los Angeles to New York of 3 hours and 23 minutes.

The son of Mr. and Mrs. John H. Glenn of New Concord, Ohio, he is married to the former Anna Margaret Castor, also of that community. They have two children—John David and Carolyn Ann.

John Glenn's special assignment is Project Apollo, which is the project for manned space flight to the moon.

Astronaut **VIRGIL I. "GUS" GRISSOM,** the second Mercury pilot to fly a suborbital mission, was born in Mitchell, Ind.

He was graduated from Purdue University with a bachelor's degree in mechanical engineering in 1950, then took aviation cadet training and received his wings in March 1951.

The 36-year-old Air Force major flew 100 combat missions in Korea in F–86 Sabrejets with the 334th Fighter-Interceptor Squadron. Following that action he became a jet pilot instructor at Bryan, Tex.

In August 1955, he entered the Air Force Institute of Technology at Wright-Patterson Air Force Base, Ohio, to study aeronautical engineering.

In October 1956, he attended the Test Pilot School at Edwards Air Force Base, Calif., and later returned to Wright-Patterson Air Force Base in May 1957 as a test pilot assigned to the Fighter Branch.

Grissom is the son of Mr. and Mrs. Dennis D. Grissom of Mitchell, and is married to the former Betty L. Moore, also of that community. They have two sons, Scott and Mark.

Virgil Grissom's special assignment is Project Gemini, which has rendezvous in space as a major objective.

JAMES A. LOVELL, JR., a lieutenant commander in the Navy, was born in Cleveland, Ohio. He attended the University of Wisconsin from 1946 to 1948 and the U.S. Naval Academy from 1948 to 1952.

From January 1958 until July 1961, he was a test pilot at the Naval Air Test Center at Patuxent River, Md. His work there included service as program manager for the F4H Weapons System Evaluation.

The 34-year-old Lovell, who was chosen as an astronaut in September 1962, was graduated from the Aviation Safety School of the University of Southern California in 1961.

His last assignment was as flight instructor and safety officer at the Naval Air Station, Oceana, Va.

Lovell's mother, Mrs. Blanch Lovell, resides at Edgewater Beach, Fla. He is married to the former Marilyn Lillie Gerlach of Milwaukee, Wis., and they have three children—Barbara Lynn, 9, James Arthur, 7, and Susan Kay, 4.

James Lovell's special assignment is to monitor design and development of all recovery systems, such as paraglider, parachute and LEM landing systems, including resolving operational problems in the reentry and recovery part of the mission.

JAMES A. McDIVITT, an Air Force captain, was named as an astronaut in September 1962. The 33-year-old native of Chicago, Ill., attended Jackson Junior College from 1948 to 1950, and the University of Michigan from 1957 to 1959. He was graduated first in his class and received a bachelor of science degree in aeronautical engineering.

He joined the Air Force in 1951 and flew 145 combat missions in F–80's and F–86's during the Korean action. McDivitt attended the U.S. Air Force Experimental Test Pilot School at Edwards Air Force Base in 1959 and 1962 and the Air Force Aerospace Research Pilot Course in 1961. His last assignment was as an experimental flight test officer at Edwards.

McDivitt is a member of the Institute of Aerospace Sciences, the American Rocket Society, and the Society of Experimental Test Pilots.

His parents are Mr. and Mrs. James McDivitt, of Jackson, Mich. He is married to the former Patricia Ann Haas of Cleveland, Ohio. They have three children—Michael A., Ann Lynn, and Patric W.

James McDivitt's special assignment is design and development of guidance and navigation systems and aids for operational requirements.

WALTER M. SCHIRRA, JR., a Navy commander, is a native of Hackensack, N.J. The 39-year-old Mercury astronaut has made the longest space flight of any American to date, his six-orbit mission on October 3, 1962.

He attended the Newark, N.J., College of Engineering for one year before entering the U.S. Naval Academy, from which he was graduated in 1945. Schirra received flight training at Pensacola, Fla., and later served with Fighter Squadron 71. As an exchange pilot with the Air Force, he flew 90 missions in Korea in F–84E aircraft.

He took part in the development of the Sidewinder missile at China Lake, Calif.; and was project pilot for the F7U–3 Cutlass and instructor pilot for the Cutlass and the FJ3 Fury.

