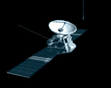
MARS EXPLORATION PROGRAM

MARS 2020 PERSEVERANCE (rover) — 2020

Perseverance is seeking signs of habitable conditions on Mars by searching for signs of past microbial life and has a drill that collects core samples and sets them aside in a "cache" on the surface of Mars. It provides opportunities to gather knowledge and demonstrate technologies that address the challenges of future human expeditions to Mars. — 2019

INSIGHT (lander) — 2018

InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) is a terrestrial planet explorer that studies Mars deep interior to understand the processes that shaped the rocky planets of the inner Solar System (including Earth) more than four billion years ago. — 2017



EXOMARS (orbiter/lander) — 2016

ESA's Trace Gas Orbiter had a successful orbit insertion and provides communications relay support for landers and rovers on the Martian surface. The demonstration module lander was lost on touchdown. — 2015

2014

MAVEN (orbiter) — 2013

(Mars Atmospheric and Volatile EvolutioN) is obtaining critical measurements of the Martian atmosphere to help understand drastic climate change on Mars over its history and how fast gases are being lost to space today. Also able to provide communications relay support for landers and rovers on the Martian surface. — 2012

CURIOSITY (rover) — 2011

Curiosity's scientific tools found chemical and mineral evidence of past habitable environments on Mars. Explores the rock record, acquires rock, regolith and air samples for onboard analysis. It has 17 cameras, a laser to vaporize and study small pinpoint spots on rocks at a distance and a drill to collect powdered rock samples. It hunts for special rocks that formed in water and/or have signs of organics. Analyzes powdered samples drilled from rocks and mesures the chemical fingerprints present in different rocks and regolith to determine their composition and history, especially their past interactions with water. — 2010 — 2009

2008

PHOENIX SCOUT (lander) — 2007

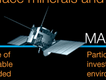
High-resolution perspective of the landing site's geology. Provided range maps and identified local minerals. Checked samples of regolith and ice for evidence whether the site was hospitable to life and scanned the atmosphere for data about the formation, duration, and movement of clouds, fog, dust, temperature and pressure. — 2006

MARS RECONNAISSANCE ORBITER (orbiter) — 2005

Detailed view of the geology and structure of Mars, identifying obstacles that could jeopardize the safety of future landers and rovers. Identifies surface minerals and studies the atmosphere. Carries a radar sounder to find subsurface water. — 2004

SPIRIT & OPPORTUNITY (rovers) — 2003

Field geology and atmospheric observations have found evidence of ancient Martian environments where intermittently wed and habitable conditions existed and could have supported microbial life. Provided high-res, full-color images of terrain, rocks and soil. Analyzed chemical and mineralogical makeup of rocks and soil and examined the interior of rocks.



MARS EXPRESS (orbiter)

Participating with ESA and ASI exploring the atmosphere and surface from polar orbit. Conducted investigations to help answer fundamental questions about the geology, atmosphere, surface environment, history of water and potential for life on Mars. Discovered evidence of recent glacial activity, explosive volcanism, and methane gas. Provided information about features beneath the surface as well as coordination of radio relay systems. — 2002

MARS ODYSSEY (orbiter) — 2001

Measurements to create maps of minerals and chemical elements and identified regions with buried water ice. Measured surface temperature and views of topography. Data regarding radiation in low-Mars orbit for eventual human exploration and potential health-effects. A communication relay for rovers and landers on Mars. — 2000

MARS POLAR LANDER (lander) — 1999

Lost on arrival.

DEEP SPACE 2 (probe)

Lost on arrival.

MARS CLIMATE ORBITER (orbiter) — 1998

Lost on arrival. — 1997

MARS GLOBAL SURVEYOR (orbiter) — 1996

Studied the entire Martian surface, atmosphere, and interior. Observed that Mars has repeatable weather patterns. Documented gully formation and debris flows. Showed the planet does not have a global magnetic field but localized magnetic fields in areas of the crust. Determined Phobos is covered by a layer of powdery material from meteoroid impacts. Observed new boulder tracks, recently formed impact craters, and diminishing amounts of carbon dioxide ice within the south polar cap. Provided the first 3-D views of the north polar ice cap. Scientists created vertical profiles of atmospheric temperature and pressure from changes in radio transmissions. Shown that Mars has seasonal and long-term change recorded on the surface. — 1995 — 1994 — 1993

PATHFINDER (rover) — 1997

Returned images from the lander and rover, chemical analyses of rocks and soil, data on winds and other weather factors. Findings suggest Mars was at one time in its past warm and wet, with water existing in liquid state and thicker atmosphere.

MARS OBSERVER (orbiter) — 1992

Communication lost prior to orbit insertion.

VIKING 1 & 2 (orbiter & lander) — 1975

NASA's Viking Project was the first U.S. mission to land a spacecraft safely on the surface of Mars and return images of the surface. Conducted 3 biology experiments to look for possible signs of life and discovered chemical activity in the Martian soil. — 1974 — 1973 — 1972

MARINER 8 & 9 (flyby) — 1971

Mariner 8 had a mission malfunction. Mariner 9 compiled a global mosaic of the Martian surface. It showed relics of ancient riverbeds and provided the first closeup pictures of the two Martian moons - Phobos and Deimos. — 1970

MARINER 6 & 7 (flyby) — 1969

Analyzed the Martian atmosphere and surface, recorded and relayed hundreds of pictures. — 1968 — 1937 — 1966 — 1965

MARINER 3 & 4 (flyby) — 1964

Mariner 3 was lost during launch.
Mariner 4 collected the first close-up photographs of Mars lunar-type impact craters and studied the solar wind.

EXPLORE HABITABILITY | FOLLOW THE WATER | SEEK SIGNS OF LIFE | PREPARE FOR FUTURE HUMAN EXPLORERS

TOP SCIENCE DISCOVERIES
OF THE
MARS EXPLORATION PROGRAM

ANCIENT, PERSISTENT LIQUID WATER AND COMPLEX SURFACE GEOLOGY
MODERN WATER AND RECENT CLIMATE CHANGE AND PLANETARY MAGNETISM
MARTIAN CLIMATE AND WEATHER AND MODERN PROCESSES AND METHANE ON MARS
GRAVITY AND FIGURE H MARS RADIATION ENVIRONMENT