

To boldly go where Man is poised to go!

Exactly fifty years ago, on October 4, 1957, the Russian spacecraft Sputnik-I was launched and became the first man-made object to go into orbit around the earth with a period of just over ninety minutes. Its launch from the Baikonur Cosmodrome in central Asia heralded the dawn of the space age culminating hardly a decade later in manned voyages to the moon and interplanetary space flights across the solar system.

Jules Verne's fiction story of 'Around the World in Eighty Days' was replaced by the routine reality of around the world in eighty minutes!

Sputnik-I had instruments weighing around 184 pounds. It orbited the earth for three months reaching a maximum altitude of nearly a thousand kilometres above the earth surface and was visible to many earth observers as a faint fourth magnitude star.

A month later, in November 1957, Sputnik 2 was launched weighing more than half a ton in orbit and carrying the dog Laika as a passenger! This twin success of the Russian space programme resulted in frantic US attempts to 'catch up'.

American flop

The first American attempt on December 6, 1957 flopped as the Navy's Vanguard rocket blew up as soon as it was launched. The US army took over and launched Explorer 1, successfully in orbit on January 31, 1958 (nearly four months after Sputnik).

Weighing only a few pounds and much lighter than the massive Sputnik, Explorer 1, nevertheless made the most important satellite discovery of the Inter-

C Sivaram recounts the space odyssey that began 50 years ago with the launch of Sputnik, the first satellite to orbit earth.

national Geophysical Year (IGY). That was the existence of radiation belts of energetic charged particles orbiting the earth which were later called the Van Allen belts.

The earth's magnetic field traps high-energy particles (from the sun and cosmic sources) separating them according to their energies causing them to orbit in a number of 'belts'.

Meanwhile the Vanguard series of satellites continued to flop and it was only on March 13, 1958 that the Vanguard I, US satellite at last went into orbit. Its payload weight was tiny (just three pounds!) and was contemptuously dismissed by the then Russian PM, Nikita Khrushchev, as a 'grapefruit'. (Sputnik 3, for instance had seven thousand pound payload!).

However the 'grapefruit' turned out to have the most stable orbit, among all the early satellites launched, and is still in orbit and is expected to have a lifetime of a thousand years (its solar powered radio, operated for a long time). Its stable orbit, enabled the shape of the earth to be determined accurately indicating a pear like shape for our planet.

Of the Vanguard series only three of the eleven satellites were pushed into orbit and the project was dubbed as a hundred million dollar flop and 'goat of American rocketry' among other things.

Hardly two years after the launch of Sputnik I, on October

7, 1959, the Russian Luna 3 spacecraft took the first photographs of the moon's far side, which had so far not been seen by man. It went around the moon in a very elliptical orbit.

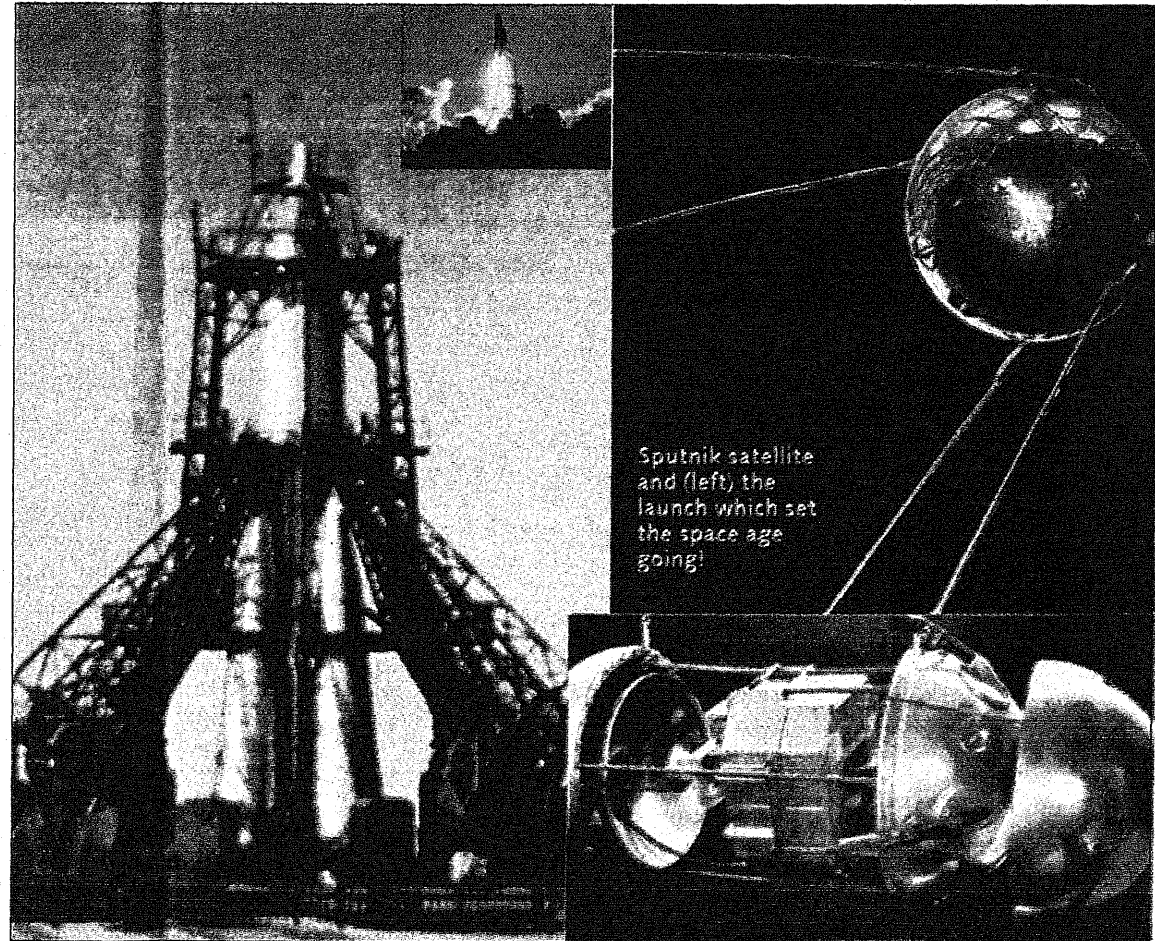
One month earlier, on September 13, 1959, the Russian craft, Luna 2, weighing 850 pounds became the first man-made object to impact on the moon.

