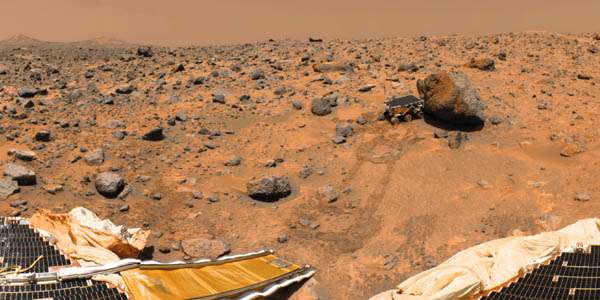
**Major milestones**

The first artificial [Earth satellite](https://www.britannica.com/technology/Earth-satellite), [Sputnik](https://www.britannica.com/technology/Sputnik) 1, was launched by the Soviet Union on October 4, 1957. The first human to go into space, [Yury Gagarin](https://www.britannica.com/biography/Yuri-Gagarin), was launched, again by the Soviet Union, for a one-orbit journey around [Earth](https://www.britannica.com/place/Earth) on April 12, 1961. Within 10 years of that first human flight, American astronauts walked on the surface of the Moon. [Apollo](https://www.britannica.com/science/Apollo-space-program) 11 crew members [Neil Armstrong](https://www.britannica.com/biography/Neil-Armstrong) and [Edwin (“Buzz”) Aldrin](https://www.britannica.com/biography/Buzz-Aldrin) made the first lunar landing on July 20, 1969. A total of 12 Americans on six separate Apollo missions set foot on the Moon between July 1969 and December 1972. Since then, no humans have left Earth orbit, but more than 500 men and women have spent as many as 438 consecutive days in space. Starting in the early 1970s, a series of Soviet (Russian from December 1991) [space stations](https://www.britannica.com/technology/space-station), the U.S. [Skylab](https://www.britannica.com/topic/Skylab) station, and numerous [space shuttle](https://www.britannica.com/technology/space-shuttle) flights provided Earth-orbiting bases for varying periods of human occupancy and activity. From November 2, 2000, when its first crew took up residence, to its completion in 2011, the [International Space Station](https://www.britannica.com/topic/International-Space-Station) (ISS) served as a base for humans living and working in space on a permanent basis. It will continue to be used in this way until at least 2024.

[](https://cdn.britannica.com/32/69632-050-AA671F9E/space-shuttle-Endeavour-International-Space-Station-spacecraft-December-9-2000.jpg)

The International Space Station, imaged from the space shuttle *Endeavour* on December 9, 2000, after installation of a large solar array (long horizontal panels). Major elements of the partially completed station included (front to back) the American-built connecting node Unity and two Russian-built modules—Zarya, a propulsion and power module, and Zvezda, the initial habitat. A Russian Soyuz TM spacecraft, which carried up the station's first three-person crew, is shown docked at the aft end of Zvezda.*National Aeronautics and Space Administration*

Since 1957 Earth-orbiting satellites and robotic [spacecraft](https://www.britannica.com/technology/spacecraft) journeying away from Earth have gathered valuable data about the [Sun](https://www.britannica.com/place/Sun), Earth, other bodies in the solar system, and the universe beyond. Robotic spacecraft have landed on the [Moon](https://www.britannica.com/place/Moon), [Venus](https://www.britannica.com/place/Venus-planet), [Mars](https://www.britannica.com/place/Mars-planet), [Titan](https://www.britannica.com/place/Titan-astronomy), a comet, and three asteroids, have visited all the major planets, and have flown by [Kuiper belt](https://www.britannica.com/place/Kuiper-belt) objects and by the nuclei of comets, including [Halley’s Comet](https://www.britannica.com/topic/Halleys-Comet), traveling in the inner solar system. Scientists have used space-derived data to deepen human understanding of the origin and [evolution](https://www.britannica.com/science/evolution-scientific-theory) of galaxies, stars, planets, and other cosmological phenomena.

