



Stars of “Touch the Stars” – Spacecraft

Mariner 2

Launch: August 27, 1962 aboard Atlas LV-3 rocket

Achievements: The world’s first successful interplanetary spacecraft, Mariner 2 passed within 34,000 miles of Venus, recording the planet’s temperature for the first time, notably its 900-degree Fahrenheit atmosphere. Mariner 2 was also the first spacecraft to measure density, velocity, composition and variation over time of the solar wind.

Mariner 9

Launch: May 30, 1971 aboard Atlas SLV-3C rocket

Achievements: As the first spacecraft to orbit Mars, Mariner 9 mapped 85 percent of the red planet’s surface. Its more than 7,000 images sent back to Earth included the first detailed views of Olympus Mons, largest volcano in the Solar System, the Valles Marineris, which dwarf’s Earth’s Grand Canyon, and the Martian moons Phobos and Deimos.

Viking 1

Launch: August 20, 1975 aboard Titan IIIE rocket

Achievements: The first of our spacecraft to land on Mars (July 20, 1976), Viking 1 provided us with our first high-resolution views of the Martian surface. With a robotic arm and an onboard biological laboratory, it collected soil samples from the landing site, searching for proof of life while examining the chemical composition of the planet’s surface.

Pioneer 10

Launch: March 2, 1972 aboard Atlas SLV-3C rocket

Achievements: The first NASA mission to the outer planets, Pioneer 10 provided over 300 shots of Jupiter, including the first close-up look of the gas giant’s Great Red Spot. After passing the Jovian moons Calisto, Ganymede, and Europa, it crossed Saturn’s orbit in February 1976, moving on to Neptune. Pioneer 10 became the first Earth-made object to leave the Solar System,

with both it and Pioneer 11 carrying a postcard to other possible civilizations providing information on our place in the universe.

Pioneer 11

Launch: April 6, 1973 aboard Atlas SLV-3C rocket

Achievements: Pioneer 11 was the second spacecraft to explore the outer planets. In addition to providing the first images of Jupiter's polar regions, the probe took close-up images of Saturn, detailing the structure of its rings for the first time.

Voyager 1

Launch: September 5, 1977 aboard Titan IIIE rocket

Achievements: On September 6, 1977, Voyager 1 took the first photo from space showing the complete Earth and Moon in a single frame. 1 ½ years later, it would make its closest approach to Jupiter, discovering the first confirmed volcanoes outside Earth on Jupiter's moon Io, and providing data indicating the at the Great Red Spot on the planet is actually a huge cyclone-like storm. In 1980, the probe encountered Saturn, discovering three moons never before seen, along with features on the planet's rings which resemble grooves on a record. After its flyby of Saturn, Voyager 1 prepared to leave the Solar System. Whereas the Pioneer missions had been fitted with a postcard, both Voyager spacecraft carried a gold record with recordings of Earth.

Voyager 2

Launch: August 20, 1977 aboard Titan IIIE rocket

Achievements: In July 1979, Voyager 2 made its closest approach to Jupiter, taking the first images of the planet's ring system and made a close approach to the planet's moon Europa, where cracks on the surface suggested ice over a liquid surface. At Saturn, Voyager 2 takes images of a number of moons and of the planet's polar regions. It then moved on to Uranus, discovering 11 new moons, and Neptune, where it discovered six. Before leaving the Solar System, Voyager 2 turned its cameras around and photographed the planets in the Solar System, including the Earth, a pale blue dot seen for the first time from beyond our neighboring planets.

Galileo

Launch: October 18, 1989 from space shuttle Atlantis in low earth orbit

Achievements: Launched to explore Jupiter and its moons, Galileo sent a descent probe 100 miles into Jupiter's atmosphere at 106,000 miles per hour, garnering information about the planet's atmosphere. Galileo's other discoveries include evidence for the existence of a saltwater ocean beneath the Jovian moon Europa's icy surface, extensive volcanic processes on the moon Io and a magnetic field generated by the moon Ganymede. The probe plunged into Jupiter's atmosphere on September 21, 2003 to prevent an unwanted impact with Europa.

