

Space Exploration Timeline 1600-1960

July 5, 1687

Publication of Principia

The English astronomer Sir Isaac Newton publishes the *Philosophiae Naturalis Principia Mathematica*. This three-volume work outlines Newton's three laws of motion as well as his law of universal gravitation and a derivation of Kepler's laws for the motion of the planets. The *Principia* is considered by many to be one of the most important scientific works ever written.

1813

First Exposition of Rocket Mechanics

The British mathematician William Moore publishes *Treatise on the Motion of Rockets*. This work features the first exposition of rocket mechanics based on Newton's third law of motion.

1903

Exploration of Cosmic Space

Russian rocket scientist Konstantin Tsiolkovsky publishes *The Exploration of Cosmic Space by Means of Reaction Devices*. This is the first serious work to be published that shows space exploration to be theoretically possible.

1914

Goddard's Rocket Patents

U.S. rocket scientist Robert H. Goddard receives two landmark patents for rockets. The first described a multi-stage rocket and the second described a rocket fueled with gasoline and liquid nitrous oxide. These two patents would become major milestones in the history of rocketry.

1919

Goddard's Famous Publication

Robert Goddard publishes *A Method of Reaching Extreme Altitudes*. The book describes Goddard's mathematical theories of rocket flight and his research into solid-fuel and liquid-fuel rockets. It is regarded by many as one of the most important works in the science of rocketry and is believed to have influenced the work of German rocket pioneers Hermann Oberth and Wernher von Braun.

May, 1924

Soviet Rocket Society Established

The Soviet Union establishes the Society for Studies of Interplanetary Travel. This group would soon be renamed the Society for the Study of Interplanetary Communications and would become the first Soviet rocket society.

March 16, 1926

First Liquid Fueled Rocket Launched

U.S. rocket scientist Robert H. Goddard launches the first liquid fueled rocket from his Aunt Effie's farm in Auburn, Massachusetts. The 4-foot high rocket dubbed "Nell" reaches an altitude of 41 feet and a speed of about 60 miles per hour. The flight lasts only 2 1/2 seconds, but paves the way for the U.S. rocket program.

1927

Rocket Club

The Verein für Raumschiffahrt (Society for Space Travel) is formed as an association of amateur rocket enthusiasts in Germany. This group brings together many of the engineers who would eventually make important contributions to space flight.

1933

Aggregate Rocket Series

Work begins in Germany on the Aggregate series of rockets. Under the direction of German rocket scientist Wernher von Braun, this program eventually leads to development of the V-2 rocket, one of Nazi Germany's most powerful weapons of destruction.

October 3, 1942

First Suborbital Flight

After two previous failures, Germany successfully launches their V-2 rocket. It is the first man-made object to achieve sub-orbital spaceflight, reaching an altitude of 100 km (62 miles). The V-2 is the progenitor of all modern rockets including the U.S. Apollo program's Saturn V moon rocket.

May 10, 1946

First U.S. High Altitude Flight

The U.S. military achieves its first high-altitude space flight using a rebuilt German V-2 rocket. Launched from the White Sands Proving Ground in New Mexico, the flight reaches an altitude of 70 miles.

May 22, 1946

First American-Designed Rocket Reaches Space

The United States launches its first American-designed rocket. Known as the Wac Corporal, the rocket reaches the edge of space at an altitude of 50 miles after being launched from the White Sands Proving Ground in New Mexico.

February 20, 1947

First Animals in Space

Fruit flies become the first animals in space as a V-2 rocket is launched from the White Sands Proving Ground. Inside are several vials containing fruit flies, rye seeds, and cotton seeds. The flight reaches an altitude of 60 miles, and the payload is later retrieved intact.

August 21, 1957

First Intercontinental Ballistic Missile

The Soviet Union launches the first Intercontinental Ballistic Missile (ICBM). Known as the R-7 Semyorka, it travels a total distance of 6000 km (3728 miles). A modified version of this missile would be used later to launch the world's first artificial satellite.

October 4, 1957

First Artificial Satellite

The USSR beat the United States into space by launching Sputnik 1. At 184 pounds, it was the world's first artificial satellite. Sputnik transmitted radio signals back to Earth for only a short time, but it was a major accomplishment.

November 3, 1957

First Live Animal in Space

Following the success of Sputnik 1, the Soviets launched Sputnik 2 on November 3, 1957. The spacecraft contained a pressurized container that housed a dog named Laika. The capsule contained a controlled atmosphere, food supply, waste collection system and biological sensors. Laika lived 8 days until the food supply ran out, and proved that animals could survive in space.

