

Getting in on the private sector space race

Elon Musk knows how to sell a story. Somewhere in space, the SpaceX founder's car is headed for the asteroid belt with a mannequin strapped into the driver's seat and "Don't Panic"—a nod to Douglas Adams' absurdist science fiction—flashing on the dashboard. It's just the right amount of silly, impish and hubristic to capture the imagination. And so it did, with good reason. There is real meat to the story Musk's stunt is selling. The Falcon Heavy launch by SpaceX that put the car on its trajectory confirms what has been increasingly apparent this decade: The private sector is leading a new space race.

The Heavy took off from the LC-39A launchpad at the National Aeronautic and Space Administration's (Nasa's) Kennedy Space Center. It's the same pad used to launch the Apollo 11 mission that put men on the moon. The symbolism is a bit too on the nose, but apt for all that. The Heavy is the most powerful rocket currently in operation. And SpaceX's cost-saving reusability approach—two of the Heavy's three rocket cores touched down safely—means that it can launch payloads of up to 64 tonnes at the relatively low price of \$90 million. In the not-too-distant past, it would have been difficult to conceive of a commercial enterprise leading the pack.

Private sector companies have operated in the space sector since the 1980s. This is not confined to the US. A healthy ecosystem has sprung up around Isro (the Indian Space Research Organisation), for instance, if more constrained than it is in the US due to strategic and regulatory issues, [as Rudraneil Sengupta has written](#) in *Mint*. But there is a substantial difference between older business models and what Musk and his fellow space entrepreneurs have been attempting for a decade or so. Contracting with national space agencies to build satellites and subsystems is one thing. Independent, vertically integrated operations without intellectual property licensed from national agencies or guaranteed purchases from them is another entirely.

The difference shows in their targets. The Heavy is capable of putting heavy national security satellites into low earth orbit (LEO), but that isn't Musk's long-term goal. He is aiming at manned space light and Mars colonization. Amazon founder Jeff Bezos' Blue Origin and Virgin Group founder Richard Branson's Virgin Galactic, meanwhile, are more oriented towards space tourism. There are, unavoidably, stretch targets and a degree of hype involved. And there will be dangerous setbacks like the Virgin Atlantic SpaceShip Two test flight crash in 2014 that left one pilot dead and another injured. But the logic is solid. As Bezos has put it, "If we can make access to space low-cost, then entrepreneurs will be unleashed.... You will see the same thing in space that I've witnessed on the internet in the last 20 years."

That entrepreneurial energy is starting to coalesce. Start-ups like Moon Express and Bengaluru-based TeamIndus are aiming to compete in Google's \$20 million Lunar XPrize competition and put landers on the moon. There is a scramble to get around the limitations of terrestrial networks for broadband connectivity—particularly in rural areas—by putting massive constellations of small communications satellites in LEO to deliver broadband over large geographic areas. SpaceX, the OneWeb consortium backed by Branson, Sunil Bharti Mittal and SoftBank, among others, Boeing and Samsung are all in the race. And asteroid mining is on the horizon. A 2017 Goldman Sachs report has pointed out its potential for monetization and disrupting commodity markets; venture firms and angel investors are starting to look at start-ups here.

But much of this will depend on the sorting out of regulatory issues. Space activity is still governed by the 1967 Outer Space Treaty. It bars state actors from militarizing or claiming celestial bodies and calls upon states to regulate all private sector activity originating within their borders. Countries like the US and India haven't quite come to grips with the problem yet. The US has a patchwork of regulatory bodies but no real point agency. The regulatory tangle in India is worse. It

lacks a nodal body—an independent body that creates a level playing field for government and private enterprises would be best—and any law regulating private sector activity in space.

There are signs that the Narendra Modi government is paying attention. In November last year, the department of space had put a draft of the [Space Activities 2017 Bill](#) online for public comments. [But as Narayan Prasad had pointed out](#) on *The Wire*, the Bill has a one-size-fits-all approach that fails to take the substantially different requirements of various space-related activities on board. This is not a recipe for ease of doing business.

The first at the table in any area of international cooperation and regulation will set the agenda. Take Luxembourg, which is attempting to turn itself into an asteroid mining hub with a law passed last year establishing the necessary legal frameworks. India has the public and private sector potential to exploit first-mover advantage—if it addresses the private sector space race with more urgency.

Is private-sector-manned spaceflight viable? Tell us at views@livemint.com

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