Schirra attended the Naval Air Safety Officer School at the University of Southern California, and had test pilot training at Patuxent River, Md. His last assignment before joining Project Mercury in April 1959, was at Patuxent in suitability development work on the F4H.

His parents, Mr. and Mrs. Walter M. Schirra, reside at La Jolla, Calif. He is married to the former Josephine C. Fraser of Seattle, Wash. They have two children—Walter M. III, and Suzanne.

Walter Schirra specializes in overall operations and training.

ELLIOT M. SEE, JR., was born in Dallas, Tex., July 23, 1927. He received a bachelor of science degree from the U.S. Merchant Marine Academy in 1949, and a master of science degree from the University of California at Los Angeles in 1962.

See served in the Navy from 1953 to 1956. Following his graduation in 1949, until he entered the Navy and since that service, he has worked for General Electric Company, first as a flight test engineer and later as an experimental test pilot.

His last job with General Electric was at Edwards, Calif., where he served as project pilot on the J 79-8 Engine Evaluation Program in their F4H bailed aircraft. He assisted the project engineer and flew approximately half of the F4H missions.

See is a member of the Institute of Aerospace Sciences. He has logged more than 3,200 hours flying time, including 2,300 hours in jet aircraft.

His parents, Mr. and Mrs. Elliot M. See, reside in Dallas. He is married to the former Marilyn Jane Denahy of Georgetown, Ohio, and they have two daughters, Sally, 6, and Carolyn, 5.

Elliot See's special assignment is to monitor the design and development of electrical and sequential systems. In addition, he will aid in the coordination for mission planning.

ALAN B. SHEPARD, JR., a Navy commander and a Project Mercury astronaut was America's first man in space. He flew a suborbital mission May 5, 1961.

The 39-year-old native of East Derry, N.H., was graduated from the U.S. Naval Academy in 1944, and the Naval War College at Newport, R.I., in 1958.

Shepard attended the Navy Test Pilot School at Patuxent River, Md., in 1950, and subsequently served two tours in flight test work there. During his first tour, he took part in high altitude tests, and took part in experiments in test and development of the Navy's in-flight refueling system, carrier suitability trials of the F2H3 Banshee, and Navy trials of the first angled carrier deck.

During his second tour at Patuxent, he was engaged in testing the F3H Demon, F8U Crusader, F4D Skyray, and the F11F Tigercat. He was project test pilot on the F5D Skylancer, and spent his last five months there as an instructor in the Test Pilot School.

His parents are Col. and Mrs. Alan B. Shephard, of East Derry. Shephard is married to the former Louise Brewer of Kennett Square, Pa. They have two daughters—Juliana and Laura.

Alan B. Shepard specializes in pilot phases of Project Mercury.

Astronaut **DONALD K. "DEKE" SLAYTON** was born in Sparta, Wis., and graduated from the University of Minnesota with a bachelor's degree in aeronautical engineering in 1949.

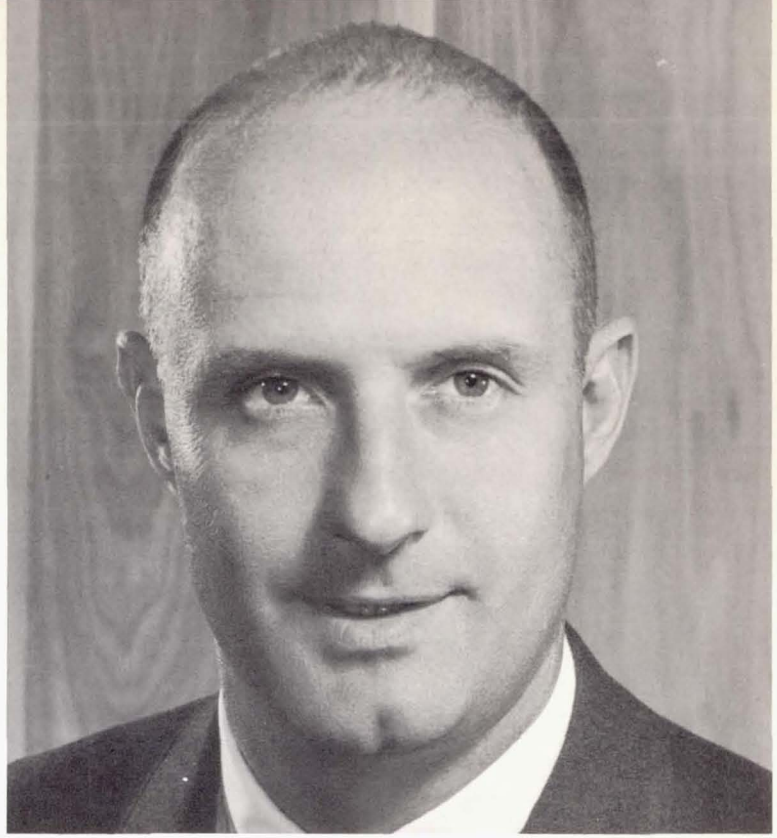
The 38-year-old Air Force major received his wings in 1942, and flew 56 combat missions in B–25's with the 304th Bombardment Group in Europe. He returned to the United States as a B–25 instructor pilot in 1944 and then served with a unit checking out pilots in the B–26.

