Celebrating Mariner's magic

SPACE MISSIONS It was exactly 40 years ago, on May 31, that Mariner 9 was launched. Eventually, the mission became the first spacecraft to orbit another planet when it entered the Martian orbit. Images sent back by Mariner 9 showed vast systems of canyons, over 4,000 kilometres long, now known as 'Valles Marineris', apart from lofty volcanoes and mountains, many dwarfing those on earth, writes **C Sivaram**

On May 31, 1971, just forty years ago, the spacecraft Mariner 9 was launched towards Mars. It became the first spacecraft to orbit another planet when it entered Martian orbit, about six months later in November 1971. In its one-year orbiting mission, it completely changed our understanding of Mars. Earlier, the Mariner 4 mission in 1964 had sent back about 20 images as it flew past Mars and these pictures already overturned earlier ideas of Mars.

Before this, many had pictured the dark regions as vegetation which depended on the seasonal melting of ice in the Martian polar caps and it was even supposed that canals channelled this water. The pictures taken by Mariner 4, instead showed presence of craters (like on the moon) and associated mountains and valleys with conspicuous absence of canals in particular! Far from being vegetation, the so-called dark regions were areas where reddish-hued matter had been swept aside by Martian winds, revealing the subterranean darkness!

Rugged terrain

The pictures of Mars entertained earlier by many astronomers as having lush vegetation growing in the temperate Martian summer fed by water released from the poles was all nullified and replaced by a rugged mountainous crater pocked surface. Earlier, the surface was thought to be uniform with no valley or mountains. Mariner 9 was not thus the first probe to reach Mars, but all the earlier missions were fly-by missions.

Mariner 6 and 7, in 1969 (Martian probes are usually launched in pairs at the favourable launch period so that at least one of them is successful) sent back over 200 images, mainly of the southern hemisphere, before contact was lost.

Indeed, Mariner 9 also had a twin probe Mariner 8. Mariner 8 was also planned to be an orbiter, but as the second stage of the launch rocket failed to ignite, it simply fell back into the sea (on earth!). However, Mariner 9 was fortunately successful and went into a highly eccentric final orbit with distances from Mars ranging between 16,000 kilometres and 1,600 kilometres. The orbital period was about 12 hours.

Around just the same time, Russia (then USSR) had launched Mars 3 (on May 28, 1971), but very little data was received (even if it went into orbit).

However, a Soviet pennant landed on Mars thus making it perhaps the first soft landing. Russian probes have been very successful in exploring Venus (a far more difficult target because of its hundred times denser than earth atmosphere) but have had not much success with Mars! For instance, on June 12, 1967, Venera 4 became the first spacecraft to transmit data as it descended the Venus atmosphere while Venera 7 became the first spacecraft to transmit data from the surface of Venus as it landed on December 15, 1970.

Observing from orbit

Mariner 9 provided the breakthrough in observing Mars continuously from orbit. Unfortunately, when Mariner 9 first arrived, a major dust storm was raging on Mars and the surface features were obscured. The dust gradually settled and Mariner 9 started clicking furiously (to make up for the flop of its twin Mariner 8).

Images sent back by Mariner 9, showed vast systems of canyons, over 4,000 kilometres long, now known as Valles Marineris.

Also very lofty volcanoes and mountains, many dwarfing those on earth, for ins Olumpus Mons extending 25 km above the surface it was topped by an enormous central caldera. Earlier this was just seen as a white patch!

Along the same Tharsis ridge, there are three more huge volcanoes. Several other features were revealed such as Hellas, a deep basin, south of Syrtis Major covered with white cloud, making it look very bright. Mariner 9 continued to send images till the end of October 1972. It is expected to enter the Martian atmosphere perhaps in 2022.

Mariner 9 has been followed by successful Martian missions. The Viking Landers 1 and 2 launched in 1975, soft landed on Mars in July and September 1976 respectively and were the first probes to look for signs of Martian biology. There was no positive unambiguous evidence.

There was the Russian Phobos 2 probe in 1988, the Mars Pathfinder 1996 and the Mars Global Surveyor 1996.

Rovers were deployed on the Martian surface to traverse and explore (Spirit and Opportunity, etc). The Mars Express of 2003 (first high-resolution map of the Martian moon Phobos) followed by the Mars Exploration Rovers (2003) and the Mars Reconnaissance Orbiter (2005), the Phoenix Probe (2009). There have been several flopped missions like Mars Polar Lander.

The Phobos-Grunt mission is planned by Russia for 2011, to land on Phobos. Mars will be visited by several spacecraft in the next few years, but Mariner 9, launched 40 years ago was the trailblazer!

MESSAGE FROM MARS **Images from Mariner 9 in 1972 such as this one, revealed that some of the mesas and mounds found within the chasms of the Martian Grand Canyon, the 'Valles Marineris', have layers in them. Right: The Mariner 4 mission in 1964 had sent back about 20 images as it flew past Mars.** PHOTO: NASA

Deccan Herald, Spectrum Science,Tuesday, May 31, 2011, pp.3