

# The Missions of Apollo

**Dates:** 1967 - 1972

**Vehicles:** *Saturn IB* and *Saturn V* launch vehicles  
*Apollo* command/service module  
 Lunar module

**Number of People Flown:** 33

**Highlights:** First humans to leave Earth orbit  
 First human landing on the Moon

## Apollo 7

October 11-22, 1968

Crew: Walter M. Schirra, Jr., Donn F. Eisele, Walter Cunningham

*Apollo 7* was a confidence-builder. After the January 1967 *Apollo* launch pad fire, the *Apollo* command module had been extensively redesigned. Schirra, the only astronaut to fly *Mercury*, *Gemini* and *Apollo* missions, commanded this Earth-orbital shakedown of the command and service modules. With no lunar lander, *Apollo 7* was able to use the *Saturn IB* booster rather than the giant *Saturn V*. The *Apollo* hardware and all mission operations worked without any significant problems, and the Service Propulsion System (SPS)—the all-important engine that would place *Apollo* in and out of lunar orbit—made eight nearly perfect firings. Even though *Apollo's* larger cabin was more comfortable than *Gemini's*, eleven days in orbit took its toll on the astronauts. The food was bad, and all three developed colds. But their mission proved the spaceworthiness of the basic *Apollo* vehicle.

## Apollo 8

December 21-27, 1968

Crew: Frank Borman, James A. Lovell, Jr., William A. Anders

The *Apollo 8* astronauts were the first human beings to venture beyond low Earth orbit and visit another world. What was originally to have been an Earth-orbit checkout of the lunar lander became instead a race with the Soviets to become the first nation to orbit the Moon. The *Apollo 8* crew rode inside the command module, with no lunar lander attached. They were the first astronauts to be launched by the *Saturn V*, which had flown only twice before. The booster worked perfectly, as did the SPS engines that had been checked out on *Apollo 7*. *Apollo 8* entered lunar orbit on the morning of December 24, 1968. For the next 20 hours the astronauts circled the Moon, which appeared out their windows as a gray, battered wasteland. They took photographs, scouted future landing sites, and on Christmas Eve read from the Book of Genesis to TV viewers back on Earth. They also photographed the first Earthrise as seen from the Moon. *Apollo 8* proved the ability to navigate to and from the Moon, and gave a tremendous boost to the entire *Apollo* program.

## Apollo 9

March 3-13, 1969

Crew: James A. McDivitt, David R. Scott, Russell L. Schweickart

*Apollo 9* was the first space test of the third critical piece of *Apollo* hardware—the lunar module. For ten days, the astronauts put all three *Apollo* vehicles through their paces in Earth orbit, undocking and then redocking the lunar lander with the command module, just as they would in lunar orbit. For this and all subsequent *Apollo* flights, the crews were allowed to name their own spacecraft. The gangly lunar module was “Spider,” the command module “Gumdrop.” Schweickart and Scott performed a spacewalk, and Schweickart checked out the new *Apollo* spacesuit, the first to have its own life support system rather than being dependent on an umbilical connection to the spacecraft. *Apollo 9* gave proof that the *Apollo* machines were up to the task of orbital rendezvous and docking.

## Apollo 10

May 18-26, 1969

Crew: Thomas P. Stafford, John W. Young, Eugene A. Cernan

This dress rehearsal for a Moon landing brought Stafford and Cernan’s lunar module—nicknamed “Snoopy”—to within nine miles of the lunar surface. Except for that final stretch, the mission went exactly as a landing would have, both in space and on the ground, where *Apollo’s* extensive tracking and control network was put through a dry run. Shortly after leaving low Earth orbit, the LM and the command/service module separated, then redocked, top to top. Upon reaching lunar orbit, they separated again. While Young orbited the Moon alone in his command module “Charlie Brown,” Stafford and Cernan checked out the LM’s radar and ascent engine, rode out a momentary gyration in the lunar lander’s motion (due to a faulty switch setting), and surveyed the *Apollo 11* landing site in the Sea of Tranquility. This test article of the lunar module was not equipped to land, however. *Apollo 10* also added another first—broadcasting live color TV from space.

## Apollo 11

July 16-24, 1969

Crew: Neil A. Armstrong, Michael Collins, Edwin E. “Buzz” Aldrin, Jr.