He joined the 319th Bombardment Group on Okinawa in April of 1945, flew seven combat missions over Japan, and spent another year as a B–25 instructor before entering the University of Minnesota.

Following graduation he was an aeronautical engineer with Boeing Aircraft Company in Seattle, returning to active duty with the Minnesota National Guard in 1951. He attended the Test Pilot School at Edwards Air Force Base, Calif., in 1955 and spent three years as an experimental jet aircraft test pilot.

Slayton is the son of Mr. and Mrs. Charles S. Slayton of Sparta and is married to the former Marjorie Lunney of Los Angeles. The Slaytons have one son, Kent.

Donald Slayton is coordinator for astronaut activities, and maintains overall supervision of astronaut duties.



Astronaut **THOMAS P. STAFFORD** was born in Weatherford, Okla.

The 32-year-old Air Force captain was graduated from the U.S. Naval Academy at Annapolis, Md., in 1952, then went into the Air Force.

As Chief of the Performance Branch, Experimental Test Pilot Division, USAF Aerospace Research Pilot School at Edwards Air Force Base, he was responsible for the supervision and administration of flying curriculum for student test pilots. Stafford monitored all flight and academic schedules, established basic textbooks and participated in and directed the writing of flight test manuals for use by the staff and students. Stafford is co-author of the Pilot's Handbook for Performance Flight Testing, and of the Aerodynamics Handbook for Performance Flight Testing.

He is the son of Mrs. Ellen Crabtree, of Weatherford, Okla. He is married to the former Faye Laverne Shoemaker, also of Weatherford. The Staffords have two daughters, Dianne and Karen.

Thomas Stafford's special assignment is to monitor the design and development of communications and instrumentation systems, insuring that onboard systems are compatible with pilot needs and properly integrated with the mission control system, ground operational support and other communications links.

Astronaut **EDWARD H. WHITE** was born in San Antonio, Tex.

He was graduated from the U.S. Military Academy at West Point in 1952 with a bachelor of science degree, and received a master of science degree in aeronautical engineering from the University of Michigan in 1959.

The 32-year-old Air Force captain joined that branch of the service upon graduation from the Military Academy and attended the Air Force Test Pilot School at Edwards Air Force Base, Calif., in 1959. He also attended the Air Force Survival School at Bad Tolz, Germany.

As an experimental test pilot with the Aeronautical System Division at Wright-Patterson Air Force Base, Ohio, he made flight tests for research and weapons systems development, wrote technical engineering reports, and made recommendations for improvement in aircraft design and construction.

White is the son of Mr. and Mrs. Edward H. White of St. Petersburg, Fla. He is married to the former Patricia Eileen Finegan of Washington, D.C., and they have two children, Edward and Bonnie Lynn.

Edward White's special assignment is to monitor the design and development of flight control systems and related equipment.

Astronaut **JOHN W. YOUNG** was born in San Francisco, Calif.

He was graduated from Georgia Institute of Technology in 1952 with a bachelor of science degree in aeronautical engineering.

