



Department of  
Science and  
Technology

# MODERN SPACE EXPLORATION



## OCTOBER 4, 1957

Sputnik 1, the first man-made object to orbit the Earth, is launched by the U.S.S.R., and remains in orbit until January 4, 1958.

## NOVEMBER 3, 1957

Sputnik 2, carrying the dog Laika for 7 days in orbit, is launched by the U.S.S.R.



## OCTOBER 1, 1958

N.A.S.A. is founded, taking over existing National Advisory Committee on Aeronautics.



## APRIL 12, 1961

Vostok 1 is launched by the U.S.S.R., carrying Cosmonaut Yuri A. Gagarin, the first man in space. He orbits the Earth once.

## FEBRUARY 20, 1962

Mercury Friendship 7 lifts off with John H. Glenn, Jr., the first American in orbit, and orbits the Earth three times

## DECEMBER 14, 1962



Mariner 2, the first successful planetary spacecraft, flies past Venus, and enters a solar orbit.

## JUNE 16, 1963

Vostok 6 carries Soviet Cosmonaut Valentia Tereshkova, the first woman in space and orbits the Earth 48 times.

## MARCH 18, 1965

The first space walk is made from Soviet Voskhod 2 by Cosmonaut Alexei A. Leonov. Duration is 12 minutes.

## JUNE 2, 1966

Surveyor 1 is the first U.S. spacecraft to soft-land on the Moon.

## JULY 20, 1969

Neil Armstrong and Edwin Aldrin, Jr. make the first manned soft landing on the Moon, and the first moonwalk, using Apollo 11.

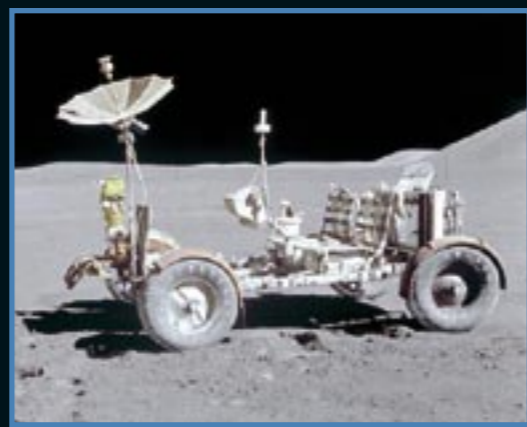


## APRIL 11, 1970

Apollo 13 is launched, suffering an explosion in its SM oxygen tanks. Its Moon landing is aborted, and the crew, James A. Lovell, Jr., John L. Swigert, Jr. and Fred W. Haise, Jr., return safely.

## JULY 30, 1971

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



## MARCH 2, 1972

Pioneer 10 is launched on an Atlas/Centaur/TE364-4 towards Jupiter by the U.S., designed to familiarize alien life with humans. It returns the first close-up images of Jupiter in 1973.

## JULY 20, 1976

Pictures of the Martian surface are taken by Viking 1, the first U.S. attempt to soft land a spacecraft on another planet.

## SEPTEMBER 3, 1976

Viking 2 lands on Mars on the Plain of Utopia, where it discovered water frost.

## SEPTEMBER 1, 1979

Pioneer 11 reaches Saturn, flying to within 20 921 kilometres and taking the first close-up photographs.



## MARCH 1, 1982

Venera 13 lands on Venus, and provides the first Venusian soil analysis.

## JUNE 19, 1983

Sally K. Ride is the first U.S. woman to travel in space, on Challenger mission STS-7.

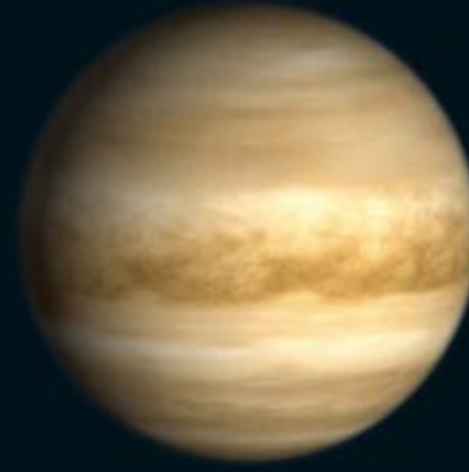


## JANUARY, 1986

Voyager 2 flies past Uranus.

