

Red Planet Day & Mars missions

November 29, 2022

In news– November 28 is marked as Red Planet Day or Mars day.

What is Red Planet Day?

- On this day in 1964, the **United States launched the space probe Mariner 4 on a course towards Mars, which it flew past in July 1965, sending back pictures of the red planet.**
- This was the **first time that a spacecraft undertook the first flyby of the red planet, becoming the first-ever spacecraft to take close-up photographs of another planet.**

Crucial Mars missions-

Early 19th century-

- In one of the earliest known cases of a fascination with the planet in the late 19th century, **Italian astronomer Giovanni Schiaparelli claimed to have observed linear patterns on the surface of the planet that he called canali.**
- This was mistranslated into English as canals, leading some to believe canals were built by intelligent beings on Mars – an early instance of Mars being thought to have life, similar to Earth.
- Although that idea fell out of favour among scientists by the early 20th century, it did permeate into science fiction as well as popular culture, **helped by the fact that Mars was at a similar distance from the sun as the earth was and thus, shared certain structural characteristics.**

1964: Mariner 4-

- After an eight-month voyage to Mars, **the Mariner 4 helped humans see images showing lunar-type impact craters**, some of them touched with frost.
- **A television camera onboard took 22 pictures, covering about 1% of the planet.** These photos were transmitted to Earth in four days.
- Although originally not expected to survive much past the Mars flyby encounter, Mariner 4 lasts about three years in solar orbit, continuing long-term studies of the solar wind environment and making coordinated measurements with Mariner 5.
- The **photographs also revealed a cratered surface resembling the Moon**, although because of their limited range, they failed to cover the more geologically diverse features that we know about now.

Viking missions of the 1970s and the 1980s-

- The Viking missions in the mid-seventies **carried out the first chemical analysis of Martian soil, as well as four biology experiments to detect biological activity** .
- In the early 1980s, scientists hypothesised, based on mineralogic composition and rock texture, that certain meteorites might have a source region in Mars.
- In 1984, a study showed that the **isotopic composition of rare gases (Xenon, Krypton, Neon and Argon) matched the isotopic ratios of the Martian atmosphere** measured by the Viking spacecraft.
- This **discovery provided a way for geochemists to study Martian samples** – and provided a huge boost to our understanding of the geochemical evolution of Mars.

Odyssey, 2001 and water on Mars-

- In 2001, the **Gamma Ray Spectrometer on board the Mars Odyssey spacecraft detected a fascinating hydrogen**

signature that seemed to indicate the presence of water ice.

- But there was ambiguity – this was because hydrogen can be part of many other compounds as well.
- **NASA's Phoenix landed on the Martian North Pole in May 2008**, and survived for about 150 days.
- The **robotic arms of Phoenix scooped soil and ice from the surface**, heated the material in eight ovens, and measured the composition of the gases with a mass spectrometer.
- The Phoenix mission established conclusively that the initial discovery of hydrogen by Mars Odyssey in 2002 was indeed water ice.

Beyond the West-

- After the Cold War, which saw intense competition between the USSR and the US in terms of deepening their forays into space, other countries also launched their explorations.
- NASA has a lander (Mars Insight), a rover (Curiosity), and three orbiters (Mars Reconnaissance Orbiter, Mars Odyssey, MAVEN); **India has an orbiter (Mangalyaan-1)**; the EU has 2 orbiters (Mars Express and ExoMars Trace Gas Orbiter); and **China and UAE will have an orbiter each (Hope and Tianwen-1 respectively)**.
- **UAE became the first mission to Mars by any West Asian, Arab or Muslim-majority country.**
- The UAE mission will study the Martian atmosphere, and will seek to address the billion-dollar question of how and why Mars lost its atmosphere.
- **India's Mars Orbiter Mission (MOM)**– a technology demonstration venture – **carried five scientific payloads** (total 15 kg) collecting data on surface geology, morphology, atmospheric processes, surface temperature and atmospheric escape process.

Further reading:
<https://journalsofindia.com/isros-mars-orbiter-mission-mom/>