January 31, 1958

First American Satellite

America launched its first satellite. Weighing only 30 pounds, Explorer 1 was launched into orbit by the Army on a Jupiter-C rocket. The satellite contained several scientific instruments. This mission discovered the radiation belts surrounding the Earth.

October 1, 1958

NASA is Born

The National Aeronautics and Space Administration (NASA) is founded, taking over the responsibilities of the existing National Advisory Committee on Aeronautics.

January 2, 1959

First Spacecraft to Achieve Solar Orbit

The Russian satellite Luna 1 is launched in an attempt to hit the Moon. The spacecraft misses the Moon and is flung out into space by the Moon's gravity. It becomes the first man-made object to achieve an orbit around the Sun.

September 12, 1959

First Spacecraft to Impact on the Moon

The Russian satellite Luna 2 is launched. On September 13, it becomes the first man-made object to hit the Moon. The spacecraft was sterilized to avoid contaminating the Moon with terrestrial bacteria.

October 4, 1959

First View of Moon's Far Side

The Russian satellite Luna 3 is launched, orbiting the Moon and photographing 70 percent of the Moon's far side.

April 1, 1960

First Weather Satellite

Tiros 1, the first successful weather satellite, is launched by the United States. Two television cameras in the satellite returned views of clouds above the Earth. Tiros 1 was only operational for 78 days, but proved that satellites could be useful tools for surveying weather conditions from space.

Space Exploration Timeline 1961-1970

April 12, 1961

First Man in Space

Russian Cosmonaut Yuri Alekseyevich Gagarin became the first human to venture into space. The Vostok 1 spacecraft made one complete orbit around Earth in 108 minutes, and reached altitudes of 112 to 203 miles. The flight lasted only one hour and 48 minutes.

May 5, 1961

First American in Space

On May 5, 1961, Astronaut Alan Shepard became the first American to be launched into space. Shepard's suborbital flight lasted only 15 minutes, during which time he experienced about 5 minutes of "weightlessness" and tested the maneuvering capability of his Mercury capsule.

May 25, 1961

President Kennedy's Historic Speech

Just 20 days after Alan Shepard's flight, President John F. Kennedy made his historic speech to Congress. He challenged the nation to land "a man on the Moon and return him safely to Earth" before the end of the decade.

February 20, 1962

First American in Orbit

Astronaut John H. Glenn was launched into orbit aboard an Atlas D rocket, where he became the first American to orbit the Earth. Glenn made a total of 3 complete orbits, and the flight time was 4 hours and 56 minutes.

March 18, 1965

First Space Walk

Commander Pavel I. Belyayev and Pilot Alexei A. Leonov into Earth's orbit were launched into orbit aboard Voskhod 2. Alexei Leonov performed the first, tethered space walk outside of his spacecraft while in Earth's orbit. This historic venture into space lasted a mere 12 minutes.

July 14, 1965

First Close-up Images of Mars

Mariner 4 arrived at Mars and gave scientists their first views of the planet at close range. The resulting photos showed no sign of the famous "canals" and no evidence of life.

February 3, 1966

First Spacecraft to Land on the Moon

The Russian spacecraft Luna 9 completed a 250,000-mile trip and successfully became the first spacecraft to soft-land on the Moon. Luna 9 transmitted pictures of the Moon's surface back to Earth. The mission demonstrated that the Moon's surface was strong enough to support the weight of a large spacecraft.

June 2, 1966

First American Spacecraft on the Moon

Surveyor 1 became the first American spacecraft to soft-land on the Moon. After a journey of 63 hours and 36 minutes, Surveyor 1 successfully landed only 9 miles off its target in the Oceanus Procellarum. The spacecraft transmitted more than 11,000 high-resolution photographs before its energy sources were depleted.

January 27, 1967

First U.S. Space Tragedy

During a routine test of the Apollo 1 spacecraft on the launch pad, a spark caused a fire to start in the crew compartment of the command module. Gus Grissom, Ed White, and Roger Chaffee, were killed in this tragic incident. It was later determined that faulty wiring caused the spark, and the pure oxygen environment in the capsule was to blame for the rapid spreading of the blaze.

April 23, 1967

First Spaceflight Casualty

Soviet Soyuz 1 is launched, carrying Vladimir M. Komarov. On April 24 it crashed during re-entry, killing Komarov, the first spaceflight fatality.

October 18, 1967

First Venus Probe

The Soviet probe Venera 4 sends a descent capsule into the atmosphere of the planet Venus, returning data about its composition.

September 15, 1968

First Moon Orbit

The Soviet Zond 5 is launched. It becomes the first spacecraft to orbit the Moon and return.

