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# Mangalyaan

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**Why is in news?** Remembering Mangalyaan: How ISRO's Mars Orbiter Mission was a great leap for India

Mangalyaan was India's **first tryst with interplanetary travel** and a somewhat unlikely success — **prior to ISRO, no other space agency had successfully managed to orbit the Red Planet in its first attempt.**

While the orbiter had a planned mission duration of just six months, it stayed in touch with Earth till April 2022, when communications were finally lost, possibly due to an exhaustion of fuel resources.

## About the mission:

The Mars Orbiter Mission (MOM), also known as Mangalyaan, was a space probe launched by the Indian Space Research Organisation (ISRO).

MOM was launched on November 5, 2013, from the Satish Dhawan Space Centre in Sriharikota, India, and entered Mars orbit on September 24, 2014.

It was launched aboard **PSLV-C25**.

The Mangalyaan mission is an important milestone for ISRO, as it is the first time that India has sent a spacecraft to another planet. It has also helped to increase the country's international standing in the field of space exploration.

It was **India's first interplanetary mission** and the **country's first spacecraft to reach the planet Mars.**

The primary objective of the mission was to demonstrate India's technological capabilities in interplanetary exploration and to **study the Martian surface and atmosphere.**

The mission was a success and completed all its objectives, **making India the first Asian country to reach Mars and the first nation in the world to do so on its first attempt.**

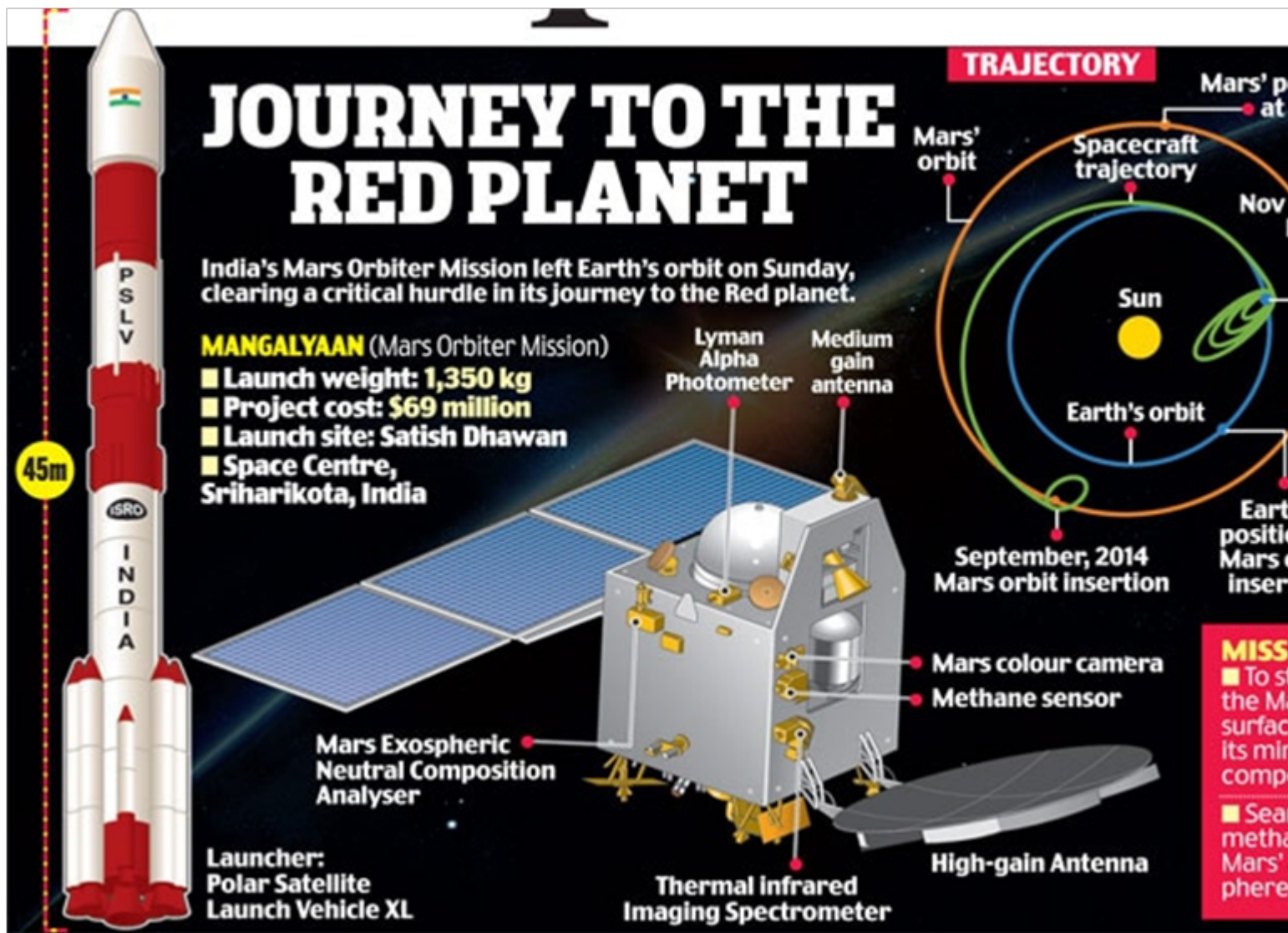
ISRO became just the fourth space agency — after the **US's NASA, Russia's ROSCOSMOS, and the European Space Agency** — to accomplish this feat.