On February 3, 1966, Luna 9, softlanded on the moon, and transmitted data for more than an hour, thus showing that the moon is not covered by a thick layer of dust, into which astronauts can sink (as was conjectured by some astronomers!). This was soon followed by the softlanding of a number of American surveyor spacecraft paving the way for a manned moon landing by Apollo 11, on July 20, 1969.

The Soviet spaceship Zond 5, launched September 15, 1968, became the first craft to fly around the moon and re-enter the earth's atmosphere, a precursor of the manned Apollo 8, US spacecraft, which on December 24, 1968 orbited the moon (100km above the surface) and returned to earth.

There were six manned flights to the moon (Apollo 11 to 17), while Apollo 13, had a mishap in April 1970, while orbiting the moon.

The last manned moon mission, that of Apollo 17, was in December 1972. The unmanned Soviet probes also brought back lunar soil to the earth, while their Lunokhod probe in 1970, became the first remote operated rover



vehicle, which traversed kilometres of lunar terrain.

In parallel with the lunar probes, spacecraft were sent to other planets. The Russian space probe Venera 3 crashed on Venus on March 1, 1966 and followed by a softlanding probe three years later, which survived the dense, torrid Venus atmosphere. Mariner 4 flew past Mars in July 1965, demolishing once and for all, the myth of the Martian canals! Mariner 10 flew past Mer-

cury in 1974.

In manned space flight, the Russians again had the first success, when Yuri Gagarin, orbited the earth once on April 12, 1961. A few months later, Gherman Titov completed 17 orbits. The first American manned orbital flight came in February 1962, when John Glenn completed three orbits.

The Russian, Tereshkova, became the first woman cosmonaut in June 1963, while Alexei

Leonov performed the first space walk in March 1965. In October 1964, the Russians had the first three seater manned spacecraft Vokshod in orbit. In July 17, 1975, there was a docking and joint mission of the Apollo and Soyuz spacecraft.

Some of the other highlights of the space age have been the Pioneer 10 and 11 missions to Jupiter and Saturn and the Voyager 1 and 2 missions to Jupiter, Saturn, Uranus and Neptune. All

these spacecraft are now leaving the solar system.

Spacecraft army

The Magellan mission, which mapped Venus, the Galileo mission which explored Jupiter and its moons, the Cassini mission to Saturn and Titan and the New Horizon spacecraft, which would reach Pluto in 2015, are other notable achievements. Hardly five centuries ago, Magellan in 1520, circumnavigated the globe in three years, we are now traversing the entire solar system in TEN years.

In addition, there have been spacecraft to rendezvous with comets like Halley, Tempel I, Wild 2, etc. and asteroid landings like Hayabusa.

The spin offs of the space age, like the innumerable communication, weather and other satellites for scientific purposes, have now littered space with several thousand pieces of debris in near earth orbit. They are also being monitored as they could pose danger.

We can only wonder what the next 50 years of space voyage would bring.

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