

A Calendar of Space Flight: Man's Countdown for the Moon

The first trips look modest now — lone men strapped in tiny capsules, 15-minute suborbital flights or cautious whirls around the earth, all bound by gravity to come home again. They are modest only by comparison, of course. At the time those early trips were enormously exciting and seemed incredibly adventurous. Starting with Vostok 1 in 1961, each gave impetus to the next, each compounding the sophistication of space technology, each expanding the boldness of the goal. Rockets grew from the slender Mercury Redstone to the overwhelming Saturn V that launched Apollo 11. Flights around the earth grew to voyages around the moon, and walks in space led to steps upon the lunar surface. The effort has been enormous, demanding the best from hundreds of thousands of men and women. The cost has been great: the United States has spent \$51 billion exploring space, the Soviet Union a comparable amount. And there has been sacrifice; four men have died testing the limits of equipment and techniques. Since 1961 the two countries have launched 33 manned space flights. In them were the 40 cosmonauts and astronauts pictured on these pages, every one of whom has helped mankind reach out and touch the moon.



Technicians made adjustments in Vostok 1



Gagarin rode to launch pad in special van



A hero's welcome from Premier Khrushchev



April 12, 1961
VOSTOK 1

The first man to fly in space was Soviet pilot Yuri Gagarin. A 125-foot rocket hurled him once around the earth, more than 200 miles high at 17,000 miles an hour. After 89 minutes in orbit, Gagarin fired braking rockets, plunging the Vostok ("East") capsule back into the atmosphere. Parachutes cushioned its fall to the earth, and Gagarin stepped out "without a bruise." The Soviets led the space race, and Premier Khrushchev boasted, "Let the capitalist countries try to catch up."



Alan Shepard in first Mercury capsule



On the deck of the U.S.S. "Lake Champlain"



May 5, 1961
MERCURY 3

The first American space flight was suborbital; that is, pilot Alan Shepard was thrown up into space and back again in a ballistic trajectory. The Mercury Redstone rocket pushed the 4,265-pound spacecraft to a speed of 5,100 miles an hour and an altitude of 115 miles. Shepard's capsule, which he had named "Freedom 7" (the number 7 was used on these first capsules by Mercury astronauts), landed in the Atlantic 300 miles from the Cape Canaveral (now Kennedy) launch site. The trip took 15 minutes.



Grissom was rescued as capsule sank



Medics checked him out on carrier



July 21, 1961
MERCURY 4

Gus Grissom's suborbital flight was almost identical to Alan Shepard's, except that Grissom's space capsule was never recovered. Just after splash-down, an escape hatch was unexpectedly blown open and the capsule, "Liberty Bell 7," began to fill with water. Grissom jumped free and was plucked from the sea by a helicopter. Moments later the capsule and all its instruments sank.



Titov was jubilant after 17-orbit flight



Television monitored him in space



He lifted off from cosmodrome in central Russia



The second manned Soviet craft stayed aloft for 17 orbits, giving pilot Gherman Titov 25 hours in space. He slept eight hours, ate three meals and twice used manual controls to change the angle of his space capsule. He was stunned by the colors of the earth and more than once rejoiced: "I am Eagle, I am Eagle!" His orbits crisscrossed most of the earth—including the United States, which led some in Congress to worry anew about the military uses of space.

August 6, 1961
VOSTOK 2



Glenn's launch at Cape Canaveral



Strapped in, Glenn waited for blast-off



New York welcomed Glenn, wife and L.B.J.



By the time "Friendship 7" and John Glenn splashed down safely, both had become household words. For two months, 10 separate delays had jeopardized America's first orbital flight. But at last the mission succeeded. Boosted into space atop a new, more powerful rocket, the Atlas, Glenn circled the earth three times. His hero's reception was enormous, with parades in New York and in Washington, where he also made a special address to Congress.