[](https://cdn.britannica.com/72/22072-004-5D4F9F04/NASA-rover-Pathfinder-Sojourner-boulder-planet-Chryse-July-4-1997.jpg)

NASA's Sojourner robotic rover examining a boulder on Mars's Chryse Planitia, as imaged by its parent spacecraft, Pathfinder, after landing on the planet July 4, 1997. Parts of Pathfinder's solar arrays and the rover's down ramp are in the foreground.*JPL/NASA*

Orbiting satellites also have provided, and continue to provide, important services to the everyday life of many people on Earth. Meteorologic satellites deliver information on short- and long-term weather patterns and their underlying causes. Other Earth-observation satellites remotely sense land and ocean areas, gathering data that improve management of Earth’s resources and that help in understanding global [climate change](https://www.britannica.com/science/climate-change). Telecommunications satellites allow essentially instantaneous transfer of voice, images, and data on a global basis. Satellites operated by the [United States](https://www.britannica.com/place/United-States), [Russia](https://www.britannica.com/place/Russia), and [China](https://www.britannica.com/place/China) give precision [navigation](https://www.britannica.com/technology/navigation-technology), positioning, and timing information that has become essential to many terrestrial users. Similar satellites were under development in [Europe](https://www.britannica.com/place/Europe), [Japan](https://www.britannica.com/place/Japan), and [India](https://www.britannica.com/place/India). Earth-observation satellites have also become extremely useful to the military authorities of several countries as complements to their land, sea, and air forces and have provided important security-related information to national leaders.

As the many benefits of space activity have become evident, other countries have joined the Soviet Union and the United States in developing their own space programs. They include a number of western European countries operating both individually and, after 1975, cooperatively through the [European Space Agency](https://www.britannica.com/topic/European-Space-Agency), as well as China, Japan, [Canada](https://www.britannica.com/place/Canada), [India](https://www.britannica.com/place/India), [Israel](https://www.britannica.com/place/Israel), [Iran](https://www.britannica.com/place/Iran), [North Korea](https://www.britannica.com/place/North-Korea), [South Korea](https://www.britannica.com/place/South-Korea), and [Brazil](https://www.britannica.com/place/Brazil). By the second decade of the 21st century, more than 50 countries had space agencies or other government bodies carrying out space activities.

**Significant milestones in space exploration**

A list of significant milestones in space exploration is provided in the table.

| Significant milestones in space exploration | | | |
| --- | --- | --- | --- |
| **date accomplished** | **event** | **details** | **country or agency** |
| Oct. 4, 1957 | first artificial Earth satellite | [Sputnik](https://www.britannica.com/technology/Sputnik) 1 | U.S.S.R. |
| Nov. 3, 1957 | first animal launched into space | dog Laika aboard [Sputnik](https://www.britannica.com/technology/Sputnik) 2 | U.S.S.R. |
| Sept. 14, 1959 | first spacecraft to hard-land on another celestial object (the [Moon](https://www.britannica.com/place/Moon)) | [Luna](https://www.britannica.com/technology/Luna-space-probe) 2 | U.S.S.R. |
| Oct. 7, 1959 | first pictures of the far side of the Moon | [Luna](https://www.britannica.com/technology/Luna-space-probe) 3 | U.S.S.R. |
| April 1, 1960 | first applications satellite launched | [TIROS](https://www.britannica.com/technology/TIROS) 1 (weather observation) | U.S. |
| Aug. 11, 1960 | first recovery of a payload from Earth orbit | [Discoverer](https://www.britannica.com/technology/Discoverer) 13 (part of Corona reconnaissance satellite program) | U.S. |
| April 12, 1961 | first human to orbit Earth | [Yury Gagarin](https://www.britannica.com/biography/Yuri-Gagarin) on [Vostok](https://www.britannica.com/technology/Vostok-Soviet-spacecraft) 1 | U.S.S.R. |
| Dec. 14, 1962 | first data returned from another planet ([Venus](https://www.britannica.com/place/Venus-planet)) | [Mariner](https://www.britannica.com/technology/Mariner) 2 | U.S. |
| June 16, 1963 | first woman in space | [Valentina Tereshkova](https://www.britannica.com/biography/Valentina-Tereshkova) on [Vostok](https://www.britannica.com/technology/Vostok-Soviet-spacecraft) 6 | U.S.S.R. |
| July 26, 1963 | first satellite to operate in [geostationary orbit](https://www.britannica.com/science/geostationary-orbit) | Syncom 2 (telecommunications satellite) | U.S. |
| March 18, 1965 | first space walk | [Aleksey Leonov](https://www.britannica.com/biography/Aleksei-Leonov) on [Voskhod](https://www.britannica.com/technology/Voskhod-spacecraft) 2 | U.S.S.R. |
| July 14, 1965 | first spacecraft pictures of [Mars](https://www.britannica.com/place/Mars-planet) | [Mariner](https://www.britannica.com/technology/Mariner) 4 | U.S. |
| Feb. 3, 1966 | first spacecraft to soft-land on the Moon | [Luna](https://www.britannica.com/technology/Luna-space-probe) 9 | U.S.S.R. |
| April 24, 1967 | first death during a space mission | [Vladimir Komarov](https://www.britannica.com/biography/Vladimir-Mikhaylovich-Komarov) on [Soyuz](https://www.britannica.com/technology/Soyuz) 1 | U.S.S.R. |
| Dec. 24, 1968 | first humans to orbit the Moon | [Frank Borman](https://www.britannica.com/biography/Frank-Borman), [James Lovell](https://www.britannica.com/biography/Jim-Lovell), and [William Anders](https://www.britannica.com/biography/William-A-Anders) on [Apollo](https://www.britannica.com/science/Apollo-space-program) 8 | U.S. |
| July 20, 1969 | first human to walk on the Moon | [Neil Armstrong](https://www.britannica.com/biography/Neil-Armstrong) on [Apollo](https://www.britannica.com/science/Apollo-space-program) 11 | U.S. |
| Sept. 24, 1970 | first return of lunar samples by an unmanned spacecraft | [Luna](https://www.britannica.com/technology/Luna-space-probe) 16 | U.S.S.R. |
| Dec. 15, 1970 | first soft landing on another planet (Venus) | [Venera](https://www.britannica.com/technology/Venera) 7 | U.S.S.R. |
| April 19, 1971 | first [space station](https://www.britannica.com/technology/space-station) launched | [Salyut](https://www.britannica.com/technology/Salyut) 1 | U.S.S.R. |
| Nov. 13, 1971 | first spacecraft to orbit another planet (Mars) | [Mariner](https://www.britannica.com/technology/Mariner) 9 | U.S. |
| Dec. 2, 1971 | first spacecraft to soft-land on Mars | Mars 3 | U.S.S.R. |
| Dec. 3, 1973 | first spacecraft to fly by [Jupiter](https://www.britannica.com/place/Jupiter-planet) | [Pioneer](https://www.britannica.com/technology/Pioneer-space-probes) 10 | U.S. |
| July 17, 1975 | first international docking in space | [Apollo](https://www.britannica.com/science/Apollo-space-program) and [Soyuz](https://www.britannica.com/technology/Soyuz) spacecraft during Apollo-Soyuz Test Project | U.S., U.S.S.R. |
| July 20, 1976 | first pictures transmitted from the surface of Mars | [Viking](https://www.britannica.com/topic/Viking-space-probe) 1 | U.S. |
| Sept. 1, 1979 | first spacecraft to fly by [Saturn](https://www.britannica.com/place/Saturn-planet) | [Pioneer](https://www.britannica.com/technology/Pioneer-space-probes) 11 | U.S. |
| April 12–14, 1981 | first reusable spacecraft launched and returned from space | [space shuttle](https://www.britannica.com/technology/space-shuttle) Columbia | U.S. |
| Jan. 24, 1986 | first spacecraft to fly by [Uranus](https://www.britannica.com/place/Uranus-planet) | [Voyager](https://www.britannica.com/technology/Voyager-space-probes) 2 | U.S. |
| March 13, 1986 | first spacecraft to make a close flyby of a [comet](https://www.britannica.com/science/comet-astronomy) nucleus | [Giotto](https://www.britannica.com/topic/Giotto) at [Halley's Comet](https://www.britannica.com/topic/Halleys-Comet) | European Space Agency |
| Aug. 24, 1989 | first spacecraft to fly by [Neptune](https://www.britannica.com/place/Neptune-planet) | [Voyager](https://www.britannica.com/technology/Voyager-space-probes) 2 | U.S. |
| April 25, 1990 | first large optical space telescope launched | [Hubble Space Telescope](https://www.britannica.com/topic/Hubble-Space-Telescope) | U.S., European Space Agency |
| Dec. 7, 1995 | first spacecraft to orbit Jupiter | [Galileo](https://www.britannica.com/topic/Galileo-spacecraft) | U.S. |
| Nov. 2, 2000 | first resident crew to occupy the [International Space Station](https://www.britannica.com/topic/International-Space-Station) | William Shepherd, Yury Gidzenko, and [Sergey Krikalyov](https://www.britannica.com/biography/Sergey-Konstantinovich-Krikalyov) | U.S., Russia |
| Feb. 14, 2000; Feb. 12, 2001 | first spacecraft to orbit (2000) and land on (2001) an [asteroid](https://www.britannica.com/science/asteroid) | [NEAR](https://www.britannica.com/topic/Near-Earth-Asteroid-Rendezvous-Shoemaker) at the asteroid [Eros](https://www.britannica.com/topic/Eros-asteroid) | U.S. |
| June 21, 2004 | first privately funded manned spacecraft to achieve suborbital flight above 100 km (62 miles) | [Mike Melvill](https://www.britannica.com/biography/Michael-Melvill) on [SpaceShipOne](https://www.britannica.com/topic/SpaceShipOne) | Mojave Aerospace Ventures (commercial joint venture) |
| July 1, 2004 | first spacecraft to orbit Saturn | [Cassini-Huygens](https://www.britannica.com/event/Cassini-Huygens) | U.S., European Space Agency, Italy |
| Jan. 14, 2005 | first spacecraft to land on the moon of a planet other than Earth (Saturn's moon [Titan](https://www.britannica.com/place/Titan-astronomy)) | Huygens probe of the Cassini-Huygens spacecraft | U.S., European Space Agency, Italy |
| June 13, 2010 | first spacecraft to return to Earth with samples from an asteroid | [Hayabusa](https://www.britannica.com/topic/Hayabusa-Japanese-spacecraft) | Japan |
| March 17, 2011 | first spacecraft to orbit [Mercury](https://www.britannica.com/place/Mercury-planet) | [Messenger](https://www.britannica.com/technology/Messenger-United-States-spacecraft) | U.S. |
| August 6, 2104 | first spacecraft to orbit a comet | [Rosetta](https://www.britannica.com/topic/Rosetta-European-Space-Agency-spacecraft) | European Space Agency |
| November 12, 2014 | first spacecraft to land on a comet | [Philae](https://www.britannica.com/topic/Rosetta-European-Space-Agency-spacecraft) | European Space Agency |
| March 6, 2015 | first spacecraft to orbit a [dwarf planet](https://www.britannica.com/science/dwarf-planet) ([Ceres](https://www.britannica.com/place/Ceres-dwarf-planet)) | [Dawn](https://www.britannica.com/topic/Dawn-United-States-satellite) | U.S. |
| July 14, 2015 | first spacecraft to fly by [Pluto](https://www.britannica.com/place/Pluto-dwarf-planet) | [New Horizons](https://www.britannica.com/topic/New-Horizons) | U.S. |
| December 21, 2015 | first rocket stage to return to its launch site | [Falcon 9](https://www.britannica.com/technology/Falcon-launch-vehicle) | U.S. |
| January 1, 2019 | farthest object (2014 MU69) explored by a spacecraft | [New Horizons](https://www.britannica.com/topic/New-Horizons) | U.S. |
| January 3, 2019 | first landing on the Moon's far side | [Chang'e 4](https://www.britannica.com/technology/Change-Chinese-lunar-probes) | China |