October 11, 1968

First Manned Apollo Mission

Apollo 7 is the first manned Apollo mission into space with Walter M. Schirra, Jr., Donn F. Eisele, and Walter Cunningham. It makes 163 orbits of the Earth during 10 Days, 20 minutes. The test flight checks life-support, propulsion, and control systems for the new Apollo spacecraft.

December 21, 1968

First Manned Moon Orbit

Apollo 8 is launched with Frank Borman, James A. Lovell, Jr. and William A. Anders, the first Apollo to use the Saturn V rocket, and the first manned spacecraft to orbit the Moon, making 10 orbits during its 6-day mission.

July 20, 1969

First Manned Moon Landing

Apollo 11 makes the first successful soft landing on the Moon. Neil Armstrong and Edwin Aldrin, Jr. become the first human beings to set foot on another world. Many experts still consider this to be the single greatest technological achievement of 20th century.

April 11, 1970

Apollo 13 Launch

Apollo 13 is launched, suffering an explosion in its SM oxygen tanks. Its Moon landing is aborted, and the entire world watches as James A. Lovell, Jr., John L. Swigert, Jr. and Fred W. Haise, Jr., struggle for days to survive. They return safely to Earth after several harrowing days in space.

September 12, 1970

First Automated Return of Lunar Soil

The Soviet Luna 16 is launched, conducting the first successful return of lunar soil samples by an automatic spacecraft.

November 17, 1970

First Robotic Lunar Mission

Luna 17 lands on the Moon, with the first automatic robot, Lunokhod 1. Driven by a five-man team on Earth, the craft travels over the lunar surface for 11 lunar days (322 Earth days). During this time, it returns 20,000 TV images and 206 high-resolution panoramas in addition to performing a host of experiments including soil analysis.

December 15, 1970

First Landing on Venus

The Soviet Venera 7 is the first probe to soft-land on Venus, transmitting for 23 minutes. The spacecraft send back a few images of the planet's surface before succumbing to the extreme heat and pressure of Venusian atmosphere.

Space Exploration Timeline 1971-1980

April 19, 1971

First Space Station

The Salyut 1 space station is launched by the Soviet Union and become the first space station in orbit. It remains in orbit until May 28, 1973.

June 6, 1971

First Occupation of Space Station

Soyuz 11 carried Cosmonauts G.T. Dobrovolsky, V.N. Volkov, and V.I. Patsayev to Salyut 1, the first manned occupancy of an orbital station. Tragically, on June 29, the Cosmonauts died upon Soyuz 11's reentry.

July 30, 1971

First Lunar Rover Mission

Apollo 15 astronauts David Scott and James Irwin drive the first moon rover while exploring the Moon's surface. The next year, Apollo 17 astronaut Harrison Schmitt drives a similar rover.

November 13, 1971

First Spacecraft to Orbit Another Planet

American space probe Mariner 9 is launched May 30, 1971. Six months later it arrives at the planet Mars and becomes the first spacecraft to orbit another planet. Over the next year, it maps 100 percent of the Martian surface.

December, 1972

First Black Hole Candidate

Astronomers designate Cignus X-1 as the first probable black hole This binary star system emits strong bursts as X-rays as matter is crushed out of existence by the black hole.

May 14, 1973

First U.S. Space Station

The United States launches Skylab, the first U.S. space station. It will be occupied by three crews and over the next few years will be an important arena for a number of scientific experiments.

May 25, 1973

First Skylab Crew

The United States launches Skylab 2, carrying the first crew to visit the Skylab station. The three-member crew repairs damage sustained by Skylab station during its launch. They spend 28 days in space, setting a new space duration record for American astronauts.

July 17, 1975

First International Space Rendezvous

American Apollo and Soviet Soyuz spacecraft dock in what is the first international spacecraft rendezvous. Known as the Apollo-Soyuz Test Project, this important mission proved that U.S. and Russian crews could work together successfully in space.

October, 1975

First Surface Images of Venus

The Soviet Venera 9 and Venera 10 spacecraft land successfully on Venus send the first pictures of the Venusian surface to Earth. They also take measurements of the planet's atmosphere before being destroyed by the intense heat and pressure.

July 20, 1976

First Surface Images of Mars

The first pictures of the surface of Mars are sent back to Earth by Viking 1, the first U.S. spacecraft to successfully land on another planet. The pictures reveal a rocky, desolate landscape that shows no signs of life.

September, 1976

Discovery of Water Frost on Mars

Following the success of Viking 1, the Viking 2 spacecraft lands on Mars on the Plain of Utopia. It discovers and photographs water frost and sends back stunning images of the Martian surface.

August-September, 1977

Launch of Historic Voyager Missions

The Voyager 1 and Voyager 2 spacecraft leave Earth on an epic tour of the Solar System. They will soon meet with Jupiter in 1979 and Saturn in 1980.