Half of *Apollo’s* primary goal—a safe return—was achieved at 4:17 p.m. Eastern Daylight Time on July 20, when Armstrong piloted “Eagle” to a touchdown on the Moon, with less than 30 seconds worth of fuel left in the lunar module. Six hours later, Armstrong took his famous “one giant leap for mankind.” Aldrin joined him, and the two spent two-and-a-half hours drilling core samples, photographing what they saw and collecting rocks. After more than 21 hours on the lunar surface, they returned to Collins on board “Columbia,” bringing 20.87 kilograms of lunar samples with them. The two Moon-walkers had left behind scientific instruments, an American flag and other mementos, including a plaque bearing the inscription: “Here Men From Planet Earth First Set Foot Upon the Moon. July 1969 A.D. We came in Peace For All Mankind.”

## Apollo 12

November 14-24, 1969

Crew: Charles "Pete" Conrad, Jr., Richard F. Gordon, Jr., Alan L. Bean

The second lunar landing was an exercise in precision targeting. The descent was automatic, with only a few manual corrections by Conrad. The landing, in the Ocean of Storms, brought the lunar module "Intrepid" within walking distance—182.88 meters—of a robot spacecraft that had touched down there two-and-a-half years earlier. Conrad and Bean brought pieces of the *Surveyor 3* back to Earth for analysis, and took two Moon-walks lasting just under four hours each. They collected rocks and set up experiments that measured the Moon's seismicity, solar wind flux and magnetic field. Meanwhile Gordon, on board the "Yankee Clipper" in lunar orbit, took multispectral photographs of the surface. The crew stayed an extra day in lunar orbit taking photographs. When "Intrepid's" ascent stage was dropped onto the Moon after Conrad and Bean rejoined Gordon in orbit, the seismometers the astronauts had left on the lunar surface registered the vibrations for more than an hour.

## Apollo 13

April 11-17, 1970

Crew: James A. Lovell, Jr., Fred W. Haise, Jr., John L. Swigert, Jr.

The crew's understated radio message to Mission Control was "Okay, Houston, we've had a problem here." Within 321,860 kilometers of Earth, an oxygen tank in the service module exploded. The only solution was for the crew to abort their planned landing, swing around the Moon and return on a trajectory back to Earth. Since their command module "Odyssey" was almost completely dead, however, the three astronauts had to use the lunar module "Aquarius" as a crowded lifeboat for the return home. The four-day return trip was cold, uncomfortable and tense. But *Apollo 13* proved the program's ability to weather a major crisis and bring the crew back home safely.

## Apollo 14

January 31-February 9, 1971

Crew: Alan B. Shepard, Jr., Stuart A. Roosa, Edgar D. Mitchell

After landing in the Fra Mauro region—the original destination for *Apollo 13*—Shepard and Mitchell took two Moon-walks, adding new seismic studies to the by-now familiar *Apollo* experiment package, and using a "lunar rickshaw" pull-cart to carry their equipment. A planned rock-collecting trip to the 1,000-foot-wide Cone Crater was dropped, however, when the astronauts had trouble finding their way around the lunar surface. Although later estimates showed that they had made it to within 30.48 meters of the crater's rim, the explorers had become disoriented in the alien landscape. Roosa, meanwhile, took pictures from on board command module "Kitty Hawk" in lunar orbit. On the way back to Earth, the crew conducted the first U.S. materials processing experiments in space. The *Apollo 14* astronauts were the last lunar explorers to be quarantined on their return from the Moon.

## Apollo 15

July 26-August 7, 1971

Crew: David R. Scott, James B. Irwin, Alfred M. Worden

The first of the longer, expedition-style lunar landing missions was also the first to include the lunar rover, a carlike vehicle that extended the astronauts' range. The lunar module *Falcon* touched down near the sinuous channel known as Hadley Rille, Scott and Irwin rode more than 27.36 kilometers in their rover, and had a free hand in their geological field studies compared to earlier lunar astronauts. They brought back one of the prize trophies of the *Apollo* program—a sample of ancient lunar crust nicknamed the “Genesis Rock.” *Apollo 15* also launched a small subsatellite for measuring particles and fields in the lunar vicinity. On the way back to Earth, Worden, who had flown solo on board *Endeavour* while his crewmates walked on the surface, conducted the first space-walk between Earth and the Moon to retrieve film from the side of the spacecraft.

## Apollo 16

April 16-27, 1972

Crew: John W. Young, Thomas K. Mattingly II, Charles M. Duke, Jr.