February 20, 1962
MERCURY 6



Crewman helped Carpenter with flight suit



Carpenter in mission simulator



Caribbean splashdown was far from target



President Kennedy phoned congratulations



Scott Carpenter's voyage was similar to Glenn's—three turns around the earth in about five hours. Like Glenn, Carpenter saw ice crystal "fireflies." But unlike Glenn's, Carpenter's was a continuously troubled flight. His suit overheated, instruments gave faulty readings, and the craft ran low on fuel. The re-entry rockets didn't fire on time, and when they did fire, smoke filled the cabin. Out of contact with the recovery forces, Carpenter splashed down 250 miles from the target area, and spent nearly three hours on a life raft waiting for a helicopter.

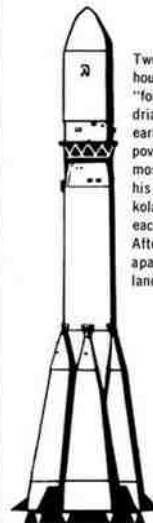
May 24, 1962
MERCURY 7



Andrian Nikolayev piloted Soviet Vostok 3



Pavel Popovich, the pilot of Vostok 4



Two Soviet pilots, launched 24 hours apart, were the first to fly "formation" in space. After Andrian Nikolayev orbited the earth alone 16 times, Pavel Popovich was launched into an almost identical orbit and brought his ship within four miles of Nikolayev's. The two could see each other, and talked by radio. After a few orbits they drifted apart, and three days later both landed safely in central Russia.

August 11 & 12, 1962
VOSTOK 3
VOSTOK 4



Automatic camera recorded Schirra's flight



Capsule was lifted to deck of "Kearsarge"



Navy man Schirra was welcomed aboard



Last Mercury flight leaves launch pad



Cooper grinned after 22-orbit flight



Headed for hot food aboard the "Kearsarge"



Bykovsky before his five-day flight



Cosmonauts Bykovsky and Tereshkova embraced



Valentina Tereshkova before flight



The only woman to fly in space

Walter Schirra and "Sigma 7" circled the earth nearly six times in nine hours, then splashed down safely in the Pacific. His orbits were oblong, taking him as high as 176 miles and as low as 100. He landed four miles from the aircraft carrier "Kearsarge," and the capsule—with Schirra inside—was plucked out of the water by a huge Navy crane. The flight, a test of his and the capsule's endurance, was practically trouble-free.



October 3, 1962
MERCURY 8

The last flight in the Mercury series was manned by Gordon Cooper, who piloted his "Faith 7" capsule around the earth 22 times in 34 hours. Cooper was remarkably relaxed—he dozed while waiting for blast-off—and his mission was largely successful. He took color photographs and movies of the earth and sent the first TV pictures from an American spacecraft. When automatic reentry devices failed, Cooper took the controls and piloted the capsule back to earth.

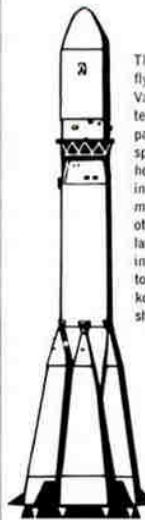


May 15, 1963
MERCURY 9



June 14, 1963
VOSTOK 5

Soviet cosmonaut Valery Bykovsky spent nearly five days in space studying the effects of long-term weightlessness. During that time he circled the earth 81 times, gradually slowing in the outer edges of the atmosphere until further orbits became impractical. Like several other Soviet pilots, Bykovsky reentered the atmosphere inside his spacecraft, then ejected at an altitude of several miles and parachuted to earth.



June 16, 1963
VOSTOK 6

The first—and only—woman to fly in space was 26-year-old Valentina Tereshkova, a textile technologist whose interest in parachuting led her to apply for space training. Launched 48 hours after Vostok 5, she stayed in orbit for three days, and communicated by radio with the other spacecraft. She, too, landed safely by parachute, and in early November married Vostok 3 commander Andrian Nikolayev. The following summer she gave birth to a daughter.



