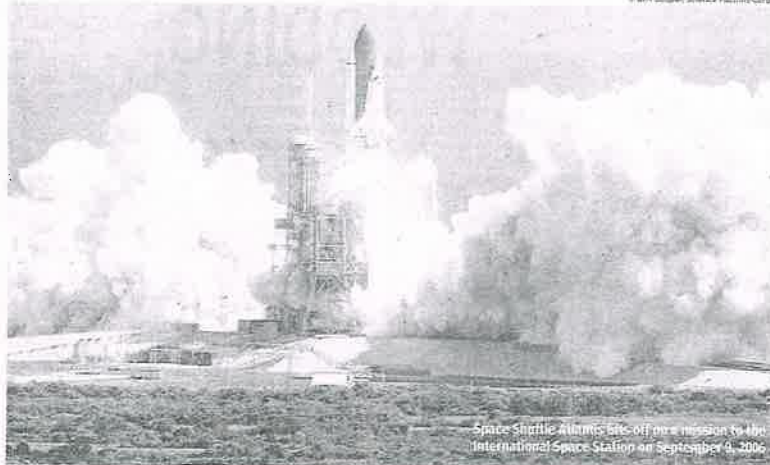


INDIA'S SPACE AUDACITY



Space Shuttle Atlantis lifts off on a mission to the International Space Station on September 9, 2006

Thrilling Odyssey

1975 | First Indian Satellite Aryabhata launched

1984 | PSLV launched. It went on to have 20 consecutively successful launches

2004 | The first operational flight of GSLV from Sriharikota

2008 | Chandrayaan1 launched from Sriharikota

on a Mars mission next year.

"We are ready for a 2013 mission," says Isro chairman K Radhakrishnan. Mars, moving in an elliptical orbit not synchronised with that of Earth, is

about 55 million km away at its nearest point, and 401 million km at the farthest point, making it a tricky planet for any orbiter or rover to reach. This means a spacecraft can't just head to Mars any time. "There are windows of opportunities to leave Earth's orbit if we have to reach Mars," explains Radhakrishnan. These open every 26 months, the first one is in late 2013, then 2016 and 2018." Isro says it can't wait till 2016. If the journey to Moon takes less than a week, the one to Mars takes 300 days. The mission would cost around Rs 450 crore, equal to a big satellite launch.

So, why should we send an orbiter around Mars when several rovers have landed on Martian soil? But weren't we once asked why India was

sending a lunar orbiter 40 years after Neil Armstrong and Edwin Buzz Aldrin set foot on Moon? Finally it was Chandrayaan1 which found the first traces of water—something repeated Moon missions could not.

While the Mars orbiter seeks habitable terrain on the red planet hopefully by the end of next year, Isro and Russian agency Roskosmos must be peering at details collected from the lunar surface by Chandrayaan2, scheduled to be launched the same year. Unlike Chandrayaan1, which had an orbiter and an impactor which plunged onto the lunar surface, Chandrayaan2 will have an orbiter, a lander and a rover. It will look for, among other things, ice in the shadow region of Moon.

And then there is the manned mission to space which India considers a matter of pride. No deadline has been set for this ambitious journey, but Isro is working hard on its GSLV-MI11.

Harlan E Spence, director of the Institute for the Study of Earth, Oceans, and Space says India is on the right track. "Space age is far from over. There is still much excitement in exploration and India has to do it," says Spence, who heads a Nasa programme on radiation in space. "It's only human nature to explore. We need to go farther, do more."

Mikhail Ya Marov, one of the Russian scientists who helped India launch its first satellite 'Aryabhata' in 1975, says, "India has shuttle capability, but you have to work on developing reusable shuttles. They hold the promise of future explorations."

Space scientists are looking at this side of the globe also because of the Long March plans of China, which became the third country to put its man in orbit on a rocket of its own in 2003. China is planning an unmanned mission to Moon in 2017 and a manned mission by 2025. The Economist in its "The end of space age" issue did not forget to recollect — though as an "unlikely antagonistic gesture" — sci-fi writer Bruce Sterling's observation that in the coming decades, a group of Chinese (or Indian) astronauts on Moon would carefully fold away the American flag planted by Armstrong and Aldrin, and put their own flag there.