The 32-year-old Navy lieutenant commander joined the Navy immediately after graduation. His last assignment, prior to selection as an astronaut trainee, was as maintenance officer for Fighter Squadron 53 at the Naval Air Station in Miramar, Calif. Early in 1962 he set world time-to-climb records for the 3,000- and 25,000-meter events in Project High Jump.

From 1959 until 1962 he was program manager and test pilot for the Navy's F4H project. He spent this period flying and writing technical reports and test results for preliminary evaluation by the Navy.

Young is the son of William Young, who now resides at Orlando, Fla. He is married to the former Barbara Vincent White of Savannah, Ga. The couple has two children, Sandra and John.

John Young's special assignment is to monitor the design and development of environmental control systems, survival gear, pressure suits, couches and other personal equipment.

LEFT: ASTRONAUT WALTER M. SCHIRRA, JR., is shown during a "flight" in the ALFA trainer.

RIGHT: ASTRONAUT DONALD K. SLAYTON steps from the gondola of the human centrifuge at Johnsville, Pennsylvania, following a test.

BELOW: a group of the astronauts and other Manned Spacecraft Center and Aerojet-General employees watch a firing of a Titan II engine during a field trip at Sacramento, California.

The training program for the flight personnel of Manned Spaceflight Center includes six major topic areas: Training in vehicle operation, training in space sciences, familiarization with conditions of spaceflight, training in ground activities, physical fitness and maintenance of flight skills.

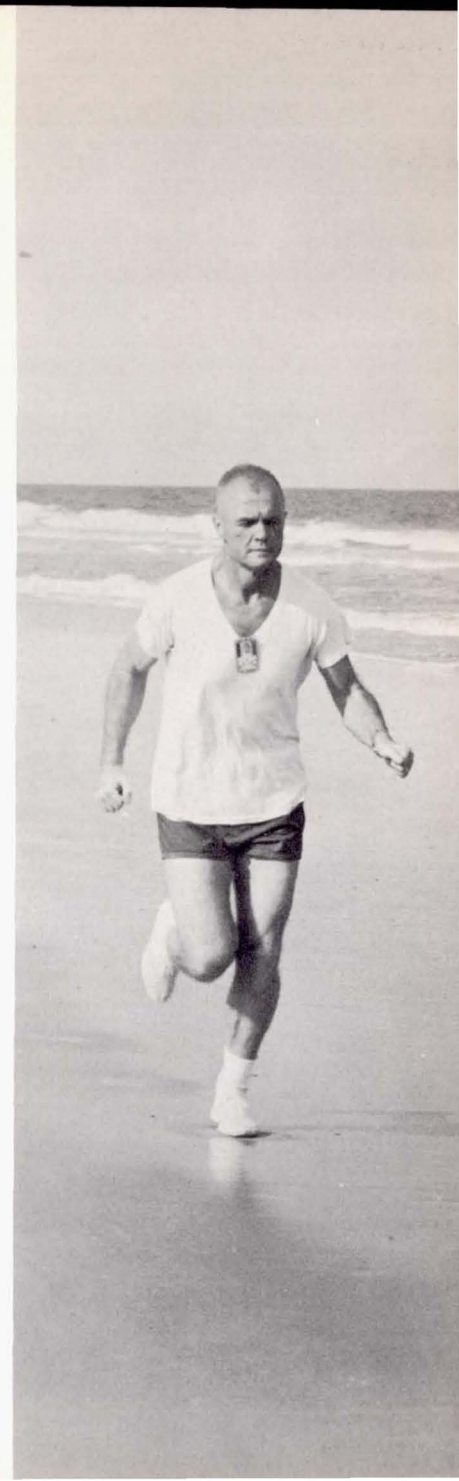
For training in vehicle operation, procedures include lectures on the various systems and operations, field trips to other National Aeronautics and Space Administration installations and contractors' facilities, training manuals, specialty study programs by the individual pilots with subsequent reports to the group; mockup inspections, and training devices.

Training devices have included the ALFA (Air Lubricated Free Axis) simulator which permits practice in solving orbit and retrofire attitude control problems by using external reference through simulated periscope and window displays; the centrifuge trainer at Johnsville, Pa., which is used as a dynamic trainer for the reentry rate damping task and the MASTIF (Multiple-Axis Spin Test Inertia Facility) at NASA's Lewis Research Center which provides tumbling rates in all three axes up to 30 revolutions per minute. The trainers most in use, however, in preparing the pilots for flight, are the procedures trainers which provide realistic simulation of the spacecraft

systems functions and failures. Effective use of the procedures trainers is predicated upon the knowledge of systems malfunctions which might occur, and what actions are taken by the pilot to correct them.