Feoktistov, Komarov and Yegorov



Leonov, Belyayev in Voskhod 2 cabin



Bulky suit, gloves made work awkward



Leonov floated freely in first space "walk"



Titan II rocket powered first Gemini



Young and Grissom waited out countdown



Ed White spacewalked during third orbit



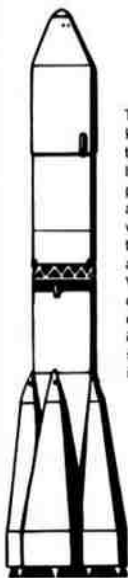
Snaking lifeline fed air, communications



He floated 120 miles above California



White and McDivitt aboard carrier "Wasp"



The first flight of the Soviet Voskhod ("Sunrise") series took three men into space for 24 hours. The crew space was pressurized and air-conditioned, and the three men wore lightweight wool coveralls instead of the bulky, inflated suits used by all previous space travelers. Vladimir Komarov piloted the craft during its 16 orbits of the earth, while space doctor Boris Yegorov and scientist Konstantin Feoktistov—both civilians—conducted experiments.

October 12, 1964
VOSKHOD 1



As his ship raced around the earth at 17,500 mph, Aleksei Leonov stepped out of a double air lock to become the first man to "walk" in space. Inside the pressurized cabin, pilot Pavel Belyayev watched Leonov's 10-minute walk and reentry by television. At the end of their 17-orbit flight, the two overshot the touchdown site and landed in five feet of snow in the Ural Mountains, where it took rescuers two days to reach them.

March 18, 1965
VOSKHOD 2



The first in a long series of two-man Gemini flights, powered by the new Titan II rocket, was a three-orbit ride by veteran astronaut Gus Grissom—the first man to travel in space twice—and John Young. Three times during the five-hour flight, Grissom changed the capsule's orbit—the first occasion a manned spacecraft had altered course. Grissom, alluding to his sunken Mercury capsule, nicknamed the 7,000-pound ship "The Unsinkable Molly Brown," and she floated just fine.

March 23, 1965
GEMINI 3



During the spacecraft's third orbit of earth, astronaut Ed White opened the hatch and stepped out—thus becoming the first American man to "walk" in space. Unlike the Russian flight three months earlier, the Gemini capsule remained opened during the walk, requiring pilot James McDivitt to wear a pressurized suit as well. White floated for 20 minutes, connected to the spacecraft by a 25-foot tether supplying oxygen and communications. He maneuvered around the outside of the capsule using a small jet gun for propulsion.

June 3, 1965
GEMINI 4



Conrad (left), Cooper rehearsed mission



Plan included photographs of earth weather



Conrad kidded Cooper after splashdown



August 21, 1965
GEMINI 5

The third manned flight in the Gemini series was an endurance trial that subjected Charles Conrad and Gordon Cooper to eight days in space, during which they circled the earth 120 times and traveled a distance of three million miles. The astronauts practiced rendezvous navigation techniques with an imaginary target; problems with the thruster rockets forced cancellation of several other exercises. Both men lost weight in space—an average of a pound a day—and grew heavy beards.



Gemini 7 photographed from Gemini 6



Formation flying at 17,500 miles an hour



Borman and Lovell after two weeks in space



Stafford, Schirra quizzed by reporters



December 4 & 15, 1965
GEMINI 6 & 7

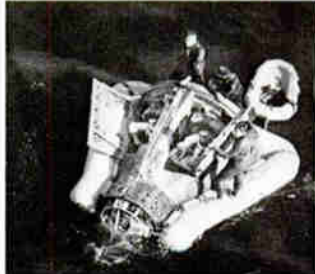
Gemini 7 took off first, sending Frank Borman and James Lovell on a two-week endurance mission that took them around the earth 206 times. Toward the middle of that journey, Gemini 6—whose launch had been delayed—lifted into space for a 185-mile-high rendezvous with the other spacecraft. Walter Schirra and Tom Stafford navigated to within six feet of Gemini 7 and the two spacecraft flew in tight formation for six hours.