December, 1978

U.S. Probes Arrive at Venus

Two U.S. Pioneer spacecraft reach the planet Venus. One drops four probes into the atmosphere, while the other maps the surface.

March 5, 1979

Voyager 1 Arrives at Jupiter

The U.S. Voyager 1 spacecraft, launched in 1977, arrives at Jupiter and begins sending back amazing images of the giant planet and its moons.

July 9, 1979

Voyager 2 Arrives at Jupiter

The U.S. Voyager 2 spacecraft, launched in 1977, arrives at Jupiter and begins sending back images of Jupiter and its moons.

September 1, 1979

First Images of Saturn

The U.S. space probe Pioneer 11 reaches Saturn, flying within 13,000 miles and taking the first close-up photographs of the planet.

November 12, 1980

Voyager 1 Arrives at Saturn

The Voyager 1 spacecraft arrives at Saturn and begins sending back extraordinary images of the ringed planet and its many moons.

Space Exploration Timeline 1981-1990

April 12, 1981

First Space Shuttle Launch

The first manned mission of the Space Transportation System (STS-1), Columbia, is launched. This mission, as well as the next three, will be a test flight to try out the spacecraft's systems.

August 25, 1981

Voyager 2 Arrives at Saturn

The Voyager 2 spacecraft arrives at Saturn and begins sending back images of the planet and its moons.

March 1, 1982

First Venus Soil Samples

The Soviet Venera 13 spacecraft lands on the planet Venus and provides the first scientific analysis of the Venusian soil.

May 13, 1982

New Space Endurance Record

Soviet cosmonauts Anatoli N. Berezovoi and Valentin V. Lebedev are launched in Soyuz T-5 to rendezvous with Salyut 7 and become the first team to inhabit the space station. They return to Earth in Soyuz T-7, setting a new duration record of 211 days.

November 11, 1982

First Operational Space Shuttle Mission

The Space Shuttle Columbia begins its fifth mission, the first operational Space Shuttle mission. STS-5 launches with a four-member crew on a five day mission that deploys two commercial satellites and performs a number of scientific experiments.

April 4, 1983

Maiden Voyage of Challenger

America's second Space Shuttle, Challenger, embarks on its first mission into space. The STS-6 mission includes America's first space walk in nine years.

June 19, 1983

First American Woman in Space

Astronaut Sally K. Ride becomes the first American woman to travel into space on Space Shuttle Challenger mission STS-7.

February 3, 1984

First Untethered Spacewalk

Astronaut Bruce McCandless takes the first untethered space walk using the new Manned maneuvering Unit (MMU). Over the next few days, McCandless and fellow astronaut and Robert L. Stewart perform a number of tests with the MMU to practice for a future satellite capture mission.

August 30, 1984

Maiden Voyage of Discovery

The third orbiter of the American Space Shuttle fleet, Discovery, lifts off for its maiden voyage into space. During mission STS-41D, the six-member crew launches three communications satellites and tests a new solar panel array.

October 3, 1985

Maiden Voyage of Atlantis

Atlantis, the fourth orbiter in America's Space Shuttle fleet, begins its first mission in space. During mission STS-51J, the five-member crew performs a number of classified missions of the U.S. Department of Defense.

January 24, 1986

Space Shuttle Challenger Tragedy

The space shuttle Challenger explodes shortly after liftoff of mission STS-51L, resulting in the loss of the spacecraft and her seven-member crew. The accident seems especially tragic because of Christa McAuliffe, the first civilian to fly into space. She is part of the Teacher in Space program and was to hold a number of classes for school children while in orbit. The accident is caused by unusually cold temperatures and a faulty O-ring seal in one of the solid rocket boosters. NASA grounds the entire space shuttle fleet until safety updates can be made.

February 20, 1986

Mir Station Launched

The first module of the Mir space station is successfully launched and placed into Earth orbit. Mir becomes the first modular space station in orbit. It hosts a number of successful Russian and American missions and remains in orbit until 2001 when it comes crashing down into the Pacific Ocean.

September 29, 1988

Space Shuttle Returns to Flight

The space shuttle Discovery launches from the Kennedy space center on mission STS-26, marking the shuttle's return to flight two and a half years after the Challenger accident. NASA redesigned the solid rocket boosters to make them safer. They also made a number of changes to operational procedures to prevent the communications breakdown that contributed to the Challenger accident.

August 25, 1989

Voyager 2 Arrives at Neptune

The Voyager 2 spacecraft arrives at Neptune, giving us our first close-up views of the blue planet and its moons. Scientists expect the planet to be a blue, featureless sphere much like Uranus. Instead, they discover a curious blue spot and a number of dynamic cloud features.