Basic science subjects in which the flight personnel are given refresher courses include space navigation, computer theory, flight mechanics, astronomy, physics of the upper atmosphere and space, bioastronautics, advanced propulsion systems, aerodynamics, guidance and control, space communications, global meteorology, and selenology. In addition, further training is conducted in star recognition together with methods of observing solar and meteorological events, earth and lunar terrain, and psychological and physiological reactions. This training aids in determining man's capability in the space environment and lays the groundwork for the scientific activities of the astronauts.

In familiarizing the flight personnel with conditions of spaceflight, an essential requirement is to introduce the novel conditions to be encountered. These include high acceleration, weightlessness, reduced atmospheric pressures, heat, disorientation, tumbling, noise and vibration. Much has been learned about these conditions through the results of the Project Mercury suborbital flights of Astronauts Alan B. Shepard, Jr., and Virgil I. Grissom; the three-orbit flights of Astronauts John H. Glenn, Jr., and M. Scott Carpenter and the six-orbit flight of Astronaut Walter M. Schirra, Jr. Weightlessness presented one of the major concerns during the earlier days of Mercury training due to the difficulty of accomplishing this state for more than a very short period of time. This concern, however, was alleviated with the flight of Schirra, who experienced nine hours of weightless flight and termed it "most pleasant."

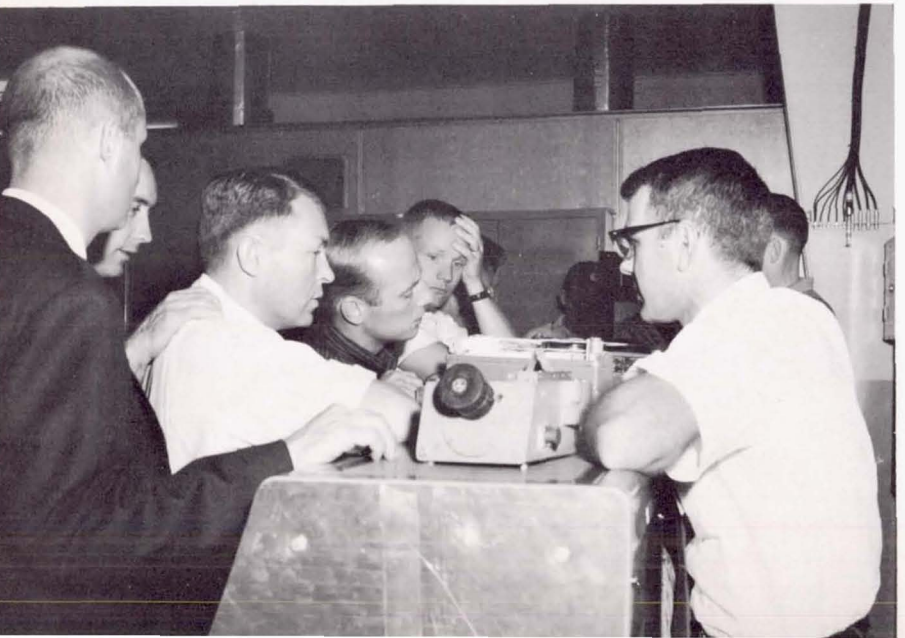


***RIGHT: NEIL ARMSTRONG** inspects a Mercury spacecraft in the white room at Hangar S.*

***FAR RIGHT: JOHN GLENN** runs on the beach at Cape Canaveral, Florida.*

ABOVE: ASTRONAUT and NASA employees inspect parts of the Sigma 7 spacecraft at Cape Canaveral, Florida, following the six-orbit flight of Astronaut Schirra, above.