Gemini 8 prepared to dock with Agena



Scott (left), Armstrong before countdown

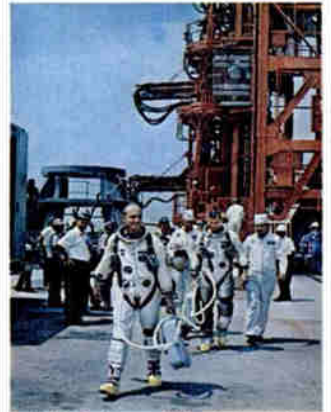


Runaway thruster forced early splashdown



March 16, 1966
GEMINI 8

Following the navigational instructions of copilot David Scott, Neil Armstrong was able to find and follow a 26-foot Agena "target" rocket that had been put into space over an hour earlier. Then Armstrong coupled the Gemini capsule to the Agena, but minutes later one of the Gemini's tiny maneuvering thrusters began firing uncontrollably, sending the two linked spacecraft into alarming gyrations. Armstrong pulled away from the Agena and shut off the errant thruster, and the rest of the mission was canceled.



Stafford and Cernan at Kennedy launch site



Attempted Agena docking was unsuccessful



Stafford (left), Cernan talked with L.B.J.



June 3, 1966
GEMINI 9

Tom Stafford and Eugene Cernan were to try another "docking" in space, but found that a protective covering on the 11-foot unmanned "target" craft kept them from actually linking up. Later in the three-day mission, Cernan stepped outside for a record two-hour space "walk." The flight plan called for Cernan to use a backpack for oxygen and communications part of the time. But Cernan became tired and the pack's radio failed, so that plan was dropped.



Docked Agena's antenna seen from Gemini



Gemini partners Young and Collins



July 18, 1966
GEMINI 10

On this flight the Gemini capsule quickly found the rendezvous target—an unmanned Agena—and docked perfectly. Thus attached, the Gemini used the Agena's still-active engines to push itself into a record orbit, 475 miles high at its peak. Later the Gemini flew to a rendezvous with another Agena. While John Young piloted, Mike Collins twice walked in space, recovering a detachable measuring device from the second Agena, but losing a \$470 Hasselblad camera in the process.



Conrad, Gordon began trip to space capsule



Agena target rocket floated 100 feet away



Gordon's spacewalk proved exhausting



September 12, 1966
GEMINI 11

During their first orbit, Pete Conrad and Richard Gordon were able to dock with an Agena rocket. Gordon later walked outside of the Gemini and attached a 100-foot rope between the capsule and the Agena. Further spacewalking was cut short because of Gordon's exhaustion. Later the Gemini undocked, backed away until the rope was taut, then began orbiting around the Agena until both craft were spinning around each other, like the ends of a baton, creating a temporary gravity in weightless space.



Buzz Aldrin took pictures from capsule door



Jim Lovell piloted last Gemini flight



November 11, 1966
GEMINI 12

The last flight in the Gemini series included several successful dockings with an Agena rocket and a series of open-door maneuvers by copilot Buzz Aldrin. While James Lovell kept the capsule steady, Aldrin twice leaned halfway out of the spacecraft, taking pictures and doing exercises. Aldrin also left the capsule completely for more than two hours, working at the end of a 25-foot tether, and beating the fatigue suffered by others by taking regular rests.



Chaffee, White, Grissom training in Apollo



Wreckage of fire that killed them



January 27, 1967
APOLLO FIRE

America's space program received a major setback in a tragic fire three weeks before the scheduled launch of the first three-man Apollo spacecraft. The fire apparently started in some wiring, and in the sealed capsule environment of pure oxygen the three astronauts inside—Gus Grissom, Ed White and Roger Chaffee—died quickly, near the seats in which they had been simulating a flight. The tragedy brought U.S. space exploration to a stunned halt. It forced a substantial redesign of the Apollo, as well as a thorough restudy of procedures.