It did so in a **record low cost of Rs 450 crore** (approx \$73 million), \$25 million less than the budget the Matt Damon starrer The Martian (2015).

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### Objective:

India's Mangalyaan mission is aimed at studying Martian atmosphere.

Its objective is to explore Martian surface features, mineralogy, morphology and atmosphere using indigenous scientific instruments.

A crucial objective of MOM was to develop technologies required in planning, designing, management and operations of an interplanetary mission.

### Importance of Mars mission for India and the world:

#### **Demonstrating India's capabilities:**

The Mangalyaan mission was the first time that India had sent a spacecraft to another planet, and its success has helped to **increase the country's international standing** in the field of space exploration.

#### **Providing valuable scientific data:**

The Mangalyaan spacecraft has been collecting data on the surface and atmosphere of Mars, as well as the surface radiation environment and the interaction between the solar wind and the Martian atmosphere.

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This data will be used to inform the design and planning of future Mars missions, including both unmanned and manned missions.

Mars experiences seasons just like Earth, so exploring Mars will help answer important questions about the development of our solar system and our place in the cosmos.

The investigations will **aid in understanding why and how Mars lost liquid water**. For humans to survive on Earth in the long run, this is a crucial question.

We might learn more about the **existence of microbial life on Mars** as a result of exploring it.

**Days on Mars last 24 hours.** The tilt that causes the seasons, as well as the rotational period and seasonal cycles, are all similar to those of Earth.

### **Promoting international cooperation:**

The Mangalyaan mission has involved collaboration between scientists and engineers from around the world and has **helped to strengthen ties between India and other countries** in the field of space exploration.

Mars is a terrestrial planet with a small atmosphere that **shares similarities with Earth's volcanoes, valleys, deserts, and polar ice caps as well as the Moon's impact craters**.

Venus is 900 degrees Fahrenheit and would melt or vaporise the majority of objects you sent to its surface due to a runaway greenhouse effect.

Due to its proximity to the Sun, Mercury is also very hot. Mars, therefore, appears perfect when compared to the nearby terrestrial planets, despite the difficulties.

### **Inspiring the public:**

The success of the Mangalyaan mission has captured the imagination of the public and has inspired people, particularly young people, to pursue careers in science, technology, engineering, and math.

### **Future Indian Mars Mission:**

ISRO came out with an '**Announcement of Opportunity**' (AO) for future Mars Orbiter Mission (MOM-2) in 2016 but 'Gaganyaan', 'Chandrayaan-3' and 'Aditya - L1' projects are in the current priority list.

Mangalyaan-2 will only be an orbiter mission and planning to launch in 2024.

### **Various Mars Missions:**

ExoMars rover (2021) (European Space Agency)

Tianwen-1: China's Mars Mission (2021)

UAE's Hope Mars Mission (UAE's first-ever interplanetary mission) (2021)

Mars 2 and Mars 3 (1971) (Soviet Union)

NASA's Perseverance Rover

Overall, the Mangalyaan mission has been an important achievement for India and the world and has contributed to our understanding of Mars and the solar system as a whole.

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