April 24, 1990

Launch of Hubble Space Telescope

Space Shuttle Discovery lifts off for mission STS-31, carrying the Edwin P. Hubble Space Telescope (HST). The telescope is successfully deployed, but is found to contain a seriously flawed primary mirror resulting in fuzzy images. A future Space Shuttle mission will install a corrective which will solve the problem and make Hubble the most powerful telescope ever created.

August 10, 1990

Magellan Arrives at Venus

U.S. spacecraft Magellan arrives at Venus where it begins mapping the planet's cloud-covered surface using radar.

Space Exploration Timeline 1991-2000

May 2, 1992

Maiden Voyage of Endeavour

The Space Shuttle Endeavour lifts off on its maiden voyage, bringing the number of orbiters in America's Space Shuttle fleet once again to four. The STS-49 mission included the capture and rescue of a communications satellite that was stuck in the wrong orbit.

February 3, 1994

First Russian Cosmonaut Aboard Shuttle

Sergei Krikalev becomes the first Russian Cosmonaut to fly on aboard a U.S. Space Shuttle during Discovery mission STS-60.

February 6, 1995

First Female Shuttle Pilot

Eileen M. Collins becomes the first woman to fly a Space Shuttle on mission STS-63. During the mission, Space Shuttle Discovery maneuvers to within 37 feet of Russian space station Mir, in preparation for a future shuttle-Mir docking.

March 22, 1995

New Space Endurance Record

Cosmonaut Valeriy Polyakov returns to Earth after an impressive 438-day mission aboard Russian space station Mir, setting a new space endurance record.

June 25, 1995

First Shuttle Docks with Mir

Space Shuttle Atlantis rendezvous with Russian space station Mir during a ten-day mission on STS-71. Cosmonauts are transferred to and from Atlantis. Astronaut Norman Thagard is returned from Mir after setting a new American space endurance record of 115 days.

December 7, 1995

Galileo Arrives at Jupiter

The Galileo spacecraft arrives at Jupiter and a probe is dropped into the planet's atmosphere. The orbiter will spend the next two years orbiting and studying the planet and its moons.

May 18, 1996

X PRIZE Competition Announced

Underneath the famous arch in St. Louis, Missouri, the creation of the X PRIZE competition is officially announced to the world. Featuring a large number of high-profile sponsors and supporters, the X PRIZE offers 10 million dollars to the first person or team to safely launch and land a spacecraft capable of carrying three people to a suborbital altitude of 100 kilometers (62.5 miles) and repeat the trip again within two weeks. It is hoped that the X PRIZE will help to jump start civilian and commercial space programs.

September 26, 1996

Shannon Lucid Returns from Mir

Space Shuttle Atlantis touches down bringing home U.S. astronaut Shannon Lucid. Lucid set a new U.S. space endurance record after spending 188 days aboard the Russian space station Mir.

July 4, 1997

Mars Pathfinder Lands on Mars

The Mars Pathfinder probe lands on the surface of Mars. A small robotic rover examines the nearby terrain, sending back amazingly detailed images of the planet's surface.

November 20, 1998

First ISS Module Launched

A Russian Proton rocket is launched from the Baikonur Cosmodrome on the steppes of the Asian nation of Kazakhstan. This rocket carries the Russian-built Zarya Control Module, the first component what will be the new International Space Station (ISS).

October 29, 1998

John Glenn Returns to Space

Space Shuttle Discovery begins mission STS-95, carrying veteran astronaut John H. Glenn. Glenn was the first U.S. astronaut to orbit the Earth during the Mercury program in 1962. This mission marks his return to space after 33 years.

December 4, 1998

First American ISS Module

The Space Shuttle Endeavour lifts off for space carrying the Unity module for the International Space Station (ISS). The unity module is attached to the Russian Zarya module, which was launched in November.

February 14, 2000

First Detailed Study of an Asteroid

The U.S. Near Earth Asteroid Rendezvous (NEAR) spacecraft arrives at the asteroid Eros. It begins a yearlong mission to study the gravity and composition of Eros in addition to sending back detailed images of the asteroid's surface. Eros is an S-class asteroid approximately 20 miles (33 km) and 8 miles (13 km) wide. The Valentine's Day arrival date is most appropriate for an asteroid named after the Greek god of love.

Space Exploration Timeline 2001-2010

February 12, 2001

First Landing on an Asteroid

The Near Earth Asteroid Rendezvous (NEAR) spacecraft is successfully landed on the surface of the asteroid Eros. NEAR sends back unprecedented images of the asteroid's surface during its hour-long descent. NEAR had been in orbit around Eros since February 14, 2000. It was never designed to land on the asteroid. The landing is a last minute idea to get some additional data as the spacecraft as it runs out of fuel and nears the end of its mission.