This idea is shared by many. Jean Pierre Bibring, lead scientist of European Space Agency's Rosetta Lander mission, says both countries appear to have clarity unlike the US. "They may well be reviving the Apollo mission and that is good news." So, will it be a repeat of the 1960s and the 1970s space race? Unlikely, as the international community has realised the need for symbiotic collaboration than mindless competition. "There's a lot to achieve together," says Radhakrishnan. "Each country will have its own missions and India will be in the forefront."

After arguing against outer space exploration through two lengthy articles, The Economist asked its readers online to vote: So, is this the end of space age? While going to print, when 3,658 readers had voted, the results showed this: Yes: 26%. No: 74%.

'We too can carry astronauts to space'

He's busy lining up a series of satellite launches and pressing for government sanction for the prestigious Mars mission late next year. Indian Space Research Organization chairman K Radhakrishnan tells Arun Ram that India has the capability to put two astronauts in an orbit 300-400km above Earth for a week

Are you re-inventing the wheel? No, we are leapfrogging. Newer missions may find newer things. Also, newcomers have an advantage as they draw from the experience of others. Space missions also instil in the next generation a sense of exploration and an ambition to learn science which is inevitable for human development. Look at the interest the Chandrayaan1 mission has generated among school children.

But superpowers are cutting down their space programmes

Each country will have different priorities. But the spirit of science is always exploration. The space age started in the late 1950s with a sense of pride and competition.

India, which launched its first satellite 'Aryabhata' in 1975 has remained rooted to societal applications even while taking up exploration programmes.

But isn't uncertainty at the core of explorations?

Yes. Any research has an element of uncertainty. One has to be ready for failure. We didn't go to Moon (referring to Chandrayaan1) to fetch water, but we found it. That's the beauty of research. Besides the obvious results of satellite launches, there are several silent social applications of space programmes. More than 40 years ago, several people used to be killed in cyclones and natural disasters. If you don't hear such large-scale casualties today, it's because we have satellite warning systems in place.

Why is it so important to put man in space when machines have been doing the job there? Hundreds of satellites and orbiters do a good job, but only humans have the cognitive ability. Space robotics and habitation are two arms of space flights. We need them both.

So when is India sending a human to space?

We don't have a deadline yet. We did a detailed study in 2006 and found we have the capability to develop systems to put two astronauts in an orbit 300-400km above Earth for seven days. Our GSLV-MI11 (in the making) is a potential candidate to carry our astronauts to space. Our scientists are working on everything from crew module, life support and co-escape system to flight suits and space food.



Even as the US cuts down on interstellar explorations, our country is forging ahead with big plans. With the cabinet clearing the Mars mission, we will now boldly go where not many have gone before

Arun Ram | TNN

When Nasa retired its space shuttle Atlantis last July, The Economist ran a cover story titled "The end of space age." Outer space explorations are over, it said, virtually questioning the wisdom of those still having interstellar dreams. A year later, India is raring to go beyond the blueprints of an orbiter around Mars, a rover landing on Moon and a manned space mission. Some call it audacity, Indian space scientists say it's their calling. On Friday, the Union cabinet cleared the Mars mission which is expected to lift off from the Sriharikota spaceport sometime in November 2013.

One can't fault the sceptics, for they have been spoon-fed on the belief that outer space belonged to the Americans after the collapse of the Soviet Union. Today, as Russia stands on the remnants of its glorious past, irony plays out in the Americans taking the Russian Soyuz craft to reach the International Space Station.

While the Obama administration is cutting costs on its space missions, and private entrepreneurs like Elon Musk in the US and Richard Branson in the UK plan space vacations for the rich, India appears to be on the right path along with China. And the Indian Space Research Organization (Isro) is revving up with confidence, as is evident from its eagerness to go