A malfunction in the main propulsion system of the lunar module “Orion” nearly caused their Moon landing to be scrubbed, but Young and Duke ultimately spent three days exploring the Descartes highland region, while Mattingly circled overhead in “Casper.” What was thought to have been a region of volcanism turned out not to be, based on the astronauts' discoveries. Their collection of returned specimens included a 11.34 kilograms chunk that was the largest single rock returned by the *Apollo* astronauts. The *Apollo 16* astronauts also conducted performance tests with the lunar rover, at one time getting up to a top speed of 17.70 kilometers per hour.

## Apollo 17

December 7-19, 1972

Crew: Eugene A. Cernan, Ronald E. Evans, Harrison H. “Jack” Schmitt

The last man to set foot on the Moon was also the first scientist—astronaut/geologist Harrison Schmitt. While Evans circled in “America,” Schmitt and Cernan collected a record 108.86 kilograms of rocks during three Moon-walks. The crew roamed for 33.80 kilometers through the Taurus-Littrow valley in their rover, discovered orange-colored soil, and left behind a plaque attached to their lander *Challenger*, which read: “Here Man completed his first exploration of the Moon, December 1972 A.D. May the spirit of peace in which we came be reflected in the lives of all mankind.” The *Apollo* lunar program had ended.

# Apollo Statistics

Spacecraft	Launch Date	Crew	Flight Time (days:hrs:min)	Highlights
Apollo 1	Jan. 27, 1967	Virgil I. Grissom Edward H. White, II Roger Chafee		Planned as first manned Apollo Mission; fire during ground test on 1/27/67 took lives of astronauts; posthumously designated as Apollo 1.
There were no missions designated as Apollo 2 and Apollo 3.				
Apollo 4	Nov. 4, 1967	Unmanned	0:9:37	First flight of Saturn V launch vehicle. Placed unmanned Apollo command and service module in Earth orbit.
Apollo 5	Jan. 22, 1968	Unmanned	0:7:50	Earth orbital flight test of unmanned Lunar Module. Not recovered.
Apollo 6	April 4, 1968	Unmanned	0:9:57	Second unmanned test of Saturn V and Apollo.
Apollo 7	Oct. 11, 1968	Walter M. Schirra, Jr. Donn F. Eisele R. Walter Cunningham	10:20:9	First U.S. 3-person mission.
Apollo 8	Dec. 21, 1968	Frank Borman James A. Lovell, Jr. William A. Anders	6:3:1	First human orbit(s) of Moon; first human departure from Earth's sphere of influence; highest speed attained in human flight to date.
Apollo 9	Mar. 3, 1969	James A. McDivitt David R. Scott Russell L. Schweickart	10:1:1	Successfully simulated in Earth-orbit operation of lunar module to landing and takeoff from lunar surface and rejoining with command module.
Apollo 10	May 18, 1969	Thomas P. Stafford John W. Young Eugene A. Cernan	8:0:3	Successfully demonstrated complete system including lunar module to 14,300 m. from the lunar surface.
Apollo 11	July 16, 1969	Neil A. Armstrong Michael Collins Edwin E. Aldrin, Jr.	8:3:9	First human landing on lunar surface and safe return to Earth. First return of rock and soil samples to Earth, and human deployment of experiments on lunar surface.
Apollo 12	Nov. 14, 1969	Charles Conrad, Jr. Richard F. Gordon, Jr. Alan L. Bean	10:4:36	Second human lunar landing Explored surface of Moon and retrieved parts of Surveyor 3 spacecraft, which landed in Ocean of Storms on Apr. 19, 1967.
Apollo 13	Apr. 11, 1970	James A. Lovell, Jr. Fred W. Haise, Jr. John L. Swigert, Jr.	5:22:55	Mission aborted; explosion in service module. Ship circled, Moon, with crew using LM as "lifeboat" until just before reentry.
Apollo 14	Jan. 31, 1971	Alan B. Shepard, Jr. Stuart A. Roosa Edgar D. Mitchell	9:0:2	Third human lunar landing. Mission demonstrated pinpoint landing capability and continued human exploration.
Apollo 15	July 26, 1971	David R. Scott Alfred M. Worden James B. Irwin	12:7:12	Fourth human lunar landing and first Apollo "J" series mission, which carried Lunar Roving Vehicle. Worden's inflight EVA of 38 min. 12 sec was performed during return trip.
Apollo 16	Apr. 16, 1972	John W. Young Charles M. Duke, Jr. Thomas K. Mattingly II	11:1:51	Fifth human lunar landing, with Lunar Roving Vehicle.
Apollo 17	Dec. 7, 1972	Eugene A. Cernan Harrison H. Schmitt Ronald E. Evans	12:13:52	Sixth and final Apollo human lunar landing, again with roving vehicle.