## AUGUST, 1990

U.S. spacecraft Magellan arrives at Venus, where for the next year it took radar images of the surface.



## DECEMBER 9, 1994

Asteroid XM1 passes within 104 607 kilometres of Earth.

## FEBRUARY 6, 1995

Space shuttle Discovery maneuvers to within 11 metres of Russian space station Mir, in preparation for a shuttle-Mir docking (STS-63). This is the first shuttle mission to be flown by a female pilot.

## APRIL 7, 2001

The 2001 Mars Odyssey probe is launched on a trajectory for Mars orbit to be achieved in October, with a mission similar to that of the Mars Climate Orbiter launched December 1998. Mars Odyssey successfully enters Mars orbit on October 24<sup>th</sup>.

## APRIL 2002

Mark Shuttleworth is the first South African in space. He joined a team of cosmonauts on the Russian Soyuz capsule on a journey to the International Space Station. Mark Shuttleworth conducted several experiments during his 10-day space flight.



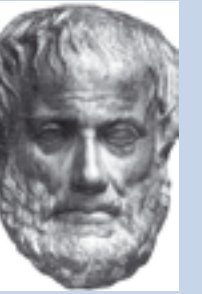
## JUNE 10, 2003

NASA's launches two robot geologist (commonly called rovers) to explore Mars and search for the possible existence of water. This forms part of NASA's Mars Exploration Project that uses robots.

## PIONEERS OF ASTRONOMY

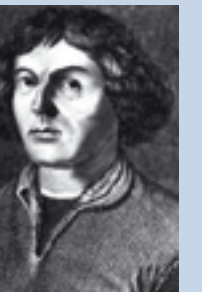
### ARISTOTLE (384-322 BC)

Aristotle suggested the Earth was round.



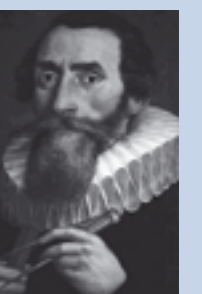
### NICOLAS COPERNICUS (1473-1543)

He said the sun was the centre of the universe and earth revolve around it.



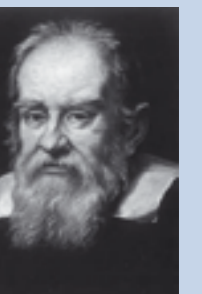
### JOHANNES KEPLER (1571-1630)

Johannes Kepler hypothesised that the orbits of the planets are ellipses around the sun.



### GALILEO (1564-1642)

Galileo Galilei was the first scientist to use a telescope in looking at the heavens and as a result discovered, amongst other things, Jupiter's moons.



### ISAAC NEWTON (1642-1727)

Isaac Newton derived the three laws of motion which apply to objects in space and on earth. Newton also developed much of geometrical optics and devised the reflecting telescope. All large modern telescopes are reflectors.



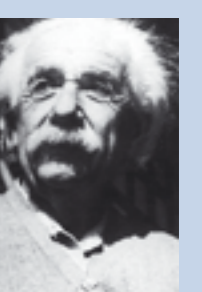
### JOHN HERSCHTEL (1792-1871)

William Herschel discovered Uranus, the first new planet since ancient times. This instantly doubles the size of the Solar System.



### ALBERT EINSTEIN (1879-1955)

He discovered and explained Brownian Motion and the photoelectric effect. Einstein made significant contributions to the theory of atomic spectra and formulated theories of special and general relativity.



### EDWIN HUBBLE (1889-1953)

Edwin Hubble studied the spiral formations of objects in the constellation of Andromeda. He found that there were three types of galaxies: spiral, elliptical and irregular. From its overall properties our Galaxy appeared to be a spiral. Modern Cosmology (the study of the overall structure of the Universe) can be said to have begun with Hubble's work. The Hubble Space Telescope is named after him.



### STEPHEN WILLIAM HAWKING (1942-today)

In the 1970's he made his scientific name with the idea that black holes are not truly black - each has a characteristic temperature and radiates energy. This work involved a mixture of ideas from thermodynamics, quantum physics, and relativity.