Vladimir Komarov, suited up for launch



In Moscow, a hero's funeral in Red Square



Donn Eisele grinned for his photograph



Walter Cunningham was systems expert



Mission commander and pilot Wally Schirra



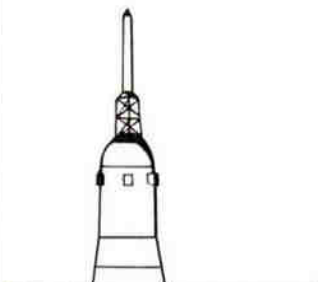
Soyuz 3 rocket en route to launch site



Recovery of massive landing parachutes



Pilot Georgi Beregovoi became a major general



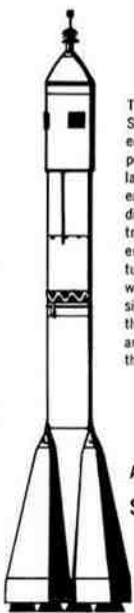
"Earth-rise," photographed from the moon



Capsule was recovered by U.S.S. "Yorktown"

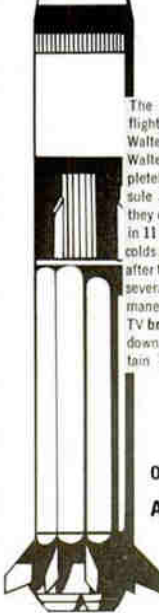


Anders, Borman, Lovell talked with L.B.J.



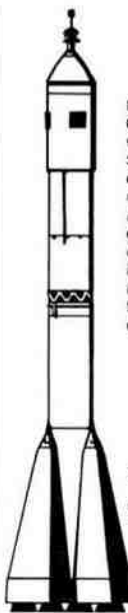
April 23, 1967
SOYUZ 1

The first flight of the Soviet Soyuz ("Union") series also ended in death. The 15,000-pound capsule was successfully launched into a near-circular earth orbit, but soon pilot Vladimir Komarov had trouble controlling its motions. After several orbits the spaceship began tumbling badly and Komarov was ordered to end the mission. Four miles above the earth the parachute lines snarled, and the capsule plunged to the ground, killing Komarov.



October 11, 1968
APOLLO 7

The first American manned flight after the fire was made by Walter Schirra, Donn Eisele and Walter Cunningham. In a completely redesigned space capsule atop a Saturn IB rocket, they circled the earth 163 times in 11 days, despite severe head colds all three developed shortly after the launch. The crew made several complicated rendezvous maneuvers, and staged seven TV broadcasts. Only the splash-down was marred; Navy Captain Schirra became seasick.



October 26, 1968
SOYUZ 3

During his four days in orbit Georgi Beregovoi twice rendezvoused with an unmanned Soyuz capsule which had preceded him into space. But he made no attempt to dock with it. After 64 orbits he returned to earth, using his capsule's aerodynamic design to soften the impact with the atmosphere. Parachutes then eased the ship to the ground. At 47, he was the oldest man to fly in space.

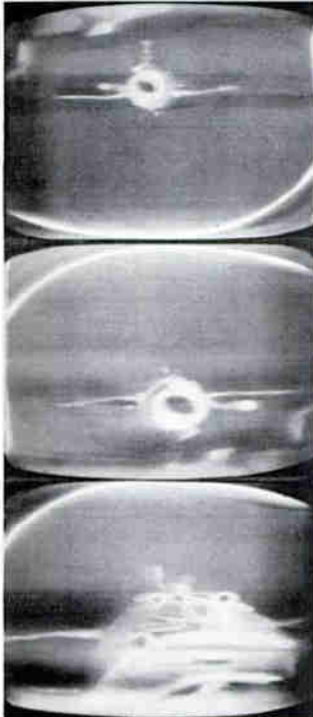


Dec. 21, 1968
APOLLO 8

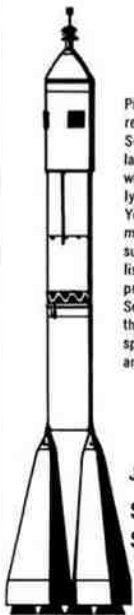
The flight was both a reconnaissance of the moon and a test of the technology and equipment necessary to get there. It was also the first manned test of the gigantic Saturn V rocket, with its 7½ million pounds of lift-off thrust. The spacecraft, with crewmen Frank Borman, James Lovell and William Anders, left earth orbit shortly after lift-off and reached the moon three days later. They circled it ten times, then returned to earth and a safe landing. While in the moon orbit, the crew looked for landing sites and broadcast TV shows, including a Christmas Eve reading of Genesis.