February 14, 2001

100th U.S. Space Walk

U.S. astronauts Thomas Jones and Robert Curbeam Jr. make history as they perform the 100th space walk in the United States space program. The space walk is part of the installation procedure for the new Destiny module of the International Space Station.

March 11, 2001

New Space Walk Record

U.S. Shuttle astronauts Susan Helms and Jim Voss set a new endurance record as they install the Leonardo module aboard the International Space Station. The total time spent in space is 8 hours 56 minutes.

April 28, 2001

First Tourist in Space

American businessman Dennis Tito becomes the first tourist to fly into space. His 20 million dollar offer is rejected by the United States, but is later welcomed by the Russian space program. A Soyuz space capsule delivers the space tourist and the Russian crew to the International Space Station, where Tito is given limited access to the station.

February 1, 2003

Space Shuttle Columbia Disaster

The space shuttle Columbia breaks up in the atmosphere over Texas while returning to the Kennedy space center. The entire seven-member crew is lost in the accident. Columbia was the first space shuttle to fly and this is her 28th mission. Investigations conclude that a piece of foam from the fuel tank broke off during launch and punctured the orbiter's left wing. This hole in the wing allowed hot gases to enter during reentry, causing the orbiter lose control and break up while traveling over 13,000 miles per hour. NASA grounds the entire space shuttle fleet until safety updates can be made.

October 15, 2003

First Chinese Manned Spaceflight

The Shenzhou 5 spacecraft is launched from Jiuquan Satellite Launch Center in China. It carries Yang Liwei who becomes the first man sent into space by the Chinese space program. China sets goals for an eventual manned space station and a manned mission to the Moon.

January 3, 2004

Spirit Rover Lands on Mars

After parachuting through the atmosphere and then bouncing to a stop using giant air bags, the Mars rover Spirit lands on the red planet in a location known as Gusev crater. Designed to last only three months, Spirit and its sister rover, Opportunity, prove to be tough and the mission is continued for several years.

January 25, 2004

Opportunity Rover Lands on Mars

The sister rover to Spirit, Opportunity lands on the opposite side of the planet Mars in a location known as Meridiani Planum. After a mission extension of several years, Opportunity and its companion, Spirit, send back extraordinary images of the Martian surface and perform chemical experiments on rock samples. Many new discoveries include layered rock formations that could have been formed in water and tornado-like dust devils moving across the surface.

June 21, 2004

First Manned Private Space Flight

A privately financed and built spacecraft known as SpaceShipOne makes history as the first non-government spacecraft to be flown into space. Pilot Mike Melvill fly the craft to an altitude of 62 miles (100 kilometers). The team hopes to win the Ansari X PRIZE by making two space flights within two weeks of each other. SpaceShipOne was built by famed aerospace designer Burt Rutan of Mojave-based Scaled Composites, with financial backing from Microsoft Corporation co-founder Paul Allen.

July 1, 2004

Cassini Probe Arrives at Saturn

After a journey of nearly seven years, the Cassini probe arrives at the planet Saturn, where it will spend four years photographing the ringed planet and its many moons for. Cassini carries with it another small probe called Huygens that will later be sent to land on Saturn's largest moon, Titan. Huygens will attempt to send back to Earth the first images of the surface of Titan.

September 29, 2004

First X PRIZE Attempt

The privately developed spacecraft, SpaceShipOne, makes its first attempt to claim the X PRIZE as Mike Melvill pilots the craft to an altitude of 337,500 feet (63.9 miles or 102.9 kilometers). The team hopes to win the Ansari X PRIZE by making another trip into space within two weeks.

October 5, 2004

X PRIZE Awarded

SpaceShipOne claims the \$10 million X PRIZE by making its second trip into space within two weeks. On this flight, civilian astronaut Brian Binnie pilots the craft to an altitude of 367,442 feet (112 kilometers), far surpassing the 100-kilometer (62.5-miles) altitude required to win the X PRIZE. The flight also breaks the altitude record for an airplane, set by X-15 pilot Joseph Walker in 1963. The SpaceShipOne team hopes to license their technology for use in future commercial space flights.

October 7, 2004

America's Space Prize Offered

Following the recent X PRIZE win by SpaceShipOne, Hotel magnate Robert Bigelow has offers \$50 million to the first private spacecraft to achieve orbit. The winner of this prize will also be offered contracts to ferry passengers to the first private space stations to be built by Bigelow's company, Bigelow Aerospace. A spacecraft will have to travel six times faster and four times higher than SpaceShipOne, which recently claimed the Ansari X PRIZE by becoming the first private spacecraft to fly into space.