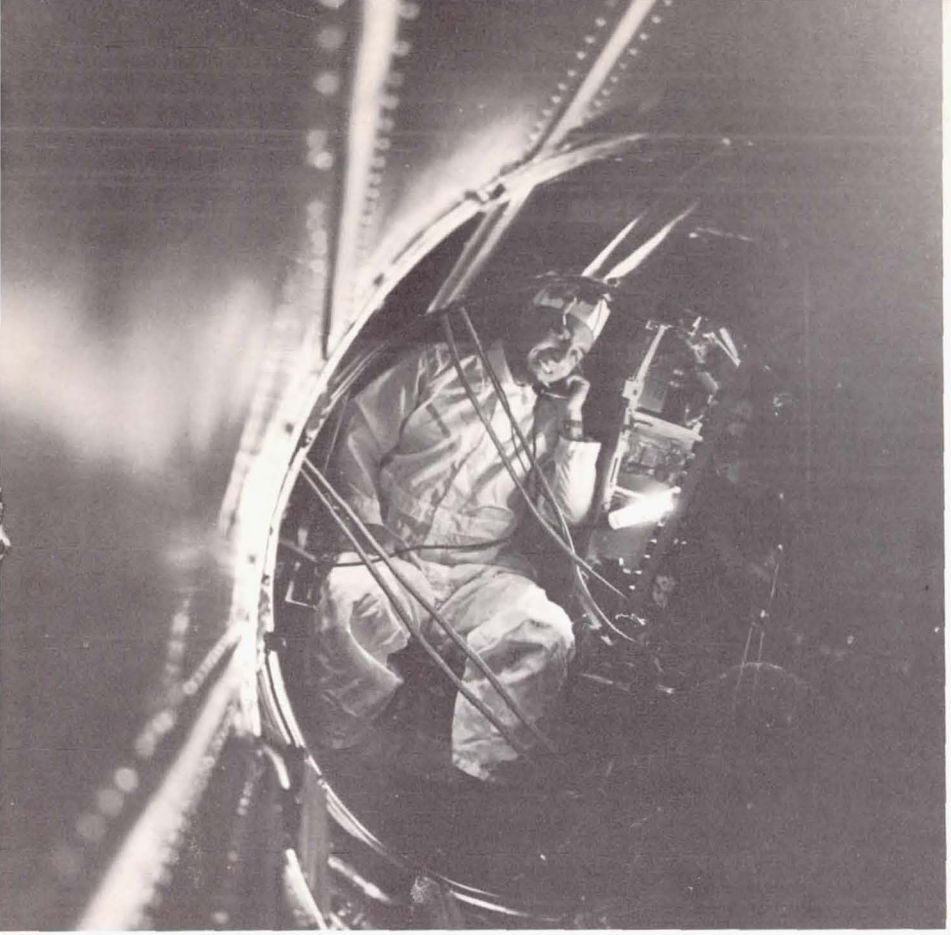
BELOW: Mercury astronauts hear a General Dynamics/Astronautics engineer give a briefing on one phase of the checkout briefing. Checkout tests of the spacecraft and launch vehicle are a part of normal inspection prior to flights.



Perhaps the most often overlooked of the training phases of the flight personnel is the ground training and its importance to the success of the overall space program. The astronauts participate actively in the countdown procedures, ground flight monitoring procedures, and recovery and survival techniques. They have played important roles in flights to date as ground communicators with the astronaut making the flight, and are eminently qualified to do so on several counts since they are so well acquainted with both the mission pilot and the many spacecraft systems.

Physical condition is very important to insure that performance does not deteriorate under various types of stresses. Since all the pilots entered the program in good physical health, each is allowed to undertake a voluntary physical fitness program tailored to his own needs. All of them swim in addition to their other daily exercises which vary with the individual. John Glenn, for instance, runs, while Al Shepard lifts weights.

One of the biggest problems to be faced by the flight personnel is the maintenance of flight skills. Due to the nature of the space programs, only a limited amount of actual flight time in space can be anticipated for any pilot over a period of years. In recognition of this and to maintain current pilot skills, flight personnel have been provided high performance aircraft and fly them regularly.



ABOVE: ASTRONAUT VIRGIL I. "GUS" GRISSOM checks various points with engineers and technicians during a spacecraft test at Hangar S.

BELOW: ASTRONAUT GORDON COOPER maintains a close watch over the progress of a simulated flight of Schirra during one of the many procedures trainer tests performed prior to the latter's six-orbit flight.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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