Khrunov, Yeliseyev, Shatalov and Volynov



Soyuz 4 approached, then docked with Soyuz 5



Pilot Vladimir Shatalov was already orbiting the earth alone in Soyuz 4 when Soyuz 5 was launched. In the second craft were three crewmen—Boris Volynov, Aleksei Yeliseyev and Yevgeni Khrunov. After lengthy maneuvers, the two Soyuz capsules docked in space, and Yeliseyev and Khrunov, wearing pressurized suits, walked from Soyuz 5 to Soyuz 4. The ships then separated—the first two spacecraft to have met in orbit and exchanged passengers.

January 14 & 15, 1969
SOYUZ 4
SOYUZ 5



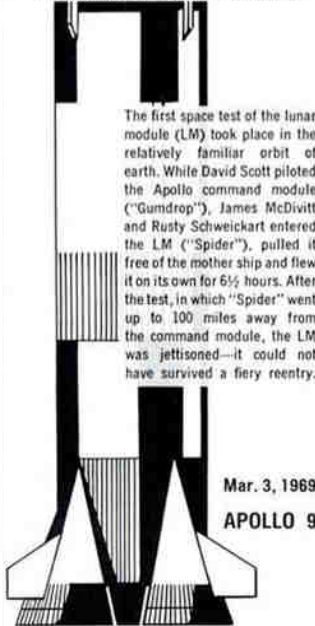
Schweickart, McDivitt, Scott, before launch



LM floated free 145 miles above Atlantic

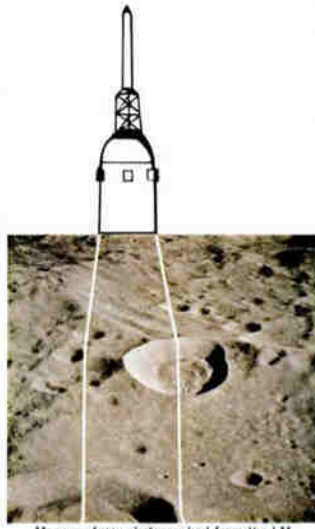


Scott in "Gumdrop" doorway, seen from LM



The first space test of the lunar module (LM) took place in the relatively familiar orbit of earth. While David Scott piloted the Apollo command module ("Gumdrop"), James McDivitt and Rusty Schweickart entered the LM ("Spider"), pulled it free of the mother ship and flew it on its own for 6½ hours. After the test, in which "Spider" went up to 100 miles away from the command module, the LM was jettisoned—it could not have survived a fiery reentry.

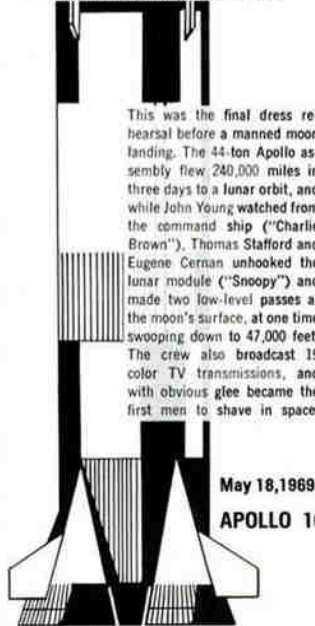
Mar. 3, 1969
APOLLO 9



Moon surface, photographed from the LM



Cernan, Young, Stafford, of Apollo 10



This was the final dress rehearsal before a manned moon landing. The 44-ton Apollo assembly flew 240,000 miles in three days to a lunar orbit, and while John Young watched from the command ship ("Charlie Brown"), Thomas Stafford and Eugene Cernan unhooked the lunar module ("Snoopy") and made two low-level passes at the moon's surface, at one time swooping down to 47,000 feet. The crew also broadcast 19 color TV transmissions, and with obvious glee became the first men to shave in space.

May 18, 1969
APOLLO 10



July 16, 1969
APOLLO 11