

"India needs urgent and radical reforms in its space sector."

When you think of outer space, you think of big powers like the United States, Russia and China. You might also note the collective European effort under the European Space agency as well as the impressive national space programmes of India and Japan. Space programmes have for long been viewed as either strategic or symbols of national prestige for big countries that are prepared to invest significant resources in the pursuit of a credible presence in outer space.

Two small countries, the United Arab Emirates in the Gulf and the Grand Duchy of Luxembourg in Europe have begun to demonstrate that the outer space need not be the playing ground for big powers alone. If you are a sceptic, you might think it is pretentious for the UAE with its native population of barely one million and Luxembourg with 600,000 people to think of a place for themselves in space.

But that is not stopping the two from thinking boldly about their possibilities in space. The interesting path these two countries have set for themselves in outer space is a reminder that Delhi needs to adapt to the rapidly changing dynamic in outer space. That size is not a constraint is reflected in the UAE's plan to launch its Mars mission, "Hope", later this year in partnership with a range of organisations across the world — including three universities in the US. Japan is scheduled to launch the UAE Mars probe this year. India's own ISRO is also working with the UAE on its Mars mission. Last year, the first Emirati Astronaut, Hazza al-Mansouri spent more than a week in the US-Russian space station.

While spectacular projects like sending an astronaut into space or launching a Mars probe generate much flag-waving at home and turn heads in the region and beyond, there is something else at the heart of the UAE's space strategy. It is about cornering a slice of the rapidly growing commercial space industry — part of a major effort to diversify the



UAE economy away from its reliance on hydrocarbons.

Luxembourg has a similar strategy. It too entered the space sector only in the middle of the last decade. It is also driven by the need for economic diversification. Over the years, Luxembourg moved away from its past reliance on the steel industry to become a centre of European banking and finance. It is now looking at commercial space as a major opportunity. Luxembourg has taken a number of regulatory steps to create a vibrant ecosystem for space companies ranging from satellite operations to future extraction of resources from asteroids and other space objects. At the moment, the space sector accounts for nearly 2 per cent of Luxembourg's GDP. There are more than 50 companies and two public research organisations that are driving the expansion of space sector in Luxembourg.

UAE and Luxembourg do have a reputation for leveraging new ideas to transcend the limitations of their size in the world. But their space adventure was not possible without the structural changes that are reshaping the global space activity.

Through the second half of the 20th century, outer space was the sole preserve of national space programmes driven by government-funding, direction and management. As military uses of space and prestige projects like Moon-landing emerged, major private sector entities already in the aviation industry like Boeing and Lockheed won space contracts in the US. But the Pentagon and the National Aeronautics and Space Administration (NASA) told these companies what to do.

The last decades of the 20th century saw significant expansion of satellite-based telecommunication, navigation, broadcasting and mapping, and lent a significant commercial dimension to the space sector. As the digital revolution in the 21st century transformed the world economy, the commercial space sector has begun to grow in leaps and bounds. The global space business is now estimated to be around \$ 400 billion and is expected easily rise to at least trillion dollars by 2040.

One example of the rise of private sector companies in the space sector is SpaceX run by the US entrepreneur Elon Musk. Hired for a resupply mission for the space station, it now launches more rockets every year than NASA. The entry of private sector has begun to drive down the cost-per-launch through innovations such as reusable rockets.

As launch costs came down, the private sector has become more ambitious. SpaceX plans to launch hundreds of satellites into the low-earth orbit to provide internet services. Amazon has plans to build a network of more than 3,000 satellites in the low-earth orbit. Musk and Amazon's Jeff Bezos have plans to develop space tourism and build human settlements on the Moon and on Mars. It is not just big companies that are aiming for the Moon. Last year, a private company in Israel sent a lunar lander to the Moon. Although the lander crashed, much like India's Vikram, the private sector has begun to do things that were once the monopoly of national agencies.

India, however, is quite some distance away from adapting to the unfolding changes in the global space business. In its early years, India's space programme that was constrained by lack of resources found innovative ways of getting ahead in space. Although the ISRO encourages private sector participation in the national space programme, its model is still very 20th century — in terms of governmental domination.

As it looks at the growing role of the private sector and the effort by nations like the UAE and Luxembourg, Delhi needs to move quickly towards a new model for India's space activity. It needs a regulatory environment that encourages a more dynamic role for the private sector and promotes innovation. It will be a pity if India squanders the many advantages of its early start in space by delaying the much-needed reform and reorganisation of its space sector.

Expected Questions (Prelims Exams)

Q. Which of the following statements is / are correct?

1. Satellites providing Internet services are placed in the 'Low Earth Orbit'.
2. Mars Mission 'Hope' is a proposed programme of UAE.
3. Indian Space Research Organization will launch 8 Earth Observation Satellites in 2020-21.

Code:

- (a) Only 1 (b) 1 and 2
(c) Only 2 (d) 1 and 3

Note: Answer of Prelims Expected Question given on 02 March., is 1 (c)

Expected Questions (Mains Exams)

"The entry of new powers into the space sector globally can be both a challenge and an example for India." Analyze this statement. (250 words)

Note: - The question of the main examination given for practice is designed keeping in mind the upcoming UPSC main examination. Therefore, to get an answer to this question, you can take the help of this source as well as other sources related to this topic.

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