



## The uncharted territory of outer space

### Context:

- Today, outer space no longer captures our mind space in the way cyberspace does.

### Did COVID-19 impact the planned Space activities?

Several space events planned well in advance proceeded even amidst the COVID-19 pandemic, some of which are:

1. The launch of missions to Mars by China and the U.S. and UAE's Mars orbiter mission
2. The first astronaut trip to orbit on a commercial enterprise built by Space X
3. The completion of the Chinese 'BeiDou' satellite navigation system
4. The U.S. Space Command
5. Russia conducted a "non-destructive test of a space-based anti-satellite weapon"



### Evolution of space industry over the years:

- The price tag for reaching low Earth orbit has declined by a factor of 20 in a decade. NASA's space shuttle cost about \$54,500 per kg; now, SpaceX's Falcon 9 advertises a cost of \$2,720 per kg.
- According to a Bank of America Report, the \$350 billion space market today will touch \$2.7 trillion by 2050. In a decade, 80,000 such satellites could be in space compared to less than 3,000 at present.
- **Increased Participation by Private Players leading to fast paced innovation:** Starlink, the constellation being constructed by SpaceX to provide global Internet access, plans more than 10,000 mass-produced small satellites in low Earth orbit.

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- Amazon's Project Kuiper received U.S. Federal Communications Commission approvals for more than 3,000 micro-satellites.
- These missions hope to transcend the digital divide and provide everyone, everywhere access to services such as distance education and telemedicine.
- Companies such as Planet, Spire Global and Iceye are using orbital vantage points to collect and analyse data to deliver fresh insights in weather forecasting, global logistics, crop harvesting and disaster response.

### What are the challenges to fulfilling the potential of space?

- **Multilateral framework for Space governance is becoming outdated for present context:** The Outer Space Treaty of 1967 enshrines the idea that space should be "the province of all mankind" and "not subject to national appropriation by claims of sovereignty".
- The Rescue Agreement, Space Liability Convention, and the Space Registration Convention expanded provisions of the Outer Space Treaty.

### Gaps in the Space laws include:

- The Moon Treaty of 1979 was not ratified by major space-faring nations.
- Space law does not have a dispute settlement mechanism.
- Space law is silent on collisions and debris
- They offer insufficient guidance on interference with others' space assets.
- **The legal framework of Space laws is state-centric, placing responsibility on states alone:** However, non-state entities are now in the fray for commercial space exploration and utilisation.
- Some states like US are providing frameworks for resource recovery through private enterprises based on the notion that this is not expressly forbidden for non-state actors.
- Some scholars and governments view this as skirting the principle of national non-appropriation, violating the spirit if not the letter of the existing space law.
- **The lack of alignment of domestic and international normative frameworks** risks a damaging free-for-all competition for celestial resources involving actors outside the space framework.

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- **Space Arms race and Growing Militarisation:** States are investing in military space systems for communications, navigation, and reconnaissance purposes, so as to ensure operability of a range of capabilities.
- Reliance of militaries on satellite systems means that space assets become potential targets. So investment in technologies that can disrupt or destroy space-based capabilities is under way.
- The space arms race is difficult to curb, especially since almost all space technologies have military applications.

### Way Ahead:

- Space legislation is needed for enabling coherence across technical, legal, commercial, diplomatic and defence goals.
- India's space vision also needs to address global governance, regulatory and arms control issues.