Cassini-Huygens

Launch: October 15, 1997 aboard Titan IV-B rocket

Achievements: A joint venture between NASA, the European Space Agency, and the Italian Space Agency, Cassini-Huygens explored Saturn and its moon Titan. In 2005, the Huygens probe was launched from the spacecraft and entered Titan's atmosphere, becoming the first landing in the outer Solar System. While there, Huygens sampled the moon's chemical composition and surface properties. Once the primary mission completed, for nine more years, Cassini would carry on its secondary mission, photographing and examining Saturn and its planets. In September 2017, it began final entry into Saturn's atmosphere.

New Horizons

Launch: January 19, 2006 aboard Atlas V rocket

Achievements: New Horizons explored Pluto, examining Pluto's Heart, a glacier more than 600 miles wide, largest in the Solar System. This was followed by the flyby on January 1, 2019 of 2014 MU69 in the Kuiper Belt, the farthest object ever visited from Earth.

Juno

Launch: August 5, 2011 aboard Atlas V rocket

Achievements: Juno took the first images of Jupiter's North Pole, awash with 800-mile wide cyclones. Microwave instruments look 250 miles beneath the atmospheric surface. Juno's data has resulted in our reassessing what we had believed about Jupiter.

Parker Solar Probe

Launch: August 12, 2018 aboard Delta IV Heavy rocket

Already arrived at the Sun, the Parker Solar Probe is on a multi-year mission to study the inner workings of our own star. Traveling within 4 million miles of the Sun's surface, the Parker Solar Probe will provide new data on solar activity and make critical contributions to our ability to forecast major space-weather events that impact life on Earth.

Orion

Lockheed Martin is the prime contractor building NASA's Orion Multi-Purpose Crew Vehicle, the only spacecraft designed for long-duration, human-rated deep space exploration. Orion will transport humans to interplanetary destinations beyond low Earth orbit, such as the moon and eventually Mars, and return them safely back to Earth. Orion will be launched into space via the Space Launch System (SLS), the largest rocket ever built by NASA.

Lunar Gateway

NASA is working with its partners to design and develop a small spaceship that will orbit the Moon called the Gateway. This spaceship will be a temporary home and office for astronauts, just about a five-day, 250,000-mile commute from Earth. The Gateway will have living quarters, laboratories for science and research, docking ports (like doors) for visiting spacecraft, and more. It will provide NASA and its partners access to more of the lunar surface than ever before, supporting both human and robotic missions. The Gateway will be our home base for astronaut

expeditions on the Moon, and future human missions to Mars. Even before our first trip to Mars, astronauts will use the Gateway to train for life far away from Earth, and we will use it to practice moving a spaceship in different orbits in deep space.

Crewed Lunar Lander

Lockheed Martin's crewed lunar lander is a single stage, fully reusable system that incorporates flight-proven technologies and systems from NASA's Orion spacecraft. In its initial configuration, the lander would accommodate a crew of four and 2,000 lbs. of cargo payload on the surface for up to two weeks before returning to the Gateway without refueling on the surface.

Mars Base Camp

Mars Base Camp is Lockheed Martin's vision for sending humans to Mars in about a decade. The concept is simple: transport astronauts from Earth, via the Moon, to a Mars-orbiting science laboratory where they can perform real-time scientific exploration, analyze Martian rock and soil samples, and confirm the ideal place to land humans on the surface in the 2030s. The major components of the architecture will be launched separately. Some are pre-positioned in Mars orbit ahead of time. Others are assembled in cis-lunar space for the journey to Mars. Six astronauts will launch on Orion, which serves as the heart of the Mars Base Camp interplanetary ship.

Mars Ascent/Descent Vehicle

The Mars Base Camp surface lander concept is a reusable, single-stage lander capable of descending to the surface from Mars orbit using supersonic retropropulsion. Each surface mission could last two weeks with up to four astronauts and return to the orbiting Mars Base Camp without surface refueling or leaving assets behind. The lander uses Orion avionics and systems as its command deck and is powered by engines using liquid-hydrogen/liquid-oxygen propellant, both of which will be generated from water.

SOURCES: NASA, JPL, Lockheed Martin