



Tianwen-1: China's Mars Mission

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Why In News

China will launch its first Mars Mission - Tianwen-1- in July, 2020.

- China's previous 'Yinghuo-1' Mars mission, which was supported by a Russian spacecraft, had failed after it did not leave the earth's orbit and disintegrated over the Pacific Ocean in 2012.
- The **National Aeronautics and Space Administration (NASA)** is also going to launch its own Mars mission in July, the **Perseverance** which aims to collect Martian samples.

Key Points

- **The Tianwen-1 Mission:**
 - It will lift off on a **Long March 5 rocket**, from the Wenchang launch centre.
 - It will carry **13 payloads** (seven orbiters and six rovers) that will explore the planet.
 - It is an all-in-one orbiter, lander and rover system.
 - **Orbiter:** It is a spacecraft designed to orbit a celestial body (astronomical body) without landing on its surface.
 - **Lander:** It is a strong, lightweight spacecraft structure, consisting of a base and three sides "petals" in the shape of a tetrahedron (pyramid-shaped). It is a protective "shell" that houses the rover and protects it, along with the airbags, from the forces of impact.
 - **Rover:** It is a planetary surface exploration device designed to move across the solid surface on a planet or other planetary mass celestial bodies.

- **Objectives:**
 - The mission will be the first to place a ground-penetrating radar on the Martian surface, which will be able to study local geology, as well as rock, ice, and dirt distribution.
 - It will search the martian surface for water, investigate soil characteristics, and study the atmosphere.
- **Landing on Mars:**
 - The mission is expected to land on the surface of Mars in the first quarter of 2021.
 - The success of the mission will make **China the third country** to achieve a Mars landing after the **USSR** (the former Eurasian empire) **and the United States of America.**

Mars

- **Size and Distance:**
 - It is the **fourth planet from the Sun** and the second-smallest planet in the Solar System.
 - Mars is about half the size of Earth.
- **Similarity to the Earth (Orbit and Rotation):**
 - As Mars orbits the Sun, it completes one rotation every 24.6 hours, which is very similar to one day on Earth (23.9 hours).
 - Mars' axis of rotation is tilted 25 degrees with respect to the plane of its orbit around the Sun. This is similar with Earth, which has an axial tilt of 23.4 degrees.
 - Like Earth, Mars has distinct seasons, but they last longer than seasons on Earth since Mars takes longer to orbit the Sun (because it's farther away).
 - Martian days are called **sols**—short for 'solar day'.
- **Surface:**
 - It has colors such as brown, gold and tan. The reason Mars looks reddish is due to oxidation or rusting of iron in the rocks, and dust of Mars. Hence it is also called **Red Planet.**
 - Mars has the **largest volcano in the solar system i.e. Olympus Mons.** It's three times taller than Earth's Mt. Everest with a base the size of the state of New Mexico.
- **Atmosphere:**
 - Mars has a thin atmosphere made up mostly of carbon dioxide, nitrogen and argon gases.
 - The temperature on Mars can be as high as (20 degrees Celsius) or as low as about -153 degrees Celsius. This is because the thin atmosphere gives an easy escape to sun heat.

- **Magnetosphere:**

Mars has no magnetic field till date, but areas of the Martian crust in the southern hemisphere are highly magnetized, indicating traces of a magnetic field.

- **Moons:** Mars has two small moons, **Phobos and Deimos**, that may be captured asteroids.

Previous Mars Missions

- The **Soviet Union in 1971** became the first country to carry out a Mars landing, **Mars 3**.

- The second country to reach Mars's surface is the **United State of America (USA)**.

Since 1976, it has achieved 8 successful Mars landings, the latest being the 'InSight' in 2019.

- European Space Agency has been able to place their spacecraft in Mars's orbit through the **Mars Express** Mission.

- India's **Mars Orbiter Mission (MOM)** or **Mangalyaan:**

- It was launched from the Satish Dhawan Space Centre in Andhra Pradesh by **Indian Space Research Organisation** in November 2013.

- It was launched on board a PSLV C25 rocket with aim of studying Martian surface and mineral composition as well as scan its atmosphere for methane (an indicator of life on Mars).

Source: IE