January 14, 2005

First Landing on an Alien Moon

After descending by parachute for 2 hours and 28 minutes, the Huygens probe lands on Saturn's largest moon, Titan. Even though a technical glitch limits the probe's imaging capabilities, Huygens is successful in sending a series of images back to Earth. For the first time, scientists get a look at the surface of a moon other than our own. The images show a surface that is flat and littered with small rocks. Dark areas on some images could indicate the presence of liquid methane.

July 4, 2005

First Impact With a Comet

After a journey of 174 days, the Deep Impact space probe fulfills its mission by slamming into a comet known as Tempel 1. The probe impacts the comet at a speed of 10.3 kilometers (6.3 miles) per second. The probe's mothership photographed the impact and analyzed the resulting debris. Among the many discoveries was water ice within the comet.

July 26, 2005

Space Shuttle Returns to Flight

The space shuttle Discovery launches from the Kennedy space center, marking the shuttle's return to flight two and a half years after the Columbia disaster. The flight is not entirely successful, however. Cameras on the orbiter record a piece of foam breaking off from the fuel tank during launch, sparking fears of another Columbia-style accident. NASA again grounds the shuttle fleet until the liquid fuel tank can be redesigned.

January 15, 2006

First Comet Samples Returned to Earth

After a journey of nearly seven years and 2.9 billion miles (4.6 billion kilometers), NASA's Stardust mission successfully comes to a conclusion in the desert salt flats of the Utah Test and Training Range. The capsule safely parachutes to the ground after collecting dust and particle samples from comet Wild 2. The samples are collected by the probe in the comet's coma within 147 miles (236 kilometers) of the comet's nucleus. Scientists believe that comets may be composed of the same primitive material that initially formed the Solar System. Analysis of the samples may help to reveal some of the secrets behind solar system formation.

March 6, 2009

The Hunt for Extrasolar Planets

The Kepler spacecraft launches on a mission to search for planets outside our solar system. This first-of-its-kind spacecraft uses a technique known as the "transit" method to search for planets orbiting distant stars. As a planet moves in front of the star's disk, the light from the star dims ever so slightly and in a regular cycle. Kepler can detect these cycles to detect a planet and also to approximate its size and orbit.

December 8, 2010

First Commercial Orbit and Return

A company called SpaceX becomes the first private company to launch a spacecraft to orbit and return it safely to the Earth. This landmark event had only been accomplished by governments before this day. The unmanned capsule, known as Dragon, is launched from Cape Canaveral, Florida, on December 8 atop a Falcon 9 rocket. After completing two orbits around the Earth, the Dragon spacecraft successfully splashes down in the Pacific Ocean off the coast of Mexico.

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February 1, 2003

Space Shuttle Columbia Disaster

The space shuttle Columbia breaks up in the atmosphere over Texas while returning to the Kennedy space center. The entire seven-member crew is lost in the accident. Columbia was the first space shuttle to fly and this is her 28th mission. Investigations conclude that a piece of foam from the fuel tank broke off during launch and punctured the orbiter's left wing. This hole in the wing allowed hot gases to enter during reentry, causing the orbiter lose control and break up while traveling over 13,000 miles per hour. NASA grounds the entire space shuttle fleet until safety updates can be made.

October 15, 2003

First Chinese Manned Spaceflight

The Shenzhou 5 spacecraft is launched from Jiuquan Satellite Launch Center in China. It carries Yang Liwei who becomes the first man sent into space by the Chinese space program. China sets goals for an eventual manned space station and a manned mission to the Moon.

January 3, 2004

Spirit Rover Lands on Mars

After parachuting through the atmosphere and then bouncing to a stop using giant air bags, the Mars rover Spirit lands on the red planet in a location known as Gusev crater. Designed to last only three months, Spirit and its sister rover, Opportunity, prove to be tough and the mission is continued for several years.

January 25, 2004

Opportunity Rover Lands on Mars

The sister rover to Spirit, Opportunity lands on the opposite side of the planet Mars in a location known as Meridiani Planum. After a mission extension of several years, Opportunity and its companion, Spirit, send back extraordinary images of the Martian surface and perform chemical experiments on rock samples. Many new discoveries include layered rock formations that could have been formed in water and tornado-like dust devils moving across the surface.

June 21, 2004

First Manned Private Space Flight

A privately financed and built spacecraft known as SpaceShipOne makes history as the first non-government spacecraft to be flown into space. Pilot Mike Melvill fly the craft to an altitude of 62 miles (100 kilometers). The team hopes to win the Ansari X PRIZE by making two space flights within two weeks of each other. SpaceShipOne was built by famed aerospace designer Burt Rutan of Mojave-based Scaled Composites, with financial backing from Microsoft Corporation co-founder Paul Allen.

July 1, 2004

Cassini Probe Arrives at Saturn

After a journey of nearly seven years, the Cassini probe arrives at the planet Saturn, where it will spend four years photographing the ringed planet and its many moons for. Cassini carries with it another small probe called Huygens that will later be sent to land on Saturn's largest moon, Titan. Huygens will attempt to send back to Earth the first images of the surface of Titan.

September 29, 2004

First X PRIZE Attempt

The privately developed spacecraft, SpaceShipOne, makes its first attempt to claim the X PRIZE as Mike Melvill pilots the craft to an altitude of 337,500 feet (63.9 miles or 102.9 kilometers). The team hopes to win the Ansari X PRIZE by making another trip into space within two weeks.

October 5, 2004

X PRIZE Awarded

SpaceShipOne claims the \$10 million X PRIZE by making its second trip into space within two weeks. On this flight, civilian astronaut Brian Binnie pilots the craft to an altitude of 367,442 feet (112 kilometers), far surpassing the 100-kilometer (62.5-miles) altitude required to win the X PRIZE. The flight also breaks the altitude record for an airplane, set by X-15 pilot Joseph Walker in 1963. The SpaceShipOne team hopes to license their technology for use in future commercial space flights.

October 7, 2004

America's Space Prize Offered

Following the recent X PRIZE win by SpaceShipOne, Hotel magnate Robert Bigelow has offers \$50 million to the first private spacecraft to achieve orbit. The winner of this prize will also be offered contracts to ferry passengers to the first private space stations to be built by Bigelow's company, Bigelow Aerospace. A spacecraft will have to travel six times faster and four times higher than SpaceShipOne, which recently claimed the Ansari X PRIZE by becoming the first private spacecraft to fly into space.

January 14, 2005

First Landing on an Alien Moon

After descending by parachute for 2 hours and 28 minutes, the Huygens probe lands on Saturn's largest moon, Titan. Even though a technical glitch limits the probe's imaging capabilities, Huygens is successful in sending a series of images back to Earth. For the first time, scientists get a look at the surface of a moon other than our own. The images show a surface that is flat and littered with small rocks. Dark areas on some images could indicate the presence of liquid methane.

July 4, 2005

First Impact With a Comet

After a journey of 174 days, the Deep Impact space probe fulfills its mission by slamming into a comet known as Tempel 1. The probe impacts the comet at a speed of 10.3 kilometers (6.3 miles) per second. The probe's mothership photographed the impact and analyzed the resulting debris. Among the many discoveries was water ice within the comet.

July 26, 2005

Space Shuttle Returns to Flight

The space shuttle Discovery launches from the Kennedy space center, marking the shuttle's return to flight two and a half years after the Columbia disaster. The flight is not entirely successful, however. Cameras on the orbiter record a piece of foam breaking off from the fuel tank during launch, sparking fears of another Columbia-style accident. NASA again grounds the shuttle fleet until the liquid fuel tank can be redesigned.

January 15, 2006

First Comet Samples Returned to Earth

After a journey of nearly seven years and 2.9 billion miles (4.6 billion kilometers), NASA's Stardust mission successfully comes to a conclusion in the desert salt flats of the Utah Test and Training Range. The capsule safely parachutes to the ground after collecting dust and particle samples from comet Wild 2. The samples are collected by the probe in the comet's coma within 147 miles (236 kilometers) of the comet's nucleus. Scientists believe that comets may be composed of the same primitive material that initially formed the Solar System. Analysis of the samples may help to reveal some of the secrets behind solar system formation.

March 6, 2009

The Hunt for Extrasolar Planets

The Kepler spacecraft launches on a mission to search for planets outside our solar system. This first-of-its-kind spacecraft uses a technique known as the "transit" method to search for planets orbiting distant stars. As a planet moves in front of the star's disk, the light from the star dims ever so slightly and in a regular cycle. Kepler can detect these cycles to detect a planet and also to approximate its size and orbit.

December 8, 2010

First Commercial Orbit and Return

A company called SpaceX becomes the first private company to launch a spacecraft to orbit and return it safely to the Earth. This landmark event had only been accomplished by governments before this day. The unmanned capsule, known as Dragon, is launched from Cape Canaveral, Florida, on December 8 atop a Falcon 9 rocket. After completing two orbits around the Earth, the Dragon spacecraft successfully splashes down in the Pacific Ocean off